Documentation of the Training Course

„Sustainable Management of Wetlands and Shallow Lakes“

Bodman-Ludwigshafen
Lake Constance, Germany

June 4th – 9th, 2002

With the contribution of the LIFE financial instrument of the European Community

Content

Edited by Andrew Blackwell and Udo Gattenlöhner

1. Introduction

In early June 2002, over 20 wetland managers and stakeholders from all over the EU as well as a few from further overseas, gathered in Bodman-Ludwigshafen, a small town on the western shore of Lake Constance to take part in a training course organised by the Lake Constance Foundation together with the Global Nature Fund and part-funded by EU LIFE III.

The training course was geared towards managers and decision makers in wetland areas. The major focus of the course was on presentations and excursions covering issues of management and rehabilitation of lakes and wetlands, small technical treatment plants, sustainable tourism and promotion of organic agriculture in wetland areas. Amongst the speakers were Dr. Salathé, the regional RAMSAR convention coordinator for Europe, Dr. Schröder from the Institute for Lake Research in Langenargen and Mr. Jacoby, expert for management of protected areas, Lake Constance Foundation.

Fieldtrips included visits to an organic farm and a farmers market for regional produce, to an Eco-Camping site and to a biological waste water treatment plant as well as to the restored Upper Swabian small lakes and the Wollmatinger Ried, a protected wetland area at Lake Constance.

People interested in further details of the entire EU LIFE funded project "Living Lakes: Sustainable management of wetlands and shallow lakes" are welcome to check out our project website www.livingwetlands.org.

The broad aim of the entire project "Living Lakes: Sustainable management of wetlands and shallow lakes" is to develop and implement management plans for La Nava/ Boada Lakes in Spain and for lakes and lagoons of the Nestos wetlands in Greece, with the intensive involvement of local communities. One of the major tasks of the project is the dissemination of know-how to interested parties primarily at European level. The Lake Constance training course was one of four courses which will take place in this context.

Photo of all Training Course participants on an excursion to look at extensive agriculture

The next Training Course is scheduled for October 2002 in the Norfolk and Suffolk Broads, UK and focuses more on the technical side of wetland management. More information on this Training Course can be obtained from the website www.broads-authority.gov.uk or from the living wetlands website mentioned earlier, or e-mail wetlandtrainingcourse@broads-authority.gov.uk.

The Broads Training Course covered the hydrological functioning of wetlands, water quality issues, managing and restoring fens and marshes, and working with local communities and visitors. Half of each day included visits to fens and marshes grazed by livestock, broads undergoing restoration, sewage treatment works and a restaurant providing local produce. Participants experienced sustainable means of enjoying the Broads by cycling and canoeing.

This brochure will offer some useful background information regarding the experience and knowledge available in the Lake Constance region and will serve as a starting point for similar projects elsewhere in Europe. Wherever possible contact details have been supplied for internet, e-mail and telephone contact with the presentators as well as the participants of the Training Course. This can be found at the end of this document.

Vital Facts: Lake Constance

Origin: ice age: glacial river erosion
Age 16,000 years
Surface: today: 540 sq. km 14,000 years ago over 1,000 sq. km
Length, width (Upper lake): 63 km x 14 km
Volume: 50 billion cubic m
Maximum depth: 252 m
Lake sedimentation: 0.10 m to 150 m
Catchment area: 12,000 sq. km
In-flow: 236 creeks and rivers
Largest in-flow: Alpine Rhine (70 %)
Outlet: 1 (Rhine)
Salinity: fresh water
Precipitation per year: 800 mm (west side), 1,400 mm (east-side)
Mean temperature: 8.6°C
Lake Constance area*): 4,367 sq. km
Vegetation: Cultural landscape, 25 % woods
Higher plants: > 2,000 species
Fish: 39 species
Nesting birds: 151 species
Waterfowl max.: 274,000 (1988)
Inhabitants in the lake area: 1.3 million: 275 sq. km
Registered watercrafts: 55,907 (31.12.98)
Lake water: drunk by 4.5 million people
Biggest problem: population growth
Greatest success: reduction of phosphate loading

2. Presentations

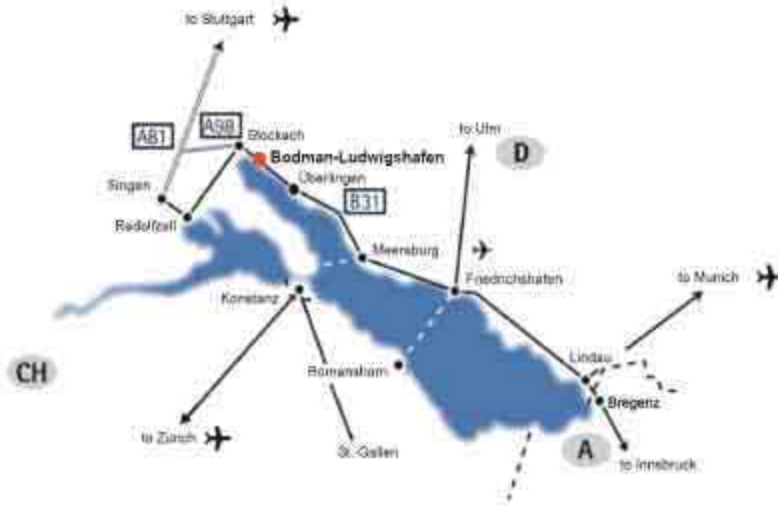
2.1. Welcome speech of the Mayor of Bodman-Ludwigshafen

Website: http://www.bodman-ludwigshafen.de/

Ladies and Gentlemen, let me welcome you to Bodman-Ludwigshafen, at Lake Constance. I am proud that you have chosen our community. Bodman-Ludwigshafen is a small community with 4.000 citizens and a few smaller enterprises. The most important income sources are apple -growing and tourism. We have 100.000 overnight stays per year.

Besides the beautiful environment, we live in a region with a lot of culture, with many churches and castles. Bodman is one of the oldest communities around Lake Constance. In the middle-ages it was a place where the King stayed at the home of the Earl of Bodman on his journey through his kingdom. Ludwigshafen, the other part of Bodman-Ludwigshafen, was an important market also because of its harbour during the 19th century, but through the automobiles and vehicles its function as a market place has been progressively lost. We are currently sitting in the former custom-house, which has been the council house for the past 12 years.

Together with the Global Nature Fund and their project Living Lakes you are here to discuss your experience about water, lakes and their surroundings and so continue your study. Germany is a federation of different counties. We are here in Baden-Württemberg. The largest Lake in Germany is Lake Constance. It is 63 kilometres long and its widest point it is 13 kilometres wide Its greatest depth is about 331 meters. At Lake Constance there are 14 water-supply-plants which deliver water to more than 5 million people.



The overall plan for the region is decided on by the county Baden-Württemberg. Out of this plan every community creates its own plans, which are more detailed. Plans of housing, factories and the environment. There are laws in Germany which take care of environmental development. For each meadow destroyed by a house, street or something else you have to do something good to the surrounding environment. This can be to renature a brook or anything else. That is important for us, because we are a region which depends on tourism. And our visitors want to see nature and the environment.

I wish you a great training course here at Lake Constance.

2.2. The current situation of wetlands and shallow lakes in Europe (RAMSAR)

Tobias Salathé, Ramsar Convention, Regional Coordinator for Europe (www.ramsar.org)

The Current Situation of
Wetlands and Shallow Lakes in Europe

An overview of current issues, focusing on:

« Wetlands: water, life and culture »

www.ramsar.org

A Special International Agreement for Wetlands

- **The oldest of the global MEA: 31 years, signed on 2 February 1971 - now World Wetlands Day**
- **The only global one devoted to a specific ecosystem**
- **Addressing wetland wise use in the context of integrated territorial and water resource planning and management**
- **Recognition of the vital role in terms of services, values and functions that wetlands perform for people**

Convention on Wetlands

(Ramsar, Iran, 1971)

The Convention's mission is the conservation and wise use of all wetlands through local, regional and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world.

Ramsar's Existing Toolkit

1 **Wise Use**	**Site management**	**International cooperation**
2 National wetland policy	*7* Ramsar site selection	*9* Shared waters Shared species Partnerships Sharing knowledge Development assistance Business sector
3 Law & institutions	*8* Management plans Monitoring Ecological change Risk assessment	
4 River basins		
5 Local people		
6 Education & public awareness		

Challenges for the Future

- Climate change and its predicted impacts (drought, storms, flooding, sea level rise, thawing of permafrost…)
- Globalization of trade, e.g. fisheries and other resources
- Increasing privatisation of services, devolution of decision-making responsibilities, greater empowerment of local communities
- Increasing land-use pressures leading to continuing wetland loss and damage
- Need to ensure continuing political support and public interest in biodiversity issues

8th Conference of the Parties

18-26 November 2002 – Valencia - Spain

Preparing Responses to the New Challenges

Wise Use of Wetlands 1

Resolutions for COP8

A Framework for Wetland Inventory

Wetland Ecosystem Assessment

Incentive Measures to achieve wise use

Integrated Coastal Zone Management

Dams: recommendations of the WCD

Climate change and wetlands: impacts, adaptation and mitigation

Wise Use of Wetlands 2

Resolutions for COP8

Water Allocation and Management: maintaining ecological functions of wetlands

Wetland Restoration

Alien Invasive Species: how to deal with them

Cultural Aspects of Wetlands

Peatlands: global action plan

Wetlands of International Importance and other Wetland Sites

Resolutions for COP8

- Environmental Impact Assessment guidelines
- Reporting change in ecological character
- Designating under-represented wetland types (Strategic Framework for the Ramsar List)
- The Ramsar Sites Database
- Management planning for wetlands
- San José Record of well-managed wetlands
- Review of Ramsar Site boundaries

Implementation of the Strategic Plan

Themes

- Wetland inventory and assessment
- Policies and legislation, impact assessment, valuation
- Restoration and rehabilitation
- Invasive alien species
- Local communities, private sector, incentives
- CEPA, Training
- Designation of RS, management, monitoring
- Management of shared water resources, sites, species
- Collaboration, sharing of expertise and information
- Financing, institutional capacity of CPs

Management and Rehabilitation

- Integrating wetland site management within broad-scale environmental planning (water resource, river catchment, groundwater…)
- Functions of management planning: resolve conflicts, define requirements, maintain continuity, enable communication,…
- Participatory process: consultation with and participation by stakeholders and local communities
- Management units, zonation and buffer zones
- Evaluation and monitoring, including socio-economic constraints, taking remedial actions

www.ramsar.org

2.3. Lake Constance: Role of the International Commission for the Protection of Lake Constance (H. Gerd Schröder)

Institute for Lake Research (ISF) (www.lfu.baden-wuerttemberg.de/isf/)

„The boundaries between countries result from historical events, and, therefore, they do not coincide with the boundaries of the watersheds. As a consequence, several lakes and rivers mark the boundaries between countries or cross them. To effectively manage these water resources and protect them against pollution, the governments of the countries concerned must agree upon common rules and actions concerning this problem." (RAVERA et al,1980)

Physical and limnological data

Lake Constance is the second largest prealpine European lake by area and volume after Lake Geneva. The lake basin is situated in the Molasse basin of the northern Alpine foreland and was mainly formed by water and ice activity during the last Quaternary glaciation period more than 15.000 years before present.

The catchment area of Lake Constance is about 11.000 km² (= 20times the lake surface) and covers the territories of the three European countries Germany (28%), Switzerland with Liechtenstein (48 %) and Austria (24%).

Lake Constance is traditionally divided into Lower Lake Constance and Upper Lake Constance. More than 90% of the water flow originates from the Alps by the three inflows Alpenrhein, Bregenzerach and Dornbirnerach in the eastern part of the Upper Lake.

Morphometric data of Lake Constance (47°39'N, 9° 18'E) and its catchment area:

	Upper lake	**Lower lake**	**total**
Altitude a.s.l (m) at middle water level	395.33	395.11	--
Surface area of water (km²)	472.3	62.4	571.5
Volume ($10^9 m^3$)	47.637	0.810	48.49
Maximum depth (m)	253.3	40	--
Mean depth (m)	101	13	85
Mean range of annual water level fluctuation (m)	1.50	1.48	--
Length of shoreline (km)	186	87	273
Mean outflow ($10^9 m^3$/yr)	11.1	11.7	11.7
Residence time (yr.)	4.3	(0.07)	--
Catchment areas (km²)	10919	568	11487

Lake Constance is oriented from Northwest to Southeast and the water body is strongly influenced by wind-activity. It is a phosphorus-low, mesotrophic hard water lake with calcite precipitation due to biogenically induced increase of the pH. Electrical conductivity of the water typically ranges between 260 and 300 µS/cm².

