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0. Summary

The International Workshop on Internet-Based Nature Observation Projects/Initiatives in Bonn, Germany on December 11-12, 2000 was attended by 35 participants from Australia, Belgium, Canada, Chile, Finland, Germany, Greece, Namibia, Russia, Slovenia, South Africa, The Netherlands, United States of America, UNESCO, UNEP-WCMC, CMS, UNFCCC. Participants were welcomed by Ulrich Hauschild/Mayor of the City of Bonn, Dr. Michael von Websky/Deputy Director-General of the Nature Conservation Directorate at the Federal Ministry for the Environment (BMU) on behalf of BMU Parliamentary State Secretary Simone Probst, Prof. Dr. Georg Rudinger/Dean Faculty of Humanities University of Bonn, Dr. Frank Begemann/Deputy Director of the German Center of Information and Documentation in Agriculture (ZADI) and Mr. Ulf Müller-Helmbrecht/Executive Secretary of the Convention of Migratory Species (CMS). They underlined and emphasized the importance of the Internet as one of the new and future-oriented media to facilitate communication and cooperation among partners throughout the world. This new and growing gateway should be developed in a way that will help to understand the value of nature across borders, ecosystems and cultures.

Participants in the workshop represented internet-based nature/biodiversity observation projects with a scientific and public awareness-raising component to schools and/or the public in general. A wide range and variety of internet-based nature/biodiversity observation projects ranged from plant and animal observation projects, ecosystem and bio-monitoring to satellite tracking. It was evident that projects used different materials, technologies, tools for interaction and out-reach strategies. Most of the projects used a Geographical Information System (GIS) for visualization of the observations. Observations were located on a map with their respective two data: (i) location of the observation and (ii) the date of the observation. INSECT@THON, a project from Namibia, was one of the outstanding practical examples of how to work with schools and students on taxonomic information in the frame of the CBD. But all projects were based on one common denominator: nature observation and interaction.

The global policy context was introduced by UNESCO in the CBD-UNESCO "Global Strategy on Biodiversity Education and Public Awareness". From the scientific view it was made evident that any project with public out-reach needs an "ex-ante", interim and ex-post monitoring & evaluation. Projects should be developed step-by-step and should start simple to facilitate the gain of experiences and adaptations based on the M&E process. That indicators may become rather relevant for activity evaluation is reflected by the following "Story" which was used with eye winking to introduce the topic.

The STORY of "The first evaluation": In the beginning God created the heaven and the earth. And God saw everything that He made. "Behold," God said, "it is very good." And the evening and the morning were the sixth day. And on the seventh day God rested from all His work. His archangel came then unto Him asking, "God, how do you know that what you have created is 'very good'? What are your criteria? On what data you base your judgement? Aren't you a little close to the situation to make a fair and unbiased evaluation?" God thought about these questions all that day and His rest was greatly disturbed. On the eighth day God said, "Lucifer, go to hell."

The driving force behind the workshop was to stimulate and facilitate:

- The exchange of experiences,
- The transfer of know-how developed and technologies used,
- The discussion concerning the possibilities to develop a global networking platform with present and future projects joining the global network using Internet as communication and cooperation platform,
- The contribution to the CBD-UNESCO public awareness-raising initiative, and
- The identification of options for a specific activity on European regional level, connecting CBD and CHM-NFPs to identify first ideas on how to raise public awareness of the Convention on Biological Diversity.

Workshop participants discussed and agreed on practical and tangible steps for how to provide a follow-up to the workshop objectives i.e.

- via the workshop website,
- identify a common subject/theme each year for mutual observation and cross-cultural communication and
- initiate the creation of a "Global Network Platform of Internet-Based Nature/Biodiversity Observation Projects" – possibly under the umbrella of UNESCO as one concrete contribution to the CBD-UNESCO global strategy for public awareness raising.

1. Background

The workshop idea was fundamentally based on the experiences gained so far from the German internet-based nature observation project "Naturdetektive" (nature detectives in the Internet) <http://www.naturdetektive.de>. "Naturdetektive" is a practical contribution to Article 13 of the Convention on Biological Diversity (CBD) on "public awareness raising on the Convention". It has been developed by the German CBD Clearing House Mechanism National Focal Point (CHM-NFP) <http://www.biodiv-chm.de> under the Federal Agency for Nature Conservation (BfN) and the Federal Ministry for the Environment (BMU). The German project "Naturdetektive" is an

attempt to actively contribute to the idea of combining the CHM with public awareness raising of the Convention on Biological Diversity. Therefore the workshop was seen as a first practical contribution to the COP5 decision on developing practical examples on how to raise public awareness of the CBD and its objectives.

Workshop participants therefore represented both international internet-based nature/biodiversity observation projects and European CHM-NFPs of the Biodiversity Convention as well as Conventions working in this area.

The Internet is one of the many options and technical as well as conceptual solutions for how to raise public awareness related to the Convention on Biological Diversity. The Internet offers as yet unexplored opportunities to create and install new ways for interactive participation and direct communication between individuals and groups throughout the world. This is expected to facilitate challenging new forms to integrate this communication gateway into daily life. This may be relevant for schools with its teachers, students but also for scientists and the public in general.

The following five objectives were discussed:

Objective 1) Identify potential for the development and objectives of the CBD-UNESCO "global strategy for public awareness raising .. on the CBD", and other Conventions (ie. CMS, UNFCCC)

Objective 2) Experience exchange, lessons learned

Objective 3) Share of know-how and technology (tools used, concepts, strategies, didactical material)

Objective 4) Start to build a global network on these projects (continue info exchange, design common activities, stimulate intercultural communication)

Objective 5) Reflect on options of how to link European CHM-NFPs with public awareness raising on the CBD initiating a European "Biodiversity observation network - EURODETS".

The workshop's aim was to contribute to the exchange of experiences among the participants on existing "Internet-based nature observation projects/initiatives". The political background is based on AGENDA 21 and its Chapter 36 on "public awareness and environmental education". Nature and environment education is an encompassing field, which applies to the formal and informal educational sector. The Internet, as a relatively new media for this activity, is gaining increasingly in importance. The methodical approaches, however, are still in a developmental phase and their potentialities need to be explored and tested in practice.

Most promising seem to be those approaches where nature and environment observation, active monitoring and experiencing nature are combined with the possibilities of the interactivity and interaction of the Internet. Here it is possible to combine personal experience, observations, the monitoring and evaluation of observations with the Internet. This creates the possibility to put one's own observations into a wider environmental context. In this context the exchange of information and experience between far distant individuals gains an even greater importance. Particularly the border-crossing natural and environmental phenomena and problems are prime subjects for such shared actions, i.e. "invasive alien species", "climatic impact on plant flowering". The workshop also aimed to give an up-to-date overview on the application and impacts of such initiatives and projects and provided some reflections on how to contribute to a global network on the nature and environment education initiatives.

The changes in our environment, in particular the irretrievable losses in species diversity, erosion of genetic resources, varieties and habitats caused by human activities, are only diffusely perceived by the public. The threat from climatic extremes such as prolonged or advanced dry periods, increasing ozone values and rising CO2 concentrations are far better brought across than the situation of the biological diversity and its importance for our habitats. It is precisely this fact - that the importance of biological diversity is so difficult to convey to the public - which has led the Parties to the Convention on Biological Diversity to emphasise the necessity to develop innovative initiatives in environmental awareness raising.

The Internet offers outstanding advantages in comparison to all other media. Almost real-time interaction is in principal possible between participants of different geographical, social, and lingual origins. The Internet also offers potential for additional forms of intercultural communication which could facilitate the understanding of local, national, regional and also global interdependencies. It could also be used for broad public participation in a monitoring activity on biological resources - which would allow the integration of local observations and participation into a regional and global context.

Discovering this potential was the main driving force of the workshop. The ideas collected during the workshop on the five workshop objectives are expected to indicate activities in this direction.