The minimum and maximum concentrations of main chemical water constituents in Lake Constance are:

	mg/l	mol/l
Ca^{2+}	36.1 - 56.1	0.9 - 1.4 x 10^{-3}
Mg^{2+}	4.9 - 9.0	0.2 - 0.37 x 10^{-3}
Na^{b}	3.4 - 4.6	0.15 - 0.2 x 10^{-3}
K^{-}	1.0 - 1.3	0.26 - 0.33 x 10^{-4}
Sr^{2+}	0.39 - 0.48	4.4 - 5.4 x 10^{-6}
HCO_3^{-}	142.2 - 155.6	1.68 - 2.55 x 10^{-3}
SO_4^{2-}	31.0 - 35.5	0.32 - 0.36 x 10^{-3}
CL^{-}	4.8 - 5.9	0.13 - 0.16 x 10^{-3}
NO_3^{-}	3.4 - 4.8	0.5 - 0.7 x 10^{-4}

The phytoplankton succession indicates a spring bloom followed by the clear water phase with very low phytoplankton concentrations due to zooplankton grazing, and a variable summer. In total, diatoms contributed up to 90% of the phytoplankton bio volume in spring and approximately 5 % during the clear water phase. Phytoplankton and bacteria, the crustaceans are the most important contributors of biomass in Lake Constance. In Winter, copepods dominate the zooplankton biomass and in spring and summer cladocerans represent the ruling phytoplankton consumers. Besides the crustaceans, protozoa and rotifers are distinct but less important participants of the zooplankton community. About 30 species of fish contribute to the fauna of Lake Constance. The dominant species are whitefish and perch. During summer, zooplankton is the main food source for most fish in Lake Constance even for those species which normally consume other food.

Human impact and Eutrophication

6.500 years ago the first lake settlements built on stilts in the lake were built on the shorelines of Lake Constance. Continuous settlement started about 4.000 years ago during the Bronze Age and about 2.000 years before present the Romans built military bases and harbours around the lake.

Alemannic tribes conquered the region some hundred years later and during the Medieval Period most of the modern cities and villages were founded. During the twentieth century the population density significantly increased from 50 to 120 inhabitants per km² on average. Nowadays the region of Lake Constance serves as environment and place of work for more than 1.2 million inhabitants. Local industries (engines, aircraft- and spacecraft equipment) and agriculture (hop, apple trees, vineyards) together with the inhabitants discharge sewage water equivalent to 3.2 million people.

Fishery has a long lasting tradition in Lake Constance starting with the first human settlements about 6,000 years BP. Today, about 170 professional fishermen and more than 10.000 anglers annually catch more than 1,000 metric tons of fish from the lake. Furthermore the lake is a major tourist attraction for more than 2 million visitors per year and is used by some 55,000 boats mainly for leisure activities. Last but not least Lake Constance is one of the most important drinking water reservoirs in Central Europe for more than 4 million people.

There was a long tradition of limnological investigations of Lake Constance, that began with first observations of phytoplankton at the end of the last century. Regularly, the lake was studied since 1919 by two Institutes in Langenargen and Constance. At this time Upper Lake

Constance was considered as a typical oligotrophic lake. Therefore a fertilisation with liquid manure was suggested to increase the production of fish.

Only one and a half centuries later a fertilisation of the lake due to pollutants from the inhabitants and their industries around the lake, became obvious. During the 1930s changes in phytoplankton composition and oxygen budget were observed. In the 1950s the phytoplankton biomass strongly increased, some algal species disappeared and new ones appeared. Algal blooms combined with increasing zooplankton and fish populations characterised the new process of eutrophication. The contents of Orthophosphate in water rose from 2-3 mg/m³ in 1950 to 9 mg/m³ in 1959. Although this development seems neglectable compared to later phosphorus concentrations clear-sighted scientists and politicians apprehended a severe danger for the health of the lake. It was clear that this danger could only be banished with the co-operation of all countries around the lake.

International Commission for the Protection of Lake Constance (IGKB)

On behalf of the international law, Lake Constance is a curiosity. Clearly defined national frontiers between Switzerland and Germany exist in the Lower lake. In the Upper lake only the shallow water area from the shoreline to 25 m water depth is national territory of the bordering countries. The major part of Upper Lake Constance is considered as common property, a so-called „condominium“. This fact plays an important role for co-operation in the protection of the lake.

In order to preserve the lake ecosystem from further degradation the International Commission for the Protection of Lake Constance (IGKB) was founded in 1959 by the three bordering countries Austria (Vorarlberg), Germany (Bavaria and Baden-Württemberg) and Switzerland (St. Gallen and Thurgau).

The main duties of the IGKB are:

- Observation of the lake
- Confirmation of the causes of its pollution
- Recommendation for co-ordinated preventive measures
- Discussion of the planned utilisation of the lake

The commission has a chairman and is composed of delegates from member governments and a limited number of high officers of those governments. The chairmanship changes after 2 years. As a rule the commissions meet at least once a year and the deputies determine measures by the principle of unanimity. As consultant agency the commission cannot decide on rules and actions connected with environmental protection but by agreement the regional governments are obliged to transform the recommendations of the IGKB into national law.

A technical and scientific board of experts serves as official consultant to the commission. The experts study the scientific and technical problems proposed by the commission and examine the research carried out by other organisations. They elaborate on the research program and prepare reports on the research sanctioned by the commission. The board of experts has 3 working groups for studying special problems concerning the topics „Lake“, „Catchment Area“ and „Accident defence“. The working results are summarised and published in so called green reports (annual investigation data of the lake monitoring) and blue reports (case studies and special topics).

Fortunately in the early 1960s phosphorus was already recognised as the main factor responsible for eutrophication. Thus the first steps could be taken to optimise reduction of phosphorus loads entering the lake. Until the early 1970s the major part of sewage entered the lake without any treatment. Therefore the IGKB desired to purify the waste water around the lake with uniform guidelines and common programmes for the construction of canalisation and sewage plants.

During the 1970s the phosphorus concentration of the lake water increased even more and at times an annual increase of 15% phosphorus could be observed. As a result, algal growth

increased greatly. In 1972 during a phase of unfavourable climatic conditions and extremely low water load an oxygen depletion beyond 2 mg/l occurred in the deepest part of the lake. In 1979 phosphorus reached its maximum value of 87mg/m³.

During that time channel systems and efficient sewage plants with three purification stages (mechanical, biological and chemical purification) were built in the whole catchment area. More than 6 billion Swiss francs were invested to connect almost 92% of the inhabitants to these plants. So effective sewage treatment and the ban of phosphorus in detergents were important steps towards a sustainable development of the lake and stabilised the ecosystem to withstand a succession of years with unfavourable climatic conditions resulting in an incomplete vertical water circulation. From 1980 onwards the phosphorus increase was stopped and its concentration sunk from 87 mg/m³ in 1979 to 15 mg/m³ in 1999.

Nevertheless the true scale to estimate the effect of restoration is not the reduction in phosphorus but the biological response of the lake, especially that of phytoplankton. For some years algal biomass has shown a decreasing trend. For example in the shallow water zones and in the area of river mouths the success has been very convincing. The success can be ascertained to a reversal of the lake development towards a state typical of a lower nutrient level. The continuous data sets show that the phytoplankton composition and its seasonal distribution has changed to a situation known from the times of a more oligotrophic lake.

With increasing numbers of inhabitants the problem of growth of the remaining phosphorus and other harmful substances becomes topical. Therefore the IGKB 'Guidelines' from 1987 demand on the base of a holistic view to include the catchment area and all fields affecting the lake, especially in industry, agriculture, settlement and traffic. In addition to the stress caused by substantial loads the stress by structural interferences is to be considered in the same way. Preventive measures should be realised before harmful effects occur.

All these efforts may serve to develop lake Constance so that it is stable against anthropogenic stress couples with unfavourable climatic conditions, which have increased during the last years. To obtain this state it is necessary to improve the quality of the whole lake with its pelagic, littoral and profundal zones. At the moment Lake Constance can be looked at as an ecosystem in transition. The various uses such as production of drinking water, fisheries and recreation can be maintained only by means of an ecologically stable state of the lake.

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2.4. Institute for Lake Research at Langenargen on Lake Constance

Dr. Helmut Müller (director)

In 1920 the Association for Lake Research and Lake Management was founded as a private institution at Langenargen on Lake Constance. In 1936 the institute was admitted to a German National Science foundation and in 1960 it was nationalised by the State of Baden-Württemberg. Since 1975 the ISF is part of the State Institute for Environmental Protection (Landesanstalt für Umweltschutz Baden-Württemberg - LfU) a technical authority, working across all environmental media as an advisory capacity to ministries and authorities in Baden-Wuerttemberg with respect to scientific and technical matters.

Today the ISF has about 40 employees working in 3 sections (hydrography - hydrochemistry - hydrobiology). Main emphasis is laid on limnological monitoring and research concerning Lake Constance and some of the 4000 small lakes in the state of Baden-Wuerttemberg. Observation, assessment and consultation characterize the three steps of practical environment protection.

The work on Lake Constance is done in close cooperation with the International Commission for the Protection of Lake Constance (IGKB) which was founded in 1960 as a transboundary commission between Germany (states Baden-Wuerttemberg and Bavaria), Austria (state Vorarlberg), Switzerland (cantons Thurgau and St. Gallen) and Liechtenstein.

The 12 scientists of the ISF have a widespread scientific background on the fields of biology, limnology, microbiology, fish ecology, chemistry, physics, oceanography and sedimentology. The ISF is partner in research projects with the universities of Constance, Stuttgart, Kassel and Haifa as well as task leader within the EU project EUROLAKES.

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2.5. Environment and nature protection at Lake Constance

Harald Jacoby, Lake Constance Foundation (www.bodensee-stiftung.orgl)

Lake Constance as a farmed ecosystem

The cultural and natural Lake Constance region holds a special status: this special lake is shared by three countries who are jointly responsible for it. In the past, the perception and the respect of people for Lake Constance has fluctuated greatly. Even today the economic and the ecological demands made on the lake stand in stark contrast to each other. Some important functions of the lake are outlined below:

Ecosystem: Lake Constance is one of the most important habitats for the flora and fauna of European fresh-water lakes. Large parts of the lake meet the criteria of the EU 'Natura 2000' directive.

Settlement area: The population density is more than 500 people/km^2 around the lake shores. Three million people live in the international Lake Constance region.

Economic area: Agricultural use of the landscape is mainly characterised through intensive fruit plantations, vegetable plots and vineyards. Industrial settlements (textile factories, metalworking industry and car factories) were established early on. Tourism has recently become an important source of income.

Drinking water reservoir: Lake Constance supplies drinking water for 4.5 million people.

Holiday region: In excess of 80 million overnight stays are registered in the region per year. 1.5 million people visit the flower island 'Mainau' each year. At the same time the lake region is very important as a recreational area for the people living in the area.

Water sports: Over 55.000 sport boats have been registered on the lake (not counting small boats and surf boards). Two-thirds of the registered boats are equipped with an engine.

Sewage water: Even in the 1980s the lake was still being exposed to high concentrations of agricultural run-off which lead to a very dangerous nutrient over-load in the lake. Today the lake still has to deal with nutrients present in treated sewage water which drains into the lake.

Traffic: As an important transport node, the Lake Constance region has one of the highest road densities in rural areas of Germany.

Transport: Shipping on and across the lake has always been important. It was not until the 1970ies that the plan to create a link for freight ships between Lake Constance and the North Sea was dropped.

Transport obstacles: Even in the 1960ies there was still discussions about building a bridge across Lake Constance.

Rubbish tip and land reclamation: Up to the 1950ies, shore areas of Lake Constance were used as rubbish tips which were later filled in to be built on. To 'restore' the lake, lake coves were still being filled up in the 1960s.

Reservoir: The natural capacity of lake Constance to store water was to be made controllable through a weir to regulate the water in and out-flow. The water was then to be used for projects not otherwise connected to the lake, such as shipping on the Rhine, and water quality improvement of other water bodies.

Trans-boundary environmental policy at Lake Constance

The most important motor for trans-boundary cooperation was the joint concern regarding the drinking water quality. It is no secret, that without this interest in using the lake for

drinking water by both Switzerland and Germany, there would not be much reason to celebrate the success of joint environmental policy.

Especially apparent is the lack of a binding trans-boundary agreement to define joint environmental quality goals in the context of an ecologically orientated economic region Lake Constance. A consequence of such an agreement would be an adjustment of economic activities in the immediate surroundings of the lake as well as in the entire catchment area.

A good example for cooperation in the field of trans-boundary water protection, is the work of the 'Internationalen Gewässerschutzkommission für den Bodensee' (International water protection agency for Lake Constance), or IGKB for short. The commission has been continuously monitoring and analysing the water quality of Lake Constance since 1959. In 1960, all countries bordering the lake signed a contract 'Übereinkommen über den Schutz des Bodensees gegen Verunreinigungen' (Agreement on the protection of Lake Constance against contamination). Most of the work of the commission is now focussed on work to control potential sources of contamination before it can become a problem. It is especially important for Lake Constance, as an important European source of drinking water, to be given the protection status 'Wasserschutzgebiet' (Water protection area).

Future perspectives for trans-boundary environmental policy

The protection of the lake from contaminants is one of the main priorities of the Lake Constance environmental policy. Unfortunately the environmental damage prevention measures are still underdeveloped in comparison to the measures carried out to repair past damages. 4 billion Euro have been spent to date on installing waste water treatment plants in the catchment area of the lake. The very high rise in phosphor levels in the lake in the 1960s and 70s have been stopped and are now dropping fast. 1979: 87 mg/m^3 , 2001: 13 mg/m^3 . The level of phosphor the IGKB (International Commission for the protection of Lake Constance) wants to achieve, is 10 mg/m^3.

This success should not detract from the fact that many other problems have not been solved as yet. Especially the problems in the area of agriculture are still far from being solved. Even though there have been many individual measures taken by farmers to reduce nutrient and pesticide input, there are still no grants and subsidies available which would make organic farming more attractive to the broad mass of farmers.