2. Presentations - structure of the workshop - rapporteurs

All presentations are briefly summarized on 1/2 or 1 page in Annex 3. The general workshop structure was divided into six sections: **1st Day** (1) welcome & introduction to the workshop, (2) the global policy context, (3) project presentations, **2nd Day** (4) presentations by European CHM-NFP's, (5) presentations by German partners to "Naturdetektive" and (6) discussion, recommendations and future actions.

For each of the five objectives a **Rapporteur** contributed, together and with the help of all other workshop participants, a list of "bullet points" which she/he recognized from the presentations as relevant to the objective.

Rapporteur:

Objective 1) CBD-UNESCO global strategy (Salvatore Arico)

Objective 2) Experience exchange (Kate Gowland)

Objective 3) Share of Know-how/Technology (Elisabeth Beaubien)

Objective 4) Global Network (Jeremy Harrison)

Objective 5) European biodiversity-based network (Severin ten Houte de Lange)

3. Conclusions and recommendations

It was evident from the discussions on the five objectives that the participants were very motivated to give continuing support to the findings of the workshop. In general they underlined that the experience exchange and the know-how as well the technology transfer aspect were very important and also represented a first practical step towards "building a global network". The discussion also broadened the perspective from "nature" to "biodiversity" observation. This was agreed and seen as the overall term for all the projects present.

In addition, the participants expected the workshop be a starting point for a "global networking platform of internet-based nature/biodiversity observation projects". The group agreed that UNESCO should be invited to evaluate a proposal to be the "host" for such a "global platform" as a concrete contribution to the development of the CBD-UNESCO global strategy on public awareness. The "global platform" would allow the participation of any nature/biodiversity observation project and would provide a new window for intercultural communication and cooperation as well as know-how and technology transfer in the frame of "building partnerships" within the Convention on Biological Diversity but also beyond and connecting other Conventions.

First ideas on how this could be realised were exchanged and identified. The "Global Network Platform" should host in its core concept a **GIS-based interactive global and regional map**. Examples of how these GIS tools could be used for the Global Network Platform were demonstrated during the workshop by EMAN/Canada and GMD/Germany. This map would be used to visualize:

- (i) the individual existing and developing internet-based biodiversity observation projects and
- (ii) the observations contributed by the projects on mutually selected yearly themes.

This would allow the use of the Global Network Platform to stimulate and further intercultural communication, cooperation, know-how and technology transfer. In addition this would clear the way for the initiation of bi- or multilateral, locally as well regionally based "individualised" observation initiatives.

Basically, participating projects would deliver only two data to the Global Network Platform:

- (i) the location of the observation (either the geo-coordinates or the name of the village/city) and
- (ii) the date of the observation.

Observations as well projects would be interactive and facilitate as such immediate interaction and communication between them. But also participation by those who do not have immediate access to the Internet would be feasible – i.e. through the use of post-cards inserted in a biological journal. Those could then send their observations to the national project, where the information would be collected. Journals could then provide a forum for reporting again about the progress of the activity. Participants agreed that this should be elaborated in more detail – but always using a step-by-step approach.

As first and concrete steps participants agreed to continue to up-date the list of internet-based nature/biodiversity observation projects via the workshop web-site and to find a way to visualise the "Global Network Platform" on each of the project's web-sites. It was evident that the chosen workshop objectives were interrelated and beneficiary for future cooperation and communication.

In the following, the summary of the recommendations and observations of each of the objectives is presented.

Recommendations

Objective 1: Identify potential for the development and objectives of the CBD-UNESCO global strategy on biodiversity education and public awareness and other conventions.

One aim of the workshop was to identify at least a handful of concrete and feasible ideas and options on how to use the Internet for the development of the CBD-UNESCO global strategy on public awareness raising. For this reason it was rather important to be aware of the recently elaborated expectations by the CBD-UNESCO expert working group on public awareness raising in Bergen/Norway November 2000 and what kind of expectations have arisen regarding this development. The discussions of the Bonn group revealed a strong interest in working on a "Global Network Platform" giving space and room for internet-based nature/biodiversity observation projects. The following points were presented related to the CBD-UNESCO global strategy following the Bonn workshop:

- Establish a network/federation of projects for exchange of lessons and other resources
- Network would respond to the need of CBD-NFP, CBD Secretariat, and general public re. implementation of part of element 1 (networking of projects v. networking of communication networks) of the draft work programme for the implementation of the initiative + programme element 4 (demonstration projects)
- First cooperative step: Network, UNESCO and CBD Secretariat to complete and make available through Initiative the database of relevant initiatives being compiled by ZADI
- Presentation of Network activities at side event on the initiative in the margins of SBSTTA 6 (Montreal, 12-16 March 2000)
- Synergy with Biosphere Reserve Integrated Monitoring (BRIM) programme (complementing biological information with abiotic + third dimension: human uses/activities and related impacts)

Objective 2: Experience Exchange/Lessons Learned

A variety of different experiences have been gained so far by the participants in developing and continuing their projects. Before starting a project, it was agreed that it should have ex-ante, interim and ex-post evaluation elements which should make it possible to monitor the project impact and the expected out-reach. Projects

should also start simple and be developed step-by-step. A recommendation to broaden participation is to integrate additional partners who contribute in one or another way to the project – potentially also as "sponsor". It was evident that many good ideas for project implementation were limited due to financial resources. But it was stated that it is not necessary to "re-invent the wheel" – projects were made available in order to share their experiences and tools as well as concepts used which were elaborated under objective 3. Relevant experiences and lessons learned were:

- Project development is an evolutionary process: step by step, start small and local and build at the pace of the available resources; building strong foundations is essential.
- There is strength in partnerships: good projects attract significant partners and it is essential to evaluate projects properly to attract partners (ex-ante, interim and ex-post evaluation).
- Environmental outcomes are not the only outcomes of internet-based projects. We can also demonstrate social and economic outcomes.
- School environment internet-based programs extend across the curriculum and into the broader community.
- It is important to maintain scientific veracity in data collection projects. Expert consultation and assistance in program design will help with this.
- Tracking programs provide excellent local nature-observation opportunities.
- Need to build on existing activity and programs: "We have lots of bricks. We need to use them to build a foundation ("wall").
- Reach out to "underprivileged" schools: education and communication is not elitist.
- Using students' illustrations online helps with student ownership and makes it user-friendly.
- Regional coordinators are essential for data quality assurance, quality control (QA/QC)

Objective 3: Share of know-how

The discussion and the exchange of experiences in relation to objective 3 was regarded as an important contribution towards transfer of know-how and best practices tested in the projects. Projects were prepared to share their materials and know-how developed yet. There was a wide variety of different materials and strategies developed which helped to

build awareness of each of the different projects in the public.

Projects used own web-sites with full information about the projects and with growing interest in interactive on-line mapping of observations and/or data submission. Further they were used to print information flyers, posters, develop TV spots, video sequences and CD ROM's. They offer Fora for dialogue with experts, prepare paper manuals and provide Curriculum support to teachers and workshops. Competitions can play an important role to attract users. Projects provide press releases, journal publications, radio interviews for outreach and offered online teacher support.

Objective 4: Building a Global Network

To build a "global network" it should be pragmatic, build on what is there, use a step-by-step approach and meet real needs (whether educational or as support to decision making).

Expected outputs and outcomes:

- Demonstrate to scientists and decision makers the value of information compiled by children and community groups leading to more projects and better resources
- Demonstrate to children and community groups the relevance and potential use of the information they compile leading to increased interest
- Increase understanding of biodiversity issues by children and community groups
- Increase information and collaboration in biodiversity monitoring programmes
- Decisions based on the information that has been made available through these programmes leading to conservation of habitats and species
- Facilitate intercultural communication.