The pressure of land use in the region is still high and shore areas, and the relationship between shore regions and the hinterland is being devalued through settlements, industrial estates and road-building projects. The highly sensitive and ecologically valuable shoreline and shallow water areas are particularly endangered and need comprehensive protection.

Joint concepts and measures for the regional re-orientation of local transport policy have not been agreed on as yet. First steps towards a Bodensee-S-Bahn (A train all around Lake Constance) is the 'Seehas' (Hegau - Lake Constance line) and the 'Geißbockbahn' (the Goat Line) or the Bodenssee-Oberschwaben-Bahn (Lake Constance Upper Swabia Line) as it is also known.

The Lake Constance Guidance Plan 1994 (Bodenseeleitbild) postulates the following aim for regional planning: 'What is needed is a sustainable, i.e. permanent environmentally friendly protection and development of the Lake Constance area as a European space'. This idea is in line with the perceptions of the environmental organisations. What is needed is a trans-country regional planning initiative which is orientated towards the development profiles designed for the Lake Constance area. But the non-committal nature of the Lake Constance Guidance Plan puts the value of important development goals and many good guidance concepts in question.

The natural resources of Lake Constance should be efficiently protected as irreplaceable basis for the regional eco-system. As drinking water reservoir, important recreational area not just for the locals, and as habitat for a diverse flora and fauna, Lake Constance is of

European importance. These ecological functions of highest value must be given priority to ensure lasting security for the cultural and natural basis of the Lake Constance region.

The international Lake Constance Conference with all the various commissions it includes, must work towards the fast implementation of the regional environmental policy as it is proposed in the Lake Constance Guidance Plan. Especially from the environmental commission, stronger momentum to forward trans-boundary environmental policy would be good.

Protection of the shore and shallow water eco-systems

The Baden-Wuerttemberg law for the protection of biotopes (§ 24 of the Naturschutzgesetz [environmental protection legislation]) stresses the vulnerability and the importance of protecting 'the natural shallow waters and shorelines of Lake Constance'. Decisive for the status of an area is the definition of it as Protection Zone I or Protection Zone II as laid out in the Bodenseeuferpläne (Lake Constance Shoreline Plans) of the regional authorities of the Hochrhein-Bodensee (Upper Rhine-Lake Constance) and the Bodensee-Oberschwaben (Lake Constance – Upperswabia). These are areas of which the shore lines are mostly still in their natural state, either through a largely intact reed belt or an alternative indigenous form of vegetation *(*hair grass *-deschampsietum rhenanae* or plantain – *plantaginaceae* population*)* which have self-cleansing functions in shallow lake areas and fulfil the definition of fishing and spawning areas.

For these areas a qualified protection plan has to be developed in accordance with the already existing spatial protection laws. It is also important to protect and encourage the existing flora and fauna populations through adequate care.

Recommendations for land and biodiversity protection

The country borders still represent grey areas in the eco-system of Lake Constance. The harmonisation of rules in existing, at times even neighbouring, zones of nature protection have still only been partly implemented. The recommendation of the Lake Constance Guidance Plan in 1982 and then again in 1994, have not been followed.

It is essential to establish the same laws of nature protection in Switzerland as in Germany. Beyond the importance of establishing laws for single cases, the countries bordering Lake Constance should decide on a joint concept and a plan for swift implementation for protecting the lake, based on international treaties for biodiversity and biotope protection (Ramsar-Convention, EG-Bird protection directive, Habitat-Directive).

To implement a trans-boundary land - and bio-diversity protection plan, the non-governmental environmental protection organisations around the lake which are represented in the Lake Constance environmental council, have developed the following guidelines and measures:

- Observe the international responsibility for the protection of endangered habitats and species
- Formulate a trans-boundary land protection concept for the entire shore- and water area
- Define joint areas of nature protection and harmonising existing areas on both sides of the border
- Harmonise existing nature protection laws e.g. laws for regulating water-sports and hunting
- Comprehensive protection of endemic 'shorelawn societies' (Strandrasengesellschaften) and a consistent regard for them during any renaturalisation projects.
- Putting the importance of Lake Constance as a very important site for migratory birds in the centre
- Strengthening the trans-boundary cooperation in official and private nature protection

Western Lake Constance Biosphere Reserve – A perspective for the future?

The western Lake Constance area offers optimal conditions for a bio-sphere reserve of trans-boundary importance especially as the area is not only of high cultural importance but is also of outstanding natural value. In spite of the land-use pressure (urbanisation, transport, agriculture, tourism, water sports), the area has maintained its highly valuable natural basis. In the German-Swiss trans-boundary areas, they are large nature protection areas, water bird gathering sites of international importance, and other large ecological priority areas (Natura 2000 areas as designated by the EU). What is still missing is a trans-boundary concept which structures all current individual initiatives under one main concept. With the project 'Untersee life' (life on lower Lake Constance) which is supported by the EU, the attempt is being made to connect seven spatially non-connected nature protection areas with a total area of 942 hectare. The underlying idea is to create a 'Lebensraumverbund Westlicher Untersee' (habitat of the western lower Lake Constance) by designing a common management scheme and optimising this over the coming years.

On top of this, the administrative district of Constance has been chosen as a PLENUM-Region (Project of the State of Baden-Wuerttemberg, to preserve and develop nature and the environment). In these regions, nature protection goals for 'cultivated landscapes which are close to nature and therefore especially valuable can be protected, without having to define them as nature protection areas'. The aim is an environmentally supportable and economically viable, i.e. sustainable use of the region.

These German planning and implementation initiatives are complemented on the Swiss side by 'Landschaftsentwicklungskonzepte' (landscape development concepts) (LEK) which are currently being developed. The best pre-conditions exist for the creation of a trans-boundary biosphere reserve 'cultural landscape lower lake Constance/ Western lake Constance'. It would be the first lake-ecosystem in central Europe to be declared a biosphere reserve. The western Lake Constance region is very typical of other central European lake regions. The land use ranges from shallow water zones and shore areas with no human influence through shallow water zones and shore areas with limited human influence, to intensively farmed agricultural zones.

Not only has it been possible to protect large areas of the region from degradation, but it has also been possible to extensify and to successfully renature already degraded areas. On the level of regional decision-making, both public and private initiatives have been in existence for many years which have been working towards creating the biosphere reserve. This is why there is a very tight cooperation between tourism, agriculture and conservation in the Western Lake Constance area. Private environmental initiatives currently protect nature reserves including the following, covering a total area of 2.800 hectares in the Western Lake Constance region: Wollmatinger Ried (marsh area), Untersee-Gnadensee , Mindelsee (small glacial lake), Mettnau Penisular and the estuary of the Radolfzeller Aach.

What the environmental organisations do

The development at Lake Constance is a good example of the fact that how the public view the value and the expert knowledge of environmental organisations is influenced by years and even decades of previous work.

Between the 1970s and the 1990ies, the work of the environmental organisations at Lake Constance were characterised in the media by calls-to-action and protest activities of the environmentalists and conservationists. The 1990s have seen a change of position of the environmental organisations towards a cooperation with the communal, regional and private intentions taking place in the region. The 'image of the enemy', which had been present in peoples heads faded in almost all cases. An important supportive factor for this was probably the continuity of the involved people – sometimes this was also a negative factor.

Once the Lake Constance Environmental Protection Project (Bodensee-Umweltschutzprojekt) of the German Environmenal Aid Association (DUH) was started in 1990, it was possible to put together a professional team for the organisation and the coordination of the project, to intensify the trans-boundary cooperation of organisations. 18 private organisations from Germany, Austria and Switzerland created the environmental council (Umweltrat) for Lake Constance and worked together in the Lake Constance Environmental Protection Project (Bodensee-Umweltschutzprojekt). The project could be realised due to a generous donation of the Lever GmbH (now called: Lever Fabergé).

The environmental council for Lake Constance was founded to be able to deal with the diverse ecological, political and administrative relations in the Lake Constance region. Information is now exchanged in regular intervals at meetings. Such meetings are also used to formulate positions on trans-boundary topics, coordinate individual projects and decide on further measures. All cooperating institutions keep their individual sovereignty but join forces to pursue a joint interest.

This cooperation was the basis in 1994 for the foundation of the 'Bodensee-Stiftung, Internationale Stiftung für Nature und Kultur' (Lake Constance Foundation), which had the following organisations as founders: the 'Schweizerischen Bund für Naturschutz' (Swiss League for Nature Conservation) which is now called Pro Natura, WWF Switzerland, the Austrian Nature Conservation League (ÖNB), the German arm of Birdlife International (NABU), and Friends of the Earth Germany and the German Environmental Aid (DUH). The Environmental Council of Lake Constance kept its technical role and is now part of the Lake Constance Foundation as advisory council (Beirat).

The aim of the foundation is the 'support of activities to preserve and develop nature, landscape and natural resources – especially by promoting sustainable economies – in the international region of Lake Constance'. By combining the traditional task of environmental organisations as watchdog with real competences in the field of sustainable regional development, the Lake Constance Foundation is set clearly apart from classical environmental organisations.

The Lake Constance Foundation has managed, in a few years, to strengthen its reputation as a qualified body for questions relating to Lake Constance, as a partner in trans-boundary discussions and cooperations and as a partner of regional businesses.

2.6. Programme of Action for the Clean-Up of Upper Swabian lakes

Dipl.-Ing. Albrecht Trautmann, Pro Regio Oberschwaben GmbH, Ravensburg (www.seenprogramm.de)

The rich lake diversity of Upper Swabia

There are almost 2300 non-flowing bodies of water in the southern part of Upper-Swabia, North of Lake Constance. These water bodies make up over half of all non-flowing bodies of water in Baden-Wuerttemberg. Many of them are leftovers of the 'Würm' glacier, but some of them were artificially created by monasteries and noble families in the middle-ages.

All of these water bodies have been heavily burdened with high levels of nutrients especially in the past half-century. The results of this have been excessive growth of algae and Higher Water Plants, loss of biodiversity, unfavourable composition of the fish stocks, partial fish dying, strongly increased production of digestive sludge and very fast siltation.

History of the Programme of Action

The regional association of Bodensee-Oberschwaben (lake Constance - Upper-Swabia) kick-started the programme and supported the first measures in 1986.

In 1989 a research programme 'Programme of action for the restoration of Upper-Swabian Lakes' was started by the environmental ministry of Baden-Wuerttemberg (Programme was coordinated by the regional council in Tübingen). For 33 selected water bodies and their catchment areas, a project group consisting of staff of the water management and agricultural offices, carried out surveys, developed clean-up concepts and the necessary measures to implement these.

From research to implementation

Since 1995 the lake programme has been continued on the basis of an agreement based on public-law (county and municipalities) with the main emphasis on the implementation of further clean-up measures.

In the year 2000, 15 water bodies had been successfully cleaned up and were taken out of the programme. In the same year 41 new water bodies were added to the programme. The management of the project was transferred to a private organisation (the Pro Regio Oberschwaben GmbH).

Clean-up measures

Mains connections are also planned for sewage to single houses (‘pumps and tubes’). Waste water treatment plants are not allowed to drain their water into non-moving water bodies, excess rainwater basins should be optimised.

The major impacts on water bodies now come from agriculture. Active consultation in the areas of manure and cultivation, creation of enough storage capacity for solid and liquid manure and the extensivation of critical areas can lead to changes in the farming behaviour and can significantly reduce nutrient input. At the moment a total area of over 700 hectares surrounding about 50 water bodies are reserved for extensive farming by contracts. 450.000 DM (225.000 Euro) compensation is currently paid for these areas.

The renaturalisation of regulated and technically enhanced rivers in the catchment area of the water bodies, is an important measure. In a few cases sedimentation tanks and flooding areas have been created upstream of ponds. These are most useful during heavy rainfall when they can filter out the erosion sediment which is carried in the tributaries.

Use of the ponds for fishing and for irrigation should be adapted to the demands of the clean-up measures. The management of artificially created and drainable ponds should follow traditional cleaning methods (regularly draining the pond every 3-6 years).

As well as the reduction of the nutrient input, a further measure used in some cases is the removal of fish (bio-manipulation). The use of the ponds for recreational purposes should not effect the ecological stability of the ponds. It is recommended that regional concepts which regulate the recreational use and the environmental protection of the ponds are put in place.

Conclusion

The clean-up of small ponds through reduction of the diverse nutrient input from the catchment areas, is to be preferred to measures taken in the individual ponds which only affect the symptoms. The implementation of measures on a voluntary basis takes up a lot of people time and is not always easy to carry through but especially in the area of agriculture, can lead to lasting improvements and manageable costs.

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2.7. Visit to the nature protection area Wollmatinger Ried: Development, management and visitor steering

Dr. Ulrich Zeidler, NABU – Birdlife Germany, (www.birdinggermany.de/wollmatinger_ried.htm)

The nature protection area Wollmatinger Ried is one of the most prominent reserves of Lake Constance. On its area of approximately 8 km^2 it covers an interesting variety of different wetland biotopes, such as shallow water zones with macrophytes, vast reed areas and wetland marshes with different sedge formations. With its diversity of 600 plant species, 250 night butterfly species and its abundant bird life the reserve is outstanding within Europe and therefore awarded with the European Diploma. It is also part of the RAMSAR convention and part of the Natura 2000 protected areas.

Since the most diverse parts of the reserve are leftovers of an old cultural landscape that has been created by human use of land, a steady management is required to keep the diversity throughout modern times. The management of the Wollmatinger Ried is based mainly upon three cooperating units. First there is a professional management in the nature conservation centre of the Wollmatinger Ried. This institution was established by the Naturschutzbund Deutschland (NABU) which is Germany's biggest NGO in terms of nature protection. Second there's a number of around 25 voluntarily active members of the local NABU group. Third is the ministry of environment with several local subdepartments of the state of Baden-Württemberg.

Among a lot of other things the management is in charge of the organization and realization of measures within the wetlands, monitoring of plants and animals and public relations. Lake Constance is one of south Germany´s favoured tourist areas. In addition to extensive tourist activities the whole region has experienced a tremendous growth in population, industry and traffic. The NABU is politically active with varied success, to secure sufficient biological corridors between the reserve and the surrounding countryside.

Since the Wollmatinger Ried is restricted to public access, a large number of guided tours and a whole programme of nature activities is offered by the NABU. The participants of the wetlands training course will be lead through the reserve and various aspects of the management will be discussed.

2.8. ECOCAMPER: Integrated Environmental Management on Camping Sites[1]

Layman Report LIFE99 ENV/D/000448
(www.ecocamping.net/; www.bodensee-stiftung.org/)

Summary of the Project's Scope and Goals

The project's aim was to develop and introduce an environmental management system for campgrounds on the basis of the EC-Ecoaudit ordinance EMAS. In this way, it was to be ensured that camping grounds employ ecological measures continually and in a well-structured manner. These measures were to be documented and their implications for the environment reviewed.

The Environmental Management System was to be developed, introduced and tested in an international model with15 participant test camping grounds on Lake Constance and Lago Maggiore. An additional goal was to incorporate standards of quality management, workplace security and hygiene.

Moreover, the project was intended to make a contribution towards sensitising the entire camping industry to environmental management and the realization of the EC Eco-Audit ordinance. In order to achieve these goals, the following measures were to be taken as part of the project:

- establishment of a project team and an international panel of experts
- research on and comparison of all European and international environmental management systems for the service industries; compilation in a complete overview
- determination of key statistics relevant to environmental protection, collection of data at beginning and completion of project, as well as presentation of these data and documentation of EMAS measures
- 10 regional workshops were to be conducted on Lake Constance and Lago Maggiore for campground owners on the core themes of environmental management, then reports on the workshops to be compiled
- 4 international workshops were to be conducted and reports on these written
- development of a checklist for "Environmental Management at Campgrounds" as a paper and as a file so that individual consultations at the campgrounds could be conducted in a structured fashion
- public relations work via internet presence, project presentation at events, publication of a trilingual informational brochure, an exhibition, as well as appearances at trade fairs

[1] The project's original name, ECOCAMPER, was changed to ECOCAMPING so as to emphasize that the campgrounds, rather than the campers, are of central importance. For this reason this report uses the designation ECOCAMPING.

Project Background: EC-Ecoaudit Ordinance

The EMAS, also called EMAS II, is a management system for managers who wish to steadily improve internal environmental protection in their enterprise without outside influence. EMAS stands for "**E**co-**M**anagement and **A**udit **S**cheme". As an ecopolitical instrument EMAS relies on the voluntary participation of companies, authorities and organizations and goes beyond the criteria required by law. Since 1993, commercial businesses and, with the amendment of the EMAS in March 2001, authorities and organisations of the EU countries as well, are able to participate in the standardized **system for environmental management and the environmental examination of a company.** The revised EMAS II contains all aspects of the international ISO 14001, but goes beyond this norm in some of its requirements (employee participation, publication of a environment report).

Every organisation intending to improve internal environmental protection can participate in EMAS II. By the term organisation, enterprises or trade (craft and commercial) as well as public institutions are to be understood. Especially important to the EU is the participation of small-scale and medium-sized businesses. The member states are urged by the European Committee to encourage small-scale and medium-sized businesses to participate in EMAS through special support programs. For EMAS II participation the organisations must inspect their activities, products and services with regard to effects on the environment and develop an environmental management system on this basis.

Realization of the Project, Method and Desired Results

The co-ordination of the ECOCAMPING project at Lake Constance and at Lago Maggiore was the responsibility of the Lake Constance Foundation. 50% of all the costs of the program were met by the LIFE program of the EU. The other half was donated by various organisations: the Deutsche Bundesstiftung Umwelt, the detergent company LEVER-Farbergé, the Deutsche Umwelthilfe, the Italian province Verbano and the city of Cannobio, the Department of the Environment Austria, the Department of the Environment Baden-Wuerttemberg, the city of Constance, the tourist information of the city of Constance, the district administration office of Lake Constance, the union of caravan and camper van manufacturers (VDWH) and the participating campsites.

The panel of experts was made up of 10 experts from conservation organizations, consumer organizations, the tourism branch, public administration and the natural sciences. The panel met a total of three times during the course of the project. Protocols were taken at each meeting. While the first meeting at the outset of the project resulted above all in useful hints on the overall realisation of the project, during the second in the project's mid-phase the panel members were able to turn their attention to detailed questions which had come up in the course of the project. At the last meeting the project's results were evaluated from the panel's perspective and suggestions for the future were made. Furthermore, individual panel members were involved in other project events, e.g. international workshops or at trade fairs. The involvement of these experts and of the organizations they represented was of great importance for the dissemination of the project's concept.

In August, 1999, instead of the initial number of 15 camping grounds, 14 campsites at Lake Constance and 6 at Lago Maggiore started the LIFE ECOCAMPING project co-ordinated by the Lake Constance Foundation. Within two years an environmental management system had been developed for campsites which is orientated to the lines of EMAS regulation.

Don't reinvent the wheel, but base your actions on methods that have proven themselves useful in the past and develop them. According to this maxim, criteria for and experiences gained from environmental management and the environmental logo systems in Europe have contributed to ECOCAMPING.

Research on and comparison of environmental management systems demonstrated that at the time there were three major systems in Europe of use to the service industries. These were: the internationally known system ISO 14001ff, the EC-Ecoaudit ordinance (at that time

still as EMAS-I) and the Eco-profit system from Austria, which addresses itself above all to small and mid-sized enterprises for which the efforts for and the costs of EMAS or ISO are too high. At that time, EMAS could be used by the service industries only in a number of European countries on the basis of ordinances relating to expansion. Since then, the introduction of EMAS-II has eliminated these limitations. Other systems such as the Swiss Q-Plus, "We run an ecologically friendly business" from the German Hotel and Guest House Association or the Environmental Seal Baden-Wuerttemberg, then in planning, were also analysed. The comparison can be downloaded at no cost from www.ecocamping.net.

The European network Ecotrans investigated the criteria of 13 additional environmental seals and awards in Europe available to camping sites. ECOCAMPING maintains close contact and exchanges experience with various ecolabels. In the future, ECOCAMPING will work together with these labels, especially in the fields of monitoring, benchmarking and surveys. ECOCAMPING has put all documents and experience resulting from establishing criteria for camping sites at the disposal of VIABONO, the German environmental umbrella ecolabel organization. However, it was not a project goal to develop an ecolable of our own.

The determination of the key environmental statistics at campgrounds proved to be a relatively difficult discussion process, as, along with the availability of pertinent environmental data such as energy and water usage, the availability of comparative data such as the number of overnight stays by permanent guests is also necessary in order to construct the key statistics. Thus, when it turned out that the number of overnight stays by permanent guests had not yet been recorded it became necessary to operate with rough estimates. Additionally, it must be taken into consideration that information about infrastructure, geographical location and weather data also need to flow into the calculation of the key statistics in order to generate numbers that would allow a meaningful comparison of the camping grounds. In this case, the project was able to attain only a provisional mid-term result. **It was established that the following statistics are pertinent for a meaningful comparison of environmental measures on campinggrounds: water usage, fuel usage (gas and oil), waste water produced, refuse remaining after each overnight stay**. In order to ensure better data capture in the future, a program of key statistics allowing individual input and the analysis of these statistics in the form of tables and graphs has been integrated into the software. However, the data produced by the camping grounds on Lake Constance and Lago Maggiore have only been collected in the form of Excel tables, as the software first became available at the end of the project's term. However, statistically significant statements on possible influence of the project on the data pertinent to the environment cannot yet be derived due to the project's relatively short term of two years, especially in view of the extreme distortion in the data brought about by the flood of the century on Lake Constance in 1999.

In the ten regional and four international workshops, the participant campsite managers and employees discussed all environmentally relevant topics within their businesses:

- environmental management
- layout of the grounds
- waste
- energy
- environmental law
- water
- leisure activities
- supply
- transport
- cleaning

A workshop structure containing the following elements was implemented:

- Feedback-circle and experience-exchange on the topics and tasks of the last workshop (with moderation)
- Topical introduction to the main theme of the current workshop
- Technical and specialist input presented by (mainly) external speakers
- Participant orientated work with the topics presented (group work or similar according to the situation)
- Explanation of the practical tasks deriving from the workshop program
- Tour of the host camping site

The exchange of experience proved to be the central point within the workshops, as it encouraged group dynamics and the feeling of a "ECOCAMPING-group". The atmosphere at the workshops was excellent and the participants showed great interest in the specialists' presentations and the following discussions on the presentation topics, problems and implementation of measures at camping sites.

The municipalities were included as well. After all, they play an important role as they often run the enterprise or are the authority responsible for planning and campsite infrastructure. Within the bounds of the project, eight municipalities and representatives of the district administrations took part in a special workshop. Here the communities recognized among others the ECOCAMPING checklist as a useful orientation.

Extensive protocols were taken of all workshop proceedings and were as a rule made available to all workshop participants. They are available upon request from ecocamping@bodensee-stiftung.org and will be sent per Email.

The ECOCAMPING-checklist was developed as a central instrument - it serves as a guideline for the ECOCAMPING adviser on site. The checklist contains questions about all aspects relevant to the environment and facilitates the application of the EMAS environmental test. It is available as a file via internet at www.ecocamping.net.

During the course of the LIFE project each camping site received three individual consultations. At the outset of the project, stock was taken of the initial position of each site in order to define an environmental policy and its goals. Then, during the second half of the project, concrete measures were defined and the structure of environmental management established. At the project's end, the extent to which initial measures were actually realized was reviewed. Environmental representatives were nominated at the ECOCAMPING sites and in some instances an environmental team was established.

The completed checklists, the environmental policy paper and the individual program constituted each site's EMAS documentation.
The completed checklists are in keeping with the internal audit report, which according to EMAS is not to be published as it concerns internal company information. As part of the third consultation, the compatibility of the EMAS documentation with the EMAS standards was reviewed.

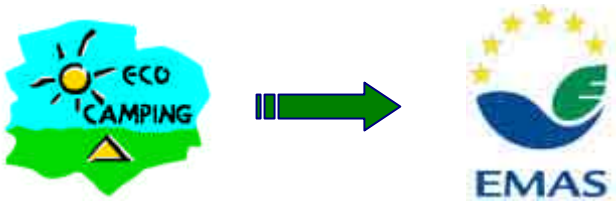
The camping sites which desired an additional EMAS verification put together an environmental declaration. After the site had fulfilled all its preconditions, an independent environmental expert reviewed the environmental declaration, the environmental policy, the extent to which the environmental aims had been achieved and the functioning of the environmental management system.

As of September 2001, three Lake Constance camping sites were successfully certified: campsite Wirthshof (Markdorf), campsite Hegne (Allensbach) and campsite Klausenhorn (Constance-Dingelsdorf).

The ECOCAMPING-guidebook and the complementary ECOCAMPING software were developed for campsite managers who intend to improve their company's environmental protection measures extensively and systematically, even if they have no external consultant.

These tools provide a full range of information on environmental management on campsites according to EMAS-II. All sorts of relevant environmental protection measures on the camping site are discussed and recommendations for improvements are presented. The guide book is made up of a loose paper collection in a folder in order to ensure its topicality and that it can be updated at any time.

At the same time, the guidebook represents an extensive documentation of the campsite`s experience within the model project as well as its results. It can be requested in a paper version via email from the Lake Constance Foundation (ecocamping@bodensee-stiftung.org).



Those who choose to use the complementary ECOCAMPING software can work on the different topical sectors by means of the questions. The program will prepare an automatic evaluation, as well as suggestions for an environmental protection program. The guidebook is also available to download via the ecocamping website (www.ecocamping.net).

The intensive public relations work conducted by the ECOCAMPING project extended far beyond the regional activities. In the Internet an extensive description of the project with much useful additional information was made available to the interested public at www.ecocamping.net. At the most important German and Italian tourism trade fairs (ITB, CMT, BIT, Caravansalon Duesseldorf), the project was represented by means of stands and presentations by specialists. Presentations at specialist congresses and camping conferences supported the sensitisation of the branch to a great extent. A particular highlight was the ECOCAMPING Day conducted at the EXPO 2000. Especially for use at events and trade fairs, but also at the campgrounds themselves, a smaller and also a more extensive project brochure in German and Italian (an English version is available as insert) was put together, as well as a lavish project exhibition in German. In order to provide visitors with additional information, colour posters were produced. All activities, including the workshops, were accompanied by intensive media contact which led to well above 100 mentions, including television coverage.

Environmental Protection: Quality improvement or loss?

The most important aim of a campsite is the well-being of its guests. Alone satisfied guests who wish to visit the campsite again put the site in the position to invest money and time in environmental protection measures and to set up an environmental management system. Therefore, it is particularly important to consider the needs of the guests when making all decisions. Although guest surveys were not originally planned as part of the project, they were encouraged by participants and experts as an important basis for decisions in environmental management. In order to gain a systematic view of guest opinions, extensive surveys were conducted in 2000 and 2001 on Lake Constance and in the Black Forest. The results of these surveys were presented in a report available from the Lake Constance Foundation.