Potential actions:

1. Choose one or more projects to develop and test as a wider or global approach with different linguistic and cultural groups

Perhaps in each category- water quality, air quality, phenology, species distribution, species movement

2. Develop a common approach based on existing experience, and apply in more countries
3. Develop mechanisms for delivering information in appropriate ways for wider use

4. Identify and build on links to other networks with information and/or experience

For example - UNESCO Man and Biosphere programme, International Long Term Ecological Research networks, Organization of Biological Field Stations

5. Build ways to integrate results with other information sources meaningfully

For example - satellite data, geographical/geophysical data, other biodiversity data

6. Evaluation and feed-back.

Objective 5: European biodiversity-based network

In the context of the Council Conclusions of the European Environment Ministers (April 2000) to use the CHM also for public awareness building specifically of the CBD and its objectives, European CHM-NFPs exchanged their views on how this could be realised. This was also regarded as specific to Europe because of the relevancy of the so-called Aarhus Convention, which obliges European countries to let the European public actively participate in decision-making in environmental matters. The German "Naturdetektive" project was seen as one possible option to stimulate transfer and access to information on biodiversity and nature. It is an existing model for broad public participation embedded in the context of the CBD. It also showed a practical example of the combination between the CHM and public awareness raising of the CBD in a very simple form. There was no final conclusion made on this point and more testing of the appropriateness of this approach was needed. It was also clear that any initiative would be part of a "global network".

It was recognized therefore that:

- It is important to link CHM's to CBD public awareness raising
- More coordination between NFP's is necessary (not necessary for each country to "invent its own wheels")
- Naturdetektive could be a model for European level "EURODETS" (CHM & public awareness)

Conclusions

It was concluded that the group should continue, by means of the workshop web-site and established contacts, to build a "partnership building networking activity" based on these experiences. All participants emphasized that each individual project would be prepared to contribute to a "global network platform" potentially hosted by UNESCO. The "Global Platform" would facilitate communication and cooperation as well as share of best practices on how countries/projects integrate biodiversity in public awareness raising like INSECT@THON in Namibia developed this for the "taxonomic area" of collections.

The "Global Platform" should be based on an interactive Geographical Information System (GIS) providing a "map" for nature/biodiversity-based observation projects. Projects would maintain their authenticity, conceptual and technical standards and underlying concepts. Furthermore, there is a strong wish to coordinate and interlink projects and identify common basic themes on a yearly basis of observation as one element to stimulate intercultural communication based on nature and biodiversity. This could be one element for raising public awareness ie. of "International Biodiversity Day"

**Annex 1) Agenda : International Workshop on "Internet-Based Nature Observation Projects"
11.-12. December 2000, Bonn, Germany
Location: ZADI*, Michaelshof 4b, Bonn-Bad Godesberg**

Monday, December 11, 2000

1st workshop day

- 09.00 – 09.30 Ulrich Hauschild (*Mayor of the City of Bonn*)
Welcome Michael von Websky (*Federal Ministry of the Environment*)
Georg Rudinger (*Dean Faculty of Philosophy, University of Bonn*)
Frank Begemann (*Deputy-Director ZADI*)
- 09.30 – 09.45 Introduction of Participants
- 09.45 – 10.00 Introduction to the Workshop – objectives – rapporteurs (Horst Freiberg)
- 10.00 – 10.20 Salvatore Arico (*UNESCO/MAB*)
"Initial steps in the design and operationalization of the CBD-UNESCO Global Initiative on Biodiversity Education and Public Awareness - The role of Internet-based services and products"
- 10.20 – 10.40 Georg Rudinger, Christian Rietz (*CEM, University of Bonn*)
"Evaluation of ecological projects"
- 10.40 – 11.00 Horst Freiberg (Germany)
"Nature-Detectives in the Internet: nature & Internet"
- 11.00 - 11.30 coffee break**
- 11.30 – 12.00 Marina Rykhlikova (Russia)
"The system of large-scale distant training and work for nature conservation in Russian Children's Telecommunication Project "Ecological Cooperation "
- 12.00 – 12.30 Kate Gowland (Australia)
"WaterWatch"
- 12.30 - 14.00 Lunch - Christmas Market Bonn-Bad Godesberg -**
- 14.00 – 14.30 Elisabeth Beaubien (Canada)
"Plantwatch: tracking climate change"
- 14.30 – 15.00 Ashley H. Kirk-Spriggs (Namibia)
"Insect@thon - a replicable model for bio-inventory"
- 15.00 - 15.30 coffee break**
- 15.30 – 16.00 Denis Brandjes (South Africa)
"SchoolNet SA – supporting the education system in South Africa through the use of ICT's"
- 16.00 – 16.30 Gerald Hau (EURONATUR/Israel)
"Nature without boundaries - Migrating birds in the Internet: A contribution to the peace process in the Middle East"
- 16.30 - 17.00 coffee break**
- 17.00 – 17.30 Brian Craig (Canada)
"Environment Canada: Ecological Monitoring and Assessment Network"