A summary of the results from the most recent survey of 2001 follows:

Most of the campers arrive with their own vehicle (97,6%), the traffic caused by campsites is therefore a relevant factor in environmental pollution.

Of main importance to the guests are cleanliness and the quality of sanitary facilities on the campsite. Also very important are the beauty of the natural surroundings and environmental protection. Additional facilities such as a shop or a leisure program for children are comparatively less important. Nearly all environmental protection measures are accepted by the camping guests. However, guests have little enthusiasm for, or they altogether reject, non-asphalted paths and parking their cars on a separate car park. Separate payment for

showers (e.g. by a special coin system) is widely rejected. Guests wish that showers be available at no cost.

If asked about the acceptance of a seal for environmental friendly campsites, 90.6% express approval. 76.7% would give precedence to a campsite with such a seal. The ECOCAMPING project was familiar to 14.2% of all the interviewed guests

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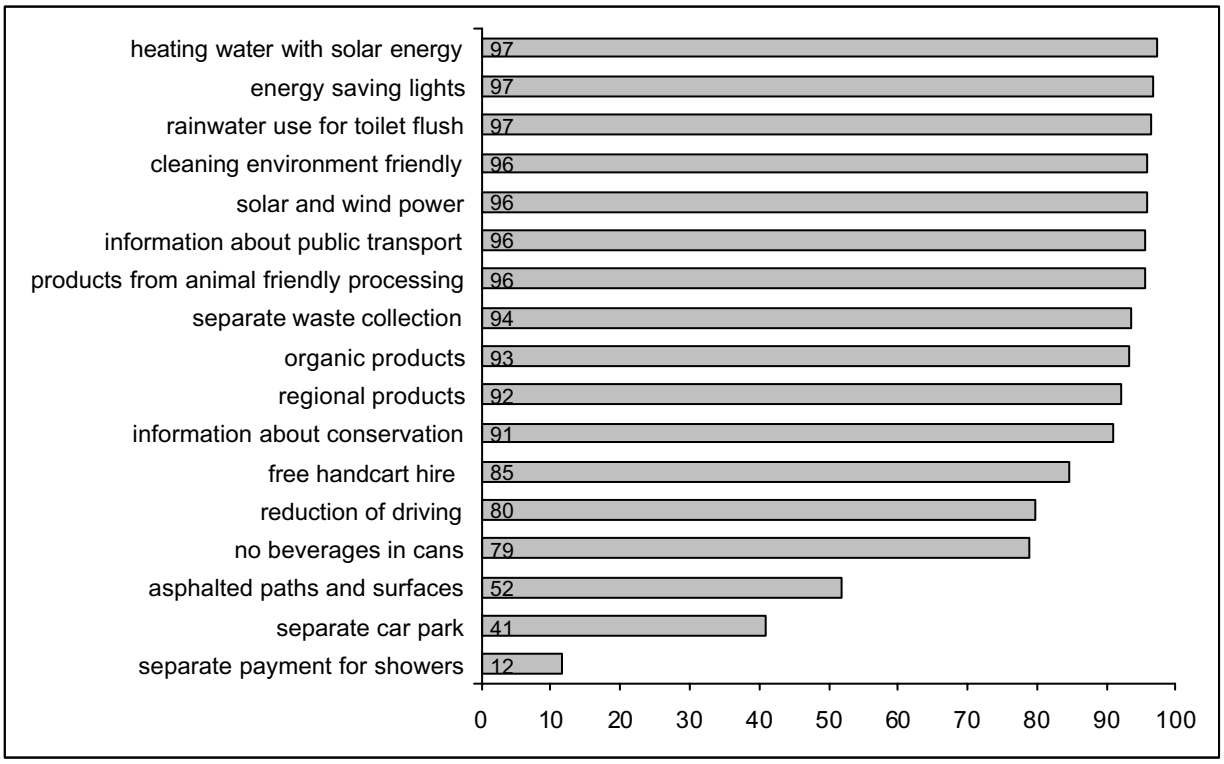

Approval of environmental protection measures on campsites in percent (visitor survey 2001)

What are the advantages of ECOCAMPING for environment and economy?

Participants gain initial economic advantage through the **detection of savings potential** for various resources such as energy, waste disposal, water, etc., all of which are relevant to environmental protection. Moreover, there are advantages in the field of **public image**, better media coverage and a general increase in the site's acceptance within the region. The improvements in **organisation,** achieved by effective environmental management, improve internal processes and communication and therefore decrease costs indirectly. However, these savings are difficult to estimate. As ECOCAMPING also improves safety measures such as emergency precautions or use and disposal of hazardous material, an advantage is achieved by **reducing internal risks** and the accompanying costs. Unfortunately, a reduction in insurance fees has not yet been achieved. The participants' exchange of experience during the workshops and beyond provides **advantages in information access** for each participant campsite manager, which can directly lead to decreasing the cost of investments. In general, one should take into consideration that the amount of economic profit gained through participating in the ECOCAMPING project is highly dependent on the starting point of the individual campsite.

The following values are the highest possible best-case savings to be expected (the numerical data are estimates on the basis of previous experience on Lake Constance and from part of the Baden-Wuerttemberg project):

- 20 - 50 % reduction in **waste disposal fees** by means of rigorous waste avoidance and systematic separation

- 20 – 50 % reduction in **water expenses** through water-saving technology and by separate payment of warm water
- 10 – 30 % reduction of **energy expenses** through consequent employment of energy-saving technology, checking electricity supply on site, elimination of electrical heating and separate payment of electricity supply for campers
- 40 – 60 % reduction of **gas or oil expenses** through modernising warm water and heating systems, as well as detection of energy-inefficient sectors (e.g. lack of insulation of warm-water pipelines, open windows and doors in heated areas)

The project's objective to sensitise the camping industry for environmental management was fulfilled. Thanks to intensive public relations work, EMAS is no longer a "blind spot" for the camping industry. But there has also been critical discussion of these measures. Participating and interested camping sites are convinced of the necessity and the advantages of environmental management, but there are many who see no necessity of a " governmental certification" if they are already acting in accordance with EMAS. These small-scale enterprises don't see a reasonable balance in the costs and benefits of an EMAS-certification.

ECOCAMPING: Evaluation of the Cost-Benefit-Relation

Public relations work and the building of networks are important in motivating campsite businesses to participate. Exchange of experience, publication of results, internet information, etc., are of use to the entire branch, not only to the participant campgrounds. The project has achieved through these measures a contribution towards the sensitisation of the camping sector to environmental protection. Therefore, the project team sees the costs incurred as an important investment in the future.

Whether the ECOCAMPING qualification is less cost-intensive than the EMAS-consultation remains to be seen in the future. Within the context of the pilot project, the checklist of environmentally relevant instruments, the guidebook and software have been put together. In the future these instruments will contribute to reducing the time needed for workshops and consultations. In the follow-up project ECOCAMPING-Bavaria the workshops were reduced to a number of 6 (previously 10). Even though the consultation time cannot be reduced through the checklist, the consultation itself can be made more effective and of higher quality through improved structure. The time for preparation and assessment has also been reduced. Future ECOCAMPING consultants will draw benefits from experiences gained at Lake Constance and Lago Maggiore. They also can use background information available in the knowledge pool and on the checklist.

Generalisation of project results: International ECOCAMPING initiative

In order to ensure the transferability of the project results, to raise its benefits for the environment and to lastingly sensitise the entire camping sector for environmental protection and EMAS as a means to that end, the Lake Constance Foundation accepted the offer of cooperation from the Association of Campsite Managers in Baden-Wuerttemberg. In February, 2001, the Foundation began to expand the project through two additional ECOCAMPING working groups with an additional 19 campgrounds throughout Baden-Wuerttemberg. Six of these 19 campgrounds will be certified according to EMAS in summer 2002.

In February 2002 ECOCAMPING Bavaria started with 15 campsites, also assisted by the Lake Constance Foundation in cooperation with the Association of Campsite Managers in Bavaria. This group will achieve its ECOCAMPING certification in the summer of 2003. At the national level, the Federal Association of Campsite Mangers in Germany (BCVD) supports the ECOCAMPING project and has designated it as the official contribution of the camping sector to the International Year of Ecological Tourism.

What does the international ECOCAMPING initiative look like?

In the future, the main target will still be the improvement of environmental protection on campsites by means of the introduction of an environmental management system according to the EMAS regulation for as many regions in Europe as possible.

Special emphasis lies on training according to the reliable ECOCAMPING method. Campsites which participate in this training and which receive consultations from the ECOCAMPING experts are initially termed “ECOCAMPING candidates”. Thus, they are still in the learning process, as can be seen by the term “candidate”, which is added to the logo. Campsite managers who complete the ECOCAMPING qualification and successfully introduce an environmental management within their company receive a diploma for their participation and a badge for the reception.
From this moment on, they are allowed to use the logo and the term „Environmental management“ in their advertising.

If you stand still, you lose ground – for this reason ECOCAMPING sites are required to attend one refresher workshop every year, to keep their environmental management up to date and to retain contact to the network.

The two logo versions for campsites

Further information and contact:

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All materials and information produced within the LIFE project are available at no cost from the address given above.

2.9. Agriculture in the Region of Lake Constance

Patrick Trötschler, Lake Constance Foundation

Structure

1. Political conditions - on both federal and state level - of the agriculture at Lake Constance
2. Structure of the agriculture at Lake Constance
3. Strong and weak points of the agriculture in the Lake Constance area
4. Strategies and practical approaches

Specific political conditions - on both federal and state level - of the agriculture at Lake Constance

Since the BSE crisis of 2002, the political climate in connection with agriculture has considerably changed. The Federal Government has defined the goal of 20% ecological areas in 2010 and now pursues a more consumer-oriented policy. Since 2001 a nation-wide valid standardised quality label for bio-products provides more transparency for the consumer.

Within the scope of a competition, 18 case study regions were selected, in which regions the so-called “Agricultural Change” shall be implemented during the next four years (total budget 35 Million €).

In 2002 and 2003, the Federal Programme “Alternative Farming” (total budget 35 million €) is supporting alternative farming methods in the sectors “Agricultural Production”, “Recording and Analysis”, “Trade, Marketing, Consumer”, “Technology – Development and Transfer” as well as “Supporting Measures”. PLENUM is an environmental strategy of Baden-Wurttemberg to protect and develop natural landscapes. In the Lake Constance area there are two Plenum-regions, projects can be applied for, for each Plenum region.

The international Lake Constance region is supported by Interreg III.

Structure of the agriculture at Lake Constance

Use

About 433.000 hectares of the international Lake Constance area are being used for agriculture. Most land used is green fields and pasture land which makes up 76% (330.000 ha) of agriculturally used land. Crops are grown on 16.4% (71.000 ha) of land and 6.9% (30.000 ha) is taken up by Sonderkulturen (other agricultural produce). In order of importance these are: fruit plantations (including Streuobst 'fruit-trees scattered on agricultural land'), hop, vegetables, and vines. The total agriculturally used area has reduced by 5% in the past 2 decades which is insignificant.

The Sonderkulturen are cultivated in immediate proximity to the lake as this is where the best microclimatic conditions are found. The further away one gets from the lake and with increasing altitude (Allgäu, Vorarlberg, schweizerisches Alpenvorland [all hilly regions around the lake]) the areas of pasture land and fields increase whereas the areas suitable for growing crops decreases.

Structure of agriculture in the region

The number of agricultural businesses around lake Constance has been decreasing steadily in the last decades. Between 1979 and 1999 the number of businesses for which farming

was the main income has almost halved, while farming as a second-income source has dropped by 20%. Currently there are still approximately 24.000 farms in the lake Constance region. The competition among farms has lead to an overall increase in farm size. In 1979, 66 % of all farms were smaller than 20 ha, but by 1999 only 38 % were smaller than 20 ha. The average size of a farm is currently 17.8 ha.

Strengths and weaknesses of Agriculture at lake Constance

Farms around lake Constance produce a wide diversity of goods. The number of ecologically friendly and organic farms is much higher than the national average.

High quality production: In comparison with other structurally weak regions, farming in the lake Constance region still has economic importance and potential. The lake Constance region is marked by a very high productivity in the areas of fruit, vegetable, hop and wine growing. Even with the structural changes currently taking place, the cultivation of areas of high ecological standards but economically border-line is still mostly viable. Renewable energy sources from forest and agriculture play a major role not just because of the amount of energy which could be produced but also because of the many product and marketing projects which have already been started.

Ecologically sound farming: Organic farming has been practised for a long time at lake Constance. The proportion of organically cultivated area is 8 %. Almost 90 % of all fruit growing businesses cultivate their fruit in an integrated way.

High level of production in farming is often connected to high levels of environmental degradation. To overcome the structural changes, integrated concepts of use especially for ecologically important sites are needed, which are currently missing.

Environmental degradation: Even with the high proportion of organic farms and the conversion of many areas to integrated production methods, agriculture is still causing considerable environmental pollution and represents a potential for ecological problems for the natural area and the drinking water reservoir, Lake Constance. It has been proved that the use of chemicals and synthetic fertilisers and pesticides is causing dangerous nutrient loading in the lake and its tributaries.