17.30 – 18.00 Irene Hinkle (USA)
"The Cascadia Lichen monitoring program"

18.00 – 18.45 Discussion and closure of the 1st workshop day

19.00 Dinner/Buffer Godesburg Castle, Bonn-Bad Godesberg

Tuesday, December 12, 2000

2nd workshop day

08.30 – 08.45 Review of the 1st day and introduction to 2nd day

08.45 – 09.45 Presentations by European CHM-NFP's to the Convention on Biological Diversity
Belgium, Finland, Germany, Greece, Slovenia, The Netherlands

09.45 - 10.00 coffee break

10.00 – 10.20 Michael Drabe (Schulen ans Netz e.V., Bonn)
"Schulen ans Netz – the German SchoolNet – partner of "Naturdetektive"

10.20 – 10.40 Bernd Krieger, Wolfgang Lehnert (Fachdidaktik Biologie, Uni Frankfurt)
"First results of the Questionnaire Naturdetektive 2000"

10.40 – 11.00 Berthold Durst, Thomas Lingen (Fachdidaktik Biologie, Uni Bonn)
"Developing Teaching Materials for Naturdetektive - Satellite Tracking of Birds"

11.00 - 11.30 coffee break

11.30 – 12.00 Hans Voss, Gennady Andrienko, Dirk Schmidt (GMD, Dialogis)
"The GIS tool used in Naturdetektive: state of the art and developments"

12.00 – 13.00 Discussion, conclusions and recommendations

- Identification of potentials for the development and objectives of the CBD/UNESCO strategy (Objective 1)

13.00 - 14.30 Lunch - Christmas Market Bonn-Bad Godesberg -

14.30 – 17.30 Continue: Discussion, conclusions and recommendations

- Experience exchange, lessons learned (Objective 2)
- Share of know-how and technology (used tools, concepts, strategies, didactical material,) (Objective 3)
- Build a global network (Objective 4)
- Elements of a Pan-European network called "EURODETS" (Objective 5)

17.30 – 17.45 Summary and Closure of the Workshop

19.00 Reception by Dra. Pia Heckes - Mayor of the City of Bonn "Altes Rathaus", Bonn

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Annex 3) Abstract of Presentations

1st Day

Kate Gowland/Australia - Waterwatch - an Australian environmental education programme <http://www.waterwatch.org.au/>

Waterwatch started in 1992/93 with the aim to achieve environment action through community monitoring. One of the national problems is the fresh water supply and thus it was necessary to create public awareness about water quality, but over the years it transformed into a data collection plan with educational background. Starting point is the catchment in which people live and making them aware of the impact of their action on it. A network of regional co-ordinators give the technical support (material and other), run the hub for the database and give necessary training for the handling of data and their entering into the database to the local groups, organisations and volunteers. A network is formed by the 53 000 participants (volunteers, groups etc) and the roughly 25% of Australia's schools which are taking part in this programme. Waterwatch developed the following tools: the database programme and national technical guidelines. There are agreed protocols and procedures which are to be followed.

Internet use: The web site is a national umbrella while the programme itself is run by the individual federal states. Thus the actual data are to be found on the state pages.

A set of 8 parameters is collected and entered offline. Later these data are transferred without further treatment. (The development of a such tool by Waterwatch and ecologists is under way.) The entry of the data acts as trigger for the map to change: since only the map and the database are interactive. Quality assurance is guaranteed by (i) the validation of the data by the regional co-ordinators (comparing split sampling etc.), (ii) entry only possible with a password and the (iii) mystery solution (within 5% of known measure).