There are no concepts for rural management: The sites of marginal returns which were cultivated up to now are being used less and less for agriculture. Due to the trend towards intensification of production, just in the district of Ravensburg, 17 000 hectares of farmland will be uncultivated and unused. There is no integrative general management concept to secure the cultivation and to support the structural changes. There is a great danger of important and drastic loss of typical and valuable landscape structures and biodiversity. This change of the cultural landscape would have negative impacts on the tourism.

Marketing

The Lake Constance area with its dense population and tourism is an interesting regional market. The positive image of Lake Constance would be an excellent brand name and condition for a successful regional marketing.

About 3.5 million people live in the Lake Constance area. Together with the tourism centres, the high-quality gastronomy and canteen kitchens (canteens, refectories, conference centres, hospitals) the Lake Constance region has the potential for high sales of regional organic products. Particularly in the food sector the region is predestined to become a model region for regional circular flow economy. Lake Constance as a model of regional identity forms the basis of a regional brand awareness.

There is neither a frame of reference nor a marketing system for regional organic food. Lake Constance as a brand is used only seldom. There is no general product-and sector-related marketing strategy for products of the Lake Constance area.

It was only possible to gain a few food stores, restaurants, canteens and tourism agencies as customers. The share of regional organic products in the retail food business is very small. The fact that there is no general frame of reference nor a marketing strategy is an important obstacle for an increase in sales. The use of Lake Constance as a brand is seldomly realised e.g. Lake Constance fruit.

Strategies and practical approaches

New sales opportunities for regional ecological products

The marketing of regional organic food shall be improved by the development of regional business structures and the creation of new outlets. For this purpose, new alliances and co-operations between agriculture, trade, distribution and commerce as well as tourism are necessary.

Model project: “Untersee-Genüsse” (Lower Lake Constance Delights)

In 1996, the first seasonally limited actions and campaigns with regional organic-products were organised. Since 1998 restaurants in the international Lower Lake Constance region offer meals with alternatively produced ingredients. Since 2001, a quality management system is being developed. Co-operation partners are the Bodensee Stiftung (Lake Constance Foundation), the Modellprojekt Konstanz GmbH (the Case Study Project Constance) and the Untersee Tourism association. The project is being financed by a yearly grant of the Untersee Tourism association (3.500 Euro), annual contributions of the restaurants (450 Euro each), (incl. monitoring costs) and performances of the Lake Constance Foundation and Case Study Constance.

Model project: “Großküchen” (Canteen-kitchens)

In 1997 a working group for the managers of canteen kitchens was organised. Several special further training courses and excursions on the aspects of “Regional organic products for canteens” were carried out. Parallel to that their were weeks of action in different canteen kitchens (university canteens, company canteens and so on). Direct cooperation between the producers and canteen kitchens has proved to be quite difficult.

Apart from the different opinions concerning the prices, the insufficient product availability and distribution of the wholesale trade are constraining factors in establishing regional organic products in canteens and gastronomy. The building up of a professional and powerful supply logistic for regional and regional organic products seems not to be convenient for Lake Constance. Instead, the already existing regional conventional infrastructure for the food supply should in future be used more for regional organic products and be optimised. Through the enlargement in diversity on the part of the wholesale trade, canteen kitchens will be able to order regional organic products without a problem in the future.

Sensitisation of the consumers for regional organic products

Consumers (including holiday-makers) should get informed by information facilities and offers about the connection between environmentally sound agriculture, healthy food, preservation of cultural landscape and nature protection.

Model project: “Erlebnisradeln am Untersee” (“Adventure” biking tours at Lower Lake Constance”)

The 120 km “Adventure cycle track Lower Lake Constance” connects 44 places and destinations under the topics agriculture, nature protection and gastronomy. Together with the Model Case Study Constance and the Untersee Tourism Association, a comprehensive brochure was created. In cooperation with the Surveyor’s Office of Baden-Wuerttemberg a special topographic map was developed. Both publications as well as information brochures of the project partners Tourismus Untersee e.V. and AG Hegau, ´ are being sold as a

"package" via book trade and the tourism information offices of the Lower Lake Constance communities with the title "Adventure cycle tracks Western Lake Constance, Hegau and neighbouring Switzerland". Initially 15.000 booklets have been printed. Additionally a special signpost system for the biking tracks was developed and installed. Meanwhile two travel agencies specialising in biking tours use the adventure cycle track as basis for package tours. During the first season already more than 500 bookings for the excursion destination "Overnight stay in straw" were made. Then the internet site "www.erlebnisradeln.de was set up. Meanwhile, the second edition of the whole package, is being sold (10.000 copies).

Model project: "Good marks for agriculture"

Especially interesting target groups for information campaigns on the topic "Alternative farming", are public educational establishments and institutions for the care of children and youths, particularly schools and kindergartens. The offer of break time snacks and meals at lunch are good opportunities to sell regional organic products and at the same time the young may discover the advantages and qualities of regional ecological products.

An analysis of the catering facilities in schools in the district of Constance during project phase I (2001) has shown that only very occasionally regional or regional organic food is being offered in the schools. A brochure is being published to inform parents, pupils, teachers of the importance and varied use of organic-products. During 2002 a working team will be created and first common actions (regional organic breakfast in schools, excursions to organic farmers etc.) will be carried out.

2.10. The farm Elmengrund

Ralf Keller, Organic Farmer

History

1925 Founding of the Farm of the Family 'Keller' with some cows, pigs and hens

1946 After WW II the farm is specialises more towards milk production

1969 Building of a new barn for 13 cows

1970 Extension of the barn for a further 20 cows

1983 Further extension by 13 places. There is now space for 27 cows and 19 calfs.

1989 During the late 80ies the family Keller realise that there is no space in the area of their farm for further extension. This is necessary to ensure that the farm can survive. Family Keller look for alternative projects to be able to keep their farm.

1990 2 major steps.
1. Family Keller decide to sell their milking-cows and sell their rights to produce 130.000 litres of milk
2. A new building to house 70 mother-cows is built at the edge of the settlement. This is the birth of the farm Elmengrund which is so called because of the name of the site it was built on.

The meat from the farm was initially sold straight from the living-room. Later the name 'Hofladen' (farmshop) was created for such sales.

1992 Due to the health problems of Ralf Keller (son) which seemed to be connected to prolonged contact with fertilisers and herbicides, Family Keller changed to organic farming.

1994 Two large garages in the area were bought and transformed to deep freeze, butcher and sales rooms. Cattle were sold as one-quarter or one-eighth cattle during this period. Customers were won through presence at markets and through personal contacts. Sales were therefore through the farmshop and by delivery as far away as Stuttgart.

1996 early in 1996 Family Keller is informed by the organisation 'Modellprojekt Konstanz' (Model project Constance) of a new project called 'Bauernmarkt Radolfzell' (Farmers market Radolfzell). A farm selling beef was being looked for to participate in this project and so Family Keller decided to support the project. In the further development of the project, Family Keller made contact with the mountain dairy in Sonthofen to supply milk and cheese products to the farmers market.
On the 27 September the farmers market was opened as a shop jointly run by 9 operators in the centre of the pedestrian shopping area of Radolfzell.

1998 In early 1998 Ralf Keller takes over the farm from his father Ottmar Keller. Shortly afterwards he takes over the entire meat business in the farmers market as it turned out that it was not viable to have three operators for this area.
The farm was increased with space to keep a further 26 mother-cows.
The farmshop and the delivery service became less and less important with the participation in the farmers market.

2000 In October Ralf Keller opened the second farmers market on the edge of the centre of Singen. Ralf Keller is responsible for all products sold in this market. Due to the construction of the town of Singen, the connection to the centre of Singen are very unsatisfactory.

Organic farm Elmengrund

The organic farm of the family Keller encompasses an area of 124 ha. The farm is situated in the region of lake Constance, more specifically in Mauenheim (several kilometres away from Singen and Radolfzell). When Ralf Keller took over his parents farm 3 years ago he saw his future as a farmer in producing organic products and in direct marketing.

The farm concentrates solely on animal farming and only grows crops as fodder for the animals and for own consumption. On the organic farm 'Elmenhof' the animals have always been able to graze outside on wide grassy areas. Keeping and feeding the animals in ways which are appropriate to the species helps to guarantee the health of the animals. The 85 Angus mother cows and calves and the two stock bulls are kept on grassland from April to the end of October. In the winter the animals are able to use a generously-sized paddock with constant access to a large barn.

Due to joint grazing of the Angus stock bulls with the rest of the herd, breeding occurs naturally. The calves are kept in an appropriate way and are constantly in the care of their mother. They are fed naturally by their mothers and graze on fresh grass. The species appropriate rearing of the Angus calves, means that they are almost totally free of connective tissues and fat. Because of this the meat contains very little water and keeps its original size when fried. The meat from 'Elmenhof' is easily digestible and is permitted during many diets.

Angus cows

The Angus cows are originally from Scotland and distinguish themselves from other races through the following features:

- High meat quality
- Strong motherly instincts (necessary when keeping mother-cows)
- Meat with short fibres and tender
- Easy births

Fresh organic quality

The family Keller sell their ecologically produced products in the region. For this reason Ralf Keller decided to be a founding member of the 'Farmers Market' in Radolfzell as the butcher. Almost all of the meat of the organic farm is now sold at the farmers market, in Radolfzell or in Singen. As well as this some meat is also sold directly at the farm gate, although this activity is no longer advertised as it is highly time intensive.

The Kellers slaughter their own animals 500 metres away from the farm so that the animals do not suffer any transport stress. This also means that the meat is free of hormones produced through stress and free of sedatives. On top of the already stringent guidelines for organic farming, family Keller only uses homeopathic medicines. According to Ralf Keller the number of ill cows has reduced drastically and the meat has been certified free of dangerous residues which seems to prove the success of these measures.

The organic farm 'Elmenhof' has been a member of the 'Neuland' (new land) organisation since 2000. Neuland is an organisation promoting species appropriate and environmental sustainable animal keeping and was founded in Bonn in 1988. The organisation has created the necessary structures to promote Neuland as an independent meat brand. Neuland was not founded as an organisation to promote organic meat but instead developed an own concept. During this period Neuland developed criteria for species appropriate rearing methods which have now been recognised and are being copied by any institutions. The overall aim is to develop a way of rearing animals on farms which is quality oriented, species appropriate and environmentally friendly.

2.11. Case Study Constance Ltd sustainable regional development in the west Lake Constance area

Michael Baldenhofer, Office „PLENUM Westlicher Bodensee“, Regional place of coordination for the Lake Constance Agenda 21 (www.modellprojekt.de)

Starting position

The **Modellprojekt Konstanz GmbH** (Case Study Constance Ltd) initiates and supervises projects aimed at the sustainable protection and development of cultural landscapes around the Western part of Lake Constance. The work of the case study is based on the understanding that landscape conservation, nature- and resource protection can only be realised on a large scale in cooperation with farming and with other relevant regional partners. This is the reason why the model case study Constance gathers representatives of municipalities, farming, nature protection, tourism, trade and business together to decide on strategies for implementing joint projects.

PLENUM (Projekt des Landes zur Erhaltung und Entwicklung von Natur und Umwelt- Project of the state to maintain and develop nature and the environment) is part of the new strategy for the protection and development of nature and the environment in the state of Baden-Wuerttemberg. A structural element of the project is the voluntary basis and the development of measures to protect nature and the environment from the grassroots -upwards. The project addresses farmers, other landowners and inhabitants of a region and supports projects to implement the measures in many areas of life.

Specialities of the project is the integrative basic approach, the innovative significance of office and communal cooperation and the strong consideration of microeconomic aspects with the implementation of environment and nature protection goals.

Goals

The Modellprojekt Konstanz GmbH contributes to the caring of the cultural and recreational landscape in the interest of the broad public. It also works for the preservation and the improvement of the natural environment as well as for the strengthening of rural areas.

The main aims of the project include the following points:

- A diverse cultural and recreational landscape
- Environment for wild plants and animals
- Use of land which is fitting to the location and sustainable
- Close cooperation between producers, refiners, trade and consumers
- Marketing of regional products and goods and services
- Environmentally sustainable tourism
- Production and recycling of renewable raw material
- Cross-communal implementation of Agenda 21

About the organisation:

The executive board, the board of directors and the company general meeting are the main elements of the organisation. On top of these, an advisory board to consult and support the organisation has been created. The advisory board has the job of developing new ideas for

projects, advising the executive board and the board of directors, inputting expert knowledge and working as a multiplicator and spreading the project philosophy. To help the executive board and the project management to carry out projects, there are three employees who work from the Office for Agriculture in Stockach. This is where the implementation of the projects and the running of the organisation takes place.

You can receive further information by contacting:

PLENUM - Office

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2.12. Farmers Market Radolfzell

Michael Baldenhofer, Plenum Project Director

Project Description

Starting position and project goals

The privileged climatic situation of the Lake Constance region allows the cultivation of a wide range of fresh agricultural products. Nevertheless the local farmers have great difficulties earning their living or building up long-term economical perspectives through farming only. There are three Bauernmärkte "farmers markets" offering fresh regional agricultural products in the western Lake Constance area, in Constance, Radolfzell, and Singen. It is expected that these so-called "Bauernmärkte am westlichen Bodensee" (Farmer Markets in the Western Lake Constance area) will provide additional income by direct marketing of the regional products thus guaranteeing a secure living of small family businesses.

The advantages of farmers markets are evident: The consumers have the opportunity to buy daily fresh and high quality regional food. They have a big choice among the various local products. And the long distances to the different farms are overcome. This "regionalisation" of the consumer's habits reduces both traffic and packaging.

As the whole cultural landscape – habitat of numerous animals and plants, and recreation area – largely depends on the agricultural use and care, this project "Bauernmarkt Radolfzell" (Farmers Market Radolfzell) is an important contribution to the protection of nature and environment.

The project "Bauernmarkt Radolfzell" (Farmers Market Radolfzell)

The oldest farmers market in the western Lake Constance region, the farmers market Radolfzell, was developed by the Modellprojekt Konstanz GmbH (Case Study Constance Ltd) in cooperation with a regional PR agency. In October 1996, Gerdi Staiblin, Minister of Agriculture, inaugurated the first farmers market.

Very centrally located, the farmers market offers a large assortment of goods at competitive prices and is a valuable addition to the cityscape. The farmers market Radolfzell has a sales area of 110 sq. m. and is open daily at the usual shop opening hours. Only regional farmers are allowed to offer their products. Traders are not accepted. Vegetables from Allensbach, fruits from Güttingen, sausages, meat and bread from the Hegau region – the whole range of farmers' goods is available. Seven regional farmers - within a radius of about 25 kilometres- run the market, and offer their products. Foreign products such as citrus fruits are not sold.

Another innovative element of the project is the integrative cooperation of different agricultural enterprises. The rich assortment is only possible through the versatility of the farmers involved. The joint marketing of the organic products underlines the importance of the factor regionalism of the project. Additionally, the project is made up of a comprehensive, complete marketing concept which is consequently pursued and realised. Special attention was given to the inclusion of the farmers into each stage of the project development enabling them to actively participate in the elaboration of the concept.

Communication

2.1. Project Description

From the beginning, great importance was attached to a catchy logo resp. corporate design (CD) for the farmers market. The logo is easy recognisable and is seen everywhere in the shop, on wall tiles, freezers, on the shop windows on packaging material (wrapping) and product package. Also in press advertising the corporate design is used all the time.

In an early project phase consultations took place with the municipal authorities, the Office of Economic Promotion, Economic Control Department and the Public Veterinary Service. So differences and possible later costs for alterations could be avoided. In summer 1996, as the opening of the farmers market was approaching, various actions were carried out to inform and influence the local people to think positively of the new food shop, namely

The interest group Bauernmarkt (IG Bauernmarkt) participated in the Radolfzell City Festival with their own stand in front of Bahnhofstraße 5. Agricultural products and snacks (sandwiches, juice, cider) were offered. A name had to be found for the farmer depicted on the logo, and a quiz was carried out. About 5000 cards were distributed in Radolfzell. In the presence of the local press, the best five suggestions were awarded a basket of goods and purchase coupons (vouchers).

A campaign together with the regional daily paper was organised to introduce the farmers involved in the project. Within the scope of the summer offer “Holiday for all those at home” three excursions to the local farmers participating in the project were organised and about 40 to 50 interested people came to see the farms and enjoy a local snack.

2.2. Advertising Concept

a) Press advertising

For press advertising an annual budget of about 5.000 € was agreed on. With this budget standardised adverts (110 x 90 mm) are being published every second week in the two local print media *Wochenblatt* (Radolfzell/Singen/Engen/Stockach, circulation about 40,000) and *Hallo Radolfzell* (City News of Radolfzell, circulation about 15,000). The adverts are individually designed and refer to seasonal offers of the respective farmers.

b) Other PR work

In August 1997 a four-colour consumer leaflet was published. Text and photos represent the farms taking part in the “Bauernmarkt Radolfzell”. In the shop, on the counters and by nameplates, reference is made to the different farms involved.
A participation of the farmers market in the next City festival is planned.

c) Multi-client survey

In June 1997, and September 2000, about 250 customers a time were interviewed.
Each consumer received a magnetic shopping list with publicity slogans on it:

The following answers are part of the 262 questions the consumers were asked:

Question 1: Do you like the Bauernmarkt?				
	Very much	much	not very much	not at all
Answer:	201	61	1	0

Question 3: I particularly like to buyin the Bauernmarkt because:	
	Answers
The products are from the region	231
I have a lot of confidence in the quality of the products	147
The price-quality ratio is good	109
Other reasons (friendly service)	21
(freshness of products)	10

Question 5: Which products are you most satisfied with?	
Vegetables	133
Bread	70
Fruit	43
Sausages	33
Salad	26
Cheese	18
Eggs	18
Dairy Products	17
Marmalade	12
All products	24

3. Development of the Project Idea

April 95	The project idea “Bauernmarkt Radolfzell” (Farmers Market) was discussed with several farmers of the Constance district.
August – October 1995	Several meetings with the farmers to define the concept and organise an action group. A bus excursion to the Farmers Market Ravensburg was organised to get a first impression of the possibilities of how to realise the farmers market concept. A foundation charter and market regulation was worked out as the basis for action. Further steps were deciding on the products to be offered and the partition of the trade counter.
October 1995	Search for an adequate location and elaboration of a concept for the inside furnishing by a planning agency.
February 1996	Foundation of the “Bauernmarkt Radolfzell e.V.” (Farmers Market Radolfzell).
February – April	A location was found. Meeting with the appropriate authorities (Economic Control Department, Public Veterinary Service, Municipal Public Affairs Office, Office of Economic Promotion of Radolfzell).

May – July 1996	PR concept and planning of the shop equipment. Decision – together with a local PR agency - , of the name, logo, slogan, PR and packaging material. Planning phase of the shop renovation works and equipment.
July 1996	PR work, invitation of the local newspaper “Südkurier” to visit the locality, quiz to find an appropriate trade name.
August – Sep.	Renovation of the shop in accordance with the official regulations Interior fittings by local workmen
September 1996	28 September: Opening of the Farmers Market 4 October 1996: Inauguration of the market by Minister Gerdi Staiblin

4 Description of the Market

Five regional full-time farmers are running the market. Four farms produce based on the principles of controlled-integratedfarming, and one farmer based on controlled-ecological principles.

Farmer	Type of production	Method	Farmland Hect.	Livestock	Market Segment
Aichem Radolfzell	fruit growing dairy farming	integrated	31	dairy cattle, breeding	pomaceus fruit stone fruit, schnapps (liquor)
Graf	agriculture potatoes, dairy farming	integrated	73	dairy cattle, breeding	brown bread pastries, cakes
Hägele Hilzingen	agriculture potatoes, dairy farming	integrated	76	dairy cattle, breeding	brown bread pastries
Hausler Allensbach	vegetables	integrated	7	-	vegetables
Keller Mauenheim	livestock breeding (mother cow)	organic	105	mother cows	meat, sausages, dairy products

The goods offered in the farmers market are all – except two – produced by the five farms involved. It was agreed upon the possibility to buy-in vegetables during the vegetation break in winter, but only the same kind of vegetables that is cultivated by the five farmers (no citrus fruits for example). All dairy products are produced outside the region as there are no full-cream-milk farms and also no larger cheese dairies in the district of Constance.

The capital cost for the shop planning, renovation works, inside equipment and furniture were about 1,000 € per sq.m. The real expenditures exceeded the estimate very slightly. Only minor subsidies of the Development Program Rural Areas (ELR), and of a commercially-oriented investment program for the creation of jobs in rural regions were used.

The distribution of the general costs (general investment costs, rent, staff, PR) is made by a very complex formula on the basis of the size of the area and the expected turnover. Each farmer keeps track of his own costs. The viable economic basis (breakeven point) is around € 380,000 per year (estimated). The real turnover exceeds this amount.

5. Importance of the Market for the Region

The project target was the creation of a long-term sales structure to guarantee the survival of rural family businesses. Another goal was to increase the offer of fresh and high-quality regional products. It can be said that the concept of the Farmers Market met with general approval of the citizens of Radolfzell. About 150 to 200 customers daily come to the shop and buy their supply of fresh food. The whole region profits from the new offer of fresh regional agricultural products. The City of Radolfzell benefits from the project as well, the pedestrian zone is busy with customers of the Farmers Market, and shops of other trades gain advantages from the increased number of people in the streets. New jobs were also created.

The care and development of cultural landscape is strongly influenced by healthy agricultural structures. So the project “Bauernmarkt Radolfzell” is also a contribution to the protection of nature and environment in the Lake Constance region.

The general trend towards a better understanding of ecology is noticeable in the environmental awareness and health-consciousness of the consumers. This in turn leads to a growing demand for regional and organic goods. The purchase of food is becoming more and more a question of trust. As the products offered in conventional stores do not take into consideration whether the products are local or not, the creation of sales structures with easy access for customers, and a wide range of products including local goods, is an important prerequisite for a change of the consumers’ habits The close contact to the agricultural producer allows the consumer to get an insight into the economic situation and problems of small local agriculture. On the other hand, due to the direct contact, the farmers hear about the goods the customers prefer or would like to buy and are able to customise their production accordingly.

2.13. Wastewater Treatment in Reed Beds

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Why ‹Constructed Wetlands›?

The world-wide trend over the past 70 years in the construction of water pollution control facilities has been toward ‹concrete and steel›. These ‹conventional› treatment plants were developed to provide the highest performance on the smallest possible room; they are highly technical installations, which are fully dependent on electricity, experienced personnel and good maintenance. The disadvantages of such facilities are high construction and operational costs, a demanding maintenance, and a strong dependence on spare parts.

In North America and Europe, economic pressure has caused engineers to search for creative, cost-effective and environmental sound alternatives for purifying wastewater. The ‹natural› way – treating sewage in artificial wetlands – is becoming increasingly popular. Hundreds of such reed bed treatment plants are in use in the USA and all over Europe; their popularity is growing every year. Scientific research and an intensive international exchange of experiences are the basis for this success.

Constructed wetlands are an appropriate technology for areas where inexpensive land is generally available and skilled labor is less available. Whether they can be used essentially alone or in series with other appropriate technologies depends on the required treatment goals. Additionally, they can be appropriate for onsite systems where local regulators call for and allow systems other than conventional septic tank/soil absorption systems.

Constructed wetlands have been used to treat a variety of wastewaters including urban runoff, municipal, industrial, agricultural and acid mine drainage. However, the scope of this manual is limited to constructed wetlands that are the major unit process in a system to treat municipal wastewater. While some degree of pre- or post-treatment will be required in conjunction with the wetland to treat wastewater to meet stream discharge or reuse requirements, the wetland will be the central treatment component.

Constructed wetland for 200 inhabitants, just after completion of construction work

Constructed wetland with polishing pond, Seychelles

What are ‹Constructed Wetlands›?

Constructed wetlands are ecological systems that combine physical, chemical, and biological processes in an engineered and managed system. Successful construction and operation of an ecological system for wastewater treatment requires knowledge and understanding of the components and the interrelationships that compose the system.

Constructed wetlands are artificial wastewater treatment systems consisting of shallow (usually less than 1 m deep) ponds or channels which have been planted with aquatic plants, and which rely upon natural microbial, biological, physical and chemical processes to treat wastewater. They typically have impervious clay or synthetic liners, and engineered structures to control the flow direction, liquid detention time and water level. Depending on the type of system, they may or may not contain an inert porous media such as rock, gravel or sand.

The apparent simplicity and natural function of constructed wetlands may obscure the complexity of interactions required for effective wastewater treatment. Unlike natural wetlands, constructed wetlands are designed and operated to meet certain performance standards. Once a constructed wetland is designed and becomes operational, the system requires regular monitoring to ensure proper operation. Based on monitoring results, these systems may need minor modifications, in addition to routine management, to maintain optimum performance.

Constructed wetland planted with bulrush (Typha)

Constructed wetland planted with reed (Phragmites)

Types of ‹Reed Bed› Systems

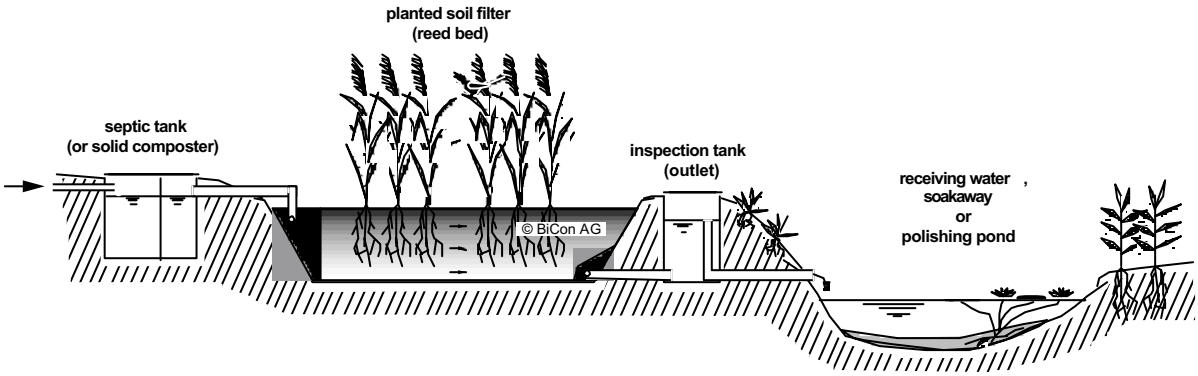
Wastewater can be treated naturally in many different ways. As early as the last century sewage was purified in natural marshes or stabilisation ponds. Nowadays, such wetlands are frequently constructed for this purpose. ‹Constructed wetlands› can be classified into two main types, dependent upon whether the water level lies over or beneath the soil surface. The first type is called ‹surface flow wetlands› (or ‹free water surface› wetlands), the second type ‹subsurface flow wetlands› (also called ‹vegetated submerged beds›).

In the early 60s, the German K. Seidel was the first who tried to purify wastewater in constructed subsurface flow wetlands. She used gravel as a soil matrix. Later, others like R. Kickuth experimented with natural loamy soils but Kickuth's ‹root zone process› proved to not function properly (clogging!). Finally, sand and gravel turned out to be generally the best substrate (‹planted soil filters›).

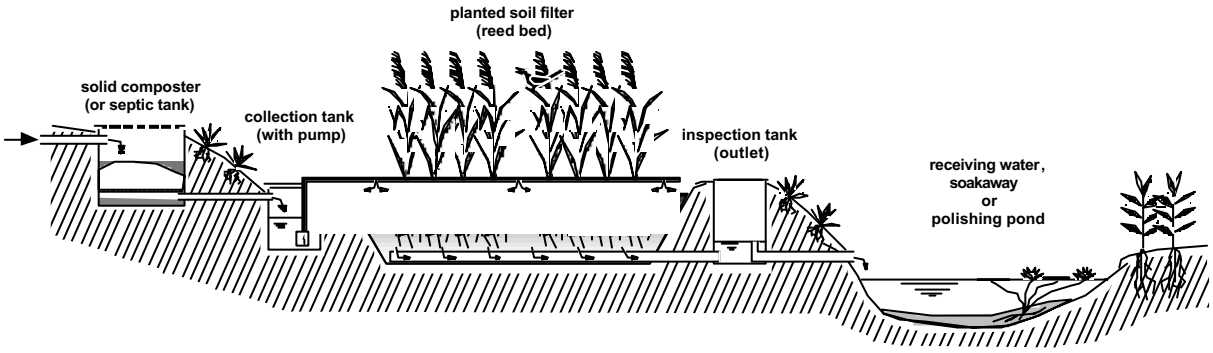
The flow direction is another important construction detail: Horizontal- or vertical-flow systems. Periodically charged and vertically percolated sand filters show the best efficiency regarding the oxidative degradation of pollutants whereas horizontal-flow wetlands have a favourable effect on the denitrification rates.

Reed bed treatment plants can be constructed for treating domestic, municipal, industrial or agricultural effluents. Each wetland system must be adjusted to the quantity and type of wastewater to be purified in the plant in order to function properly. Therefore, there is no general construction design; every case is different from each other and has to be carefully evaluated. Planning and construction must be supervised by skilled experts!

Horizontal flow soil filter



Vertical flow soil filter



Odor?

Conventional wastewater treatment processes produce odors mostly associated with anaerobic decomposition of human waste and food waste found in sewage. These odors usually are concentrated in areas of small confinement and point discharges, like influent pump stations, anaerobic digesters, and sludge-handling processes. Wetlands, in contrast, incorporate normal processes of decomposition over a relatively large area, potentially diluting odors associated with the natural decomposition of plant material, algae, and other biological solids. However, wetland treatment systems receiving septic tank and primary effluents can release anaerobic odors around the inlet piping.

Operation and Maintenance

Constructed wetland systems require a minimum of operational control. Monthly or weekly inspection of weirs and weekly sampling typically are required at the effluent end, and periodic sampling between multiple cells (different beds) is recommended.

Maintenance of constructed wetlands generally is limited to the control of unwanted plants. Harvesting of plants generally is not required, but annual removal or thinning of vegetation or replanting of vegetation may be needed to maintain flow patterns and treatment functions.

Mechanical Pre-treatment

For the removal of most of the solids – to prevent clogging of the sand filter(s) – a mechanical pre-treatment of the raw wastewater is essential. This can be achieved with a grid in front followed by a sedimentation pond, a septic tank system or a ‹solid composter›. Sedimentation ponds are only recommended in cases where huge amounts of wastewater have to be treated (e.g. industrial wastewater). For domestic or municipal sewage usually the other two techniques are the preferred solutions. The septic tank system must consist of at least 3 chambers, which have to be equipped with grease traps. The settled sludge and the scum layer must be disposed regularly, otherwise the efficiency of sedimentation decreases rapidly.

A completely different working principle is the basic idea behind the ‹solid composter›: it works as a filter in which the solids rot. The composter consists of at least 2 chambers. While one chamber is being fed, the collected material in the other chamber is composting. Each chamber has capacity of about one year. Therefore, once a year the humus of one chamber has to be dug out.

The advantage of the composter is its overall aerobic milieu. The effluent of the composter still contains oxygen and doesn't smell, whereas the effluent of a septic tank is anaerobic and smelling. The sludge of a septic tank is putrefied anaerobically whereas the collected material of a composter is composted aerobically to humus. The sludge disposal is less pleasant and more difficult than digging out ‹earthy› humus which doesn't smell.

Solid composter and its end product

Plant-Soil Filters – Technology Description

Planted soil filters are ‹subsurface flow wetlands›. The reed bed itself is a sealed ‹hollow› with a depth of about 1.2 m, filled with a permeable soil medium of particular characteristics (mainly sand and gravel) and vegetated with marsh plants (helophytes like cattail, reed,

bulrush etc.). Sealing is done with a plastic liner, bentonite (clay mineral) or some layers of compacted loamy or red soil.

The wastewater trickles through the soil filter horizontally or vertically. Horizontal flow filters are fed continuously, the retention time depends on the water level within the soil filter (depends on outlet structure). Vertical flow filters are fed intermittently (with flushing a few times per day); the sewage seeps away within approx. 30 minutes and is purified while percolating slowly through the filter medium. There remain no exposed water surfaces, the soil filters are not constructed ‹swamps›.

The purification effect – removal and retention of the pollutants – is achieved by natural biogeochemical processes in which the soil particles, the plant roots and the micro-organisms of the soil participate.

For further upgrading of the performance of the system, a polishing pond can be added at the end. The effluent is discharged into a receiving water or infiltrated into the subsoil.

Construction:
excavation – sealing with plastic liner – filling in gravel and sand – initial planting

Design Criteria and Performance

Wastewater treatment in constructed wetlands requires more space than conventional plants made of ‹concrete and steel›.

Vertical flow filters: For domestic sewage, it has to be calculated with a minimum area of 1 – 4 m^2 per person (or ‹population equivalent›), depending on the climatic conditions at the site (in tropical regions 1 m^2, in Germany and Switzerland 4 m^2). Each wetland plant consists of 2 or more separated soil filter compartments. If the terrain is flat, if there is a lack of space, and/or if a high purification efficiency has to be achieved, one or more pumps may be necessary: But the pumps run only a few minutes per day.

Horizontal flow filters: They need much more space if used as main biological step, approximately 8 – 12 m^2 per person in Swiss/German climate. We recommend horizontal filters for post-treatment, for denitrification.

In a properly designed reed bed treatment plant, the microbial community in the sandy soil and the soil matrix itself as adsorption and filtration medium are able to reduce TSS, BOD, COD, TOC, total nitrogen, total phos phorus and pathogens in the same order of that of a *good* working conventional (‹technical›) sewage treatment plant. Even small wetland plants remove phosphorus and do denitrificate. The effluent of such plants meets the EU and the Swiss standards even in the cold season!

Literature

Both publications can be downloaded from the internet: www.epa.gov

- «Constructed Wetlands Treatment of Municipal Wastewaters». United States Environmental Protection Agency EPA, September 1998, Publ.No. EPA/625/R-99/010
- «Environmental Planning for Small Communities A Guide for Local Decision-Makers». United States Environmental Protection Agency EPA, September 1994, Publ.No. EPA/625/R-94/009

Centralized Wastewater Treatment Technology Options

(Table taken from following reference: «Environmental Planning for Small Communities – A Guide for Local Decision-Makers», US-EPA 1994, Publ.No. EPA/625/R-94/009)

Technology	Description	Advantages/Disadvantages	Costs	
Land application: • Slow-rate infiltration (SRI). • Rapid infiltration (RI). • Overland flow (OF). • Subsurface wastewater infiltration systems (SWIS).	Treated wastewater is sprayed or flooded onto vegetated soils, sandy basins, or a grass-covered slope, or is distributed from pressurized laterals below the surface in gravel trenches. Natural processes purify the wastewater.	• All but SWIS require buffer area for separation and require a long-term commitment of a large land area. • Ground water contamination by nitrates might be a concern with SWIS and RI. • Except for overland flow, no discharge permit required. • SRI and OF unsuitable for treating wastewater in cold weather, requiring holding ponds for storage during winter months.	Capital O & M	Medium Low
Lagoons: • Facultative • Aerated • Controlled discharge	Wastewater is placed in a large pond and is treated by the interaction of sunlight, wind, algae, and oxygen over time. Deeper lagoons can be aerated to provide additional oxygen.	• Odors possible. • Large amount of land required. • May not always meet effluent requirements. • Aerated lagoons require significant power.	Capital O & M	Medium Low to Medium
Constructed wetlands: • Free water surface (FWS) • Submerged flow (SF)	Settled wastewater is applied to a SF-constructed wetland. Lagoontreated effluent is applied to FWS wetlands. Natural processes purify the wastewater.	• FWS requires very large land area. • Present SF design removes organics and solids. • Low energy requirements.	Capital O & M	Medium Low
Slow sand filters: • Recirculating (RSF) • Intermittent flushing (ISF)	Settled wastewater is applied to the surface of a sand bed and allowed to percolate through the bed, where it receives treatment.	• Reliable, high-quality treatment. • RSF capable of removing (~ 50%) nitrogen. • Required land area intermediate between natural and mechanical system.	Capital O & M	Medium Low
Trickling filter	Settled wastewater trickling down through a bed of rock or plastic media is purified by the bacteria living in the medium. The bacteria slough off and separate as sludge in a final settling tank.	• Process is vulnerable to freezing temperatures. • Less effective removal of toxics and metals than activated sludge (AS) systems. • Capable of meeting secondary effluent standards. • Large volume of sludge generated. • High power requirements.	Capital O & M	Medium Medium
Oxidation ditches	Screened and degritted raw wastewater is mechanically aerated in an oval ditch. After treatment, liquid and sludge are separated in a final settling tank.	• Most stable performance of all continuous flow mechanical biological systems. • May be designed and operated to meet water quality limits beyond secondary effluent. • Skilled maintenance required. • Large volume of sludge generated.	Capital O & M	Medium High
Sequencing batch reactor (SBR)	A tank is filled with screened and degritted wastewater. Wastewater is aerated, solids are allowed to settle, and the effluent is drawn off and discharged. One tank or multiple parallel tanks can be used.	• Subsequent (disinfection) processes must be oversized or require equalization. • Most flexible mechanical biological treatment systems capable of phosphorus and/or nitrogen removal. • Large volume of sludge generated. • Can be designed and operated to meet water quality limits beyond secondary effluent.	Capital O & M	Medium Medium

3. Conclusions

3.1. Evalulation of the Training Course

Positive Aspects:

- Good combination of theory and excursions
- Great variety of the programme
- Different areas with different problems / exchange of information
- Getting to know new people / Basis for future collaboration
- Important experience: cooperation NGO's/ administration - Different actors working together
- International participants of Training Course-not just European
- Students have the chance to meet experienced people / How to apply theory learned during studies
- Participants were able to contact with farmers
- Good organisation

Points of potential improvement

- Water management: more input about positive experiences around Lake Constance
- Transboundary lake: more participation from Austria and Switzerland desired
- More input to training course from water management authorities
- From water treatment to water management
- More comparison with the way other countries are dealing with some of the issues of the Training Course on a different scale
- More information about the negative sides and the difficult aspects of projects looked at during the training course
- Important to evaluate the restoration measures seen during the training course
- Connect model projects and measures with management plans: vision – objective – measure – result – continuation /monitoring
- Some days the programme was too dense
- Notes of speakers a week before

Improvements for the future:

Travel expense – subsidies

About 20 people applied from Africa, India or Eastern-Europe. They would only have been able to participate if their travel expenses had been paid. This amount of interest was not expected in advance and it was not possible to find further subsidies at short notice. From the limited budgets of the GNF and the Lake Constance Foundation, only a small subsidy towards the over night costs could be offered. In most cases this was not enough to enable people from third world countries to participate.

In the framework of preparations for future training courses, we will take into account the great interest of third-world countries and will attempt to find funding ahead of the training course.

Liability to recourse: Seven registered participants from Africa never arrived. The costs for the hotel had to be covered by the Lake Constance foundation.

Language barriers: Many German presentators had difficulty holding presentations in English. The English of some of the Greek participants was not too good, so that the Living Lakes project partner H. Jerrentrupp had to translate everything into Greek.

Transferability of the positive examples: As the projects and case studies can never be transferred one-to-one, a great deal of discussion and background information is needed to recognise the transferable aspects. One way this could be aided in future, is by a more thorough preparation of the presentators and a greater willingness on their side to discuss the background and the negative aspects/ experience with their project and not just the positive sides. A briefing was carried out – but even so, some of the presentators did not always keep to the guidelines.

A further important aspect was the exchange of information between the presentators/ hosts and the participants and between individual participants. This aspect could be structured better during future training courses and more time given for it.

We would like to thank the presentators and the participants for the lively discussions and for the positive outcome of the first training course **„Sustainable Management of wetlands and shallow lakes“** at Lake Constance. Our special thanks goes to the municipality of Bodman-Ludwigshafen for their invaluable collaboration.

Konstanz, August 2002.....

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