Murder under the microscope is a competition for schools. It is a multimedia platform of TV broadcastings plus Internet: 4 scenarios, revealed over 4 weeks, give a crime site (a catchment somewhere), 10 villains, and a victim. All to be found on video and on the Internet. It is very popular but also very expensive and resource intensive, so only one state in Australia can afford it.

Outlook to the future: To make data immediately available and allow instant comparison, a GIS tool is desirable. Since technology proves to be temperamental, try to find out what the people really want, and then they will use it.

Elisabeth Beaubien/Canada - Plantwatch - <http://www.devonian.ualberta.ca/pwatch/>

Plantwatch is a Canadian phenology programme which means a programme on "the seasonal timing of life cycle events" in which students and other volunteer observers monitor since 1985 the first or full bloom of currently 8 spring plants. It is designed to show the climate change and contribute to the understanding and the impact of this phenomenon.

The programme is open to schools as well as the general public who receive a newsletter as a reward for their efforts. The aim is to raise awareness of biodiversity and ecological relationships while at the same time developing scientific and computer skills. The observations are entered on the website of Plantwatch where the data is entered into a registration form for the appropriate local map. The result can instantly be seen. Foundations and environmental organisations provide the funds for the project. A closer cooperation with other environmental organisation such as EMAN (Ecological Monitoring and Assessment Network) and the Canadian Nature Federation is envisaged. Advertisement is done by flyers, via news media, talks on the radio, going into schools, links to other organisations etc.

About 250 reports come from Canada and the USA, and about 120 from Europe. A 150-pages teacher guide will be hosted on the web. One future aim is to have more regional observation group doing smaller phenology studies in the programme because Canada is a large country with many diverse habitats. But also to enlarge the scope by inviting people and groups from around the world on common themes is an attractive idea to act more globally. Another direction could be to enlarge the number of common plants species (described on the Internet) which can be regarded as bio-indicators to better monitor habitat changes.

Also more technology to better visualize the progression of change, hosting databases, being able to store ones own data sets are all desirable projects, providing funding could be assured.

Irene Hinkle/USA - AIRNET - an US American environmental project mainly on the bio-indicator lichen <http://www.re-sources.org/>

The objective of this project was to capture data on the air quality in the Cascade Mountain Range area in the north of the US federal state of Washington which borders onto the Canadian province British Columbia. The area has a fast growing population which has its impact on the air quality which is deteriorating. Lichens were chosen as bio-indicators because they need a certain air quality to flourish. AIRNET is a school-based programme for secondary students. Key motivator is

a one-day workshop for interested teachers by AIRNET scientific staff. Then there is a classroom presentation by research AIRNET staff under the headline why is this an issue of this area, from where things move on to an introduction into lichen classification and identification. The next step is a field trip under the guidance of a lichenologist to gather data. This is followed up by a trip in which participants are introduced to use PAX Air quality Analyser in order to back up bio-monitoring. Their data is then entered into a computer.

There is a cooperation mainly via the internet with the Canadian EMAN programme (cf. B. Craig: Frog watch report). To pick up a recurring topic of this workshop I. Hinkle vented the question of: What is a motivator for people to become involved in such a project? She developed the following goals to bring on motivation (i) to create a sense of stewardship in citizens, (ii) to motivate by ecstatic nature experience and having connecting experiences by being in nature, (iii) to establish mechanisms of quality control, and (iv) to apply Internet know-how and strengthen the capability to real-life science. To start out on such a project she would recommend from her experience to try to get as much scientific background and support as possible. To work in close cooperation with people in the educational sector guarantees a wider range of participants. Apart from that one should start small and local. It is also advisable to grow slowly and build a foundation. Regional cooperation and network add to a positive outcome for all joint in.

Lichen Bio-monitoring Data Sharing: the data the students collect during their field trips are double checked for accuracy because lichens can be difficult to distinguish from moss with which they live side by side. Quality is also assured by preparing teachers and students carefully. The students have several tools for their field work: a transparent grid to determine exact location of the lichen is put on to a section of a tree trunk. Several parameters such as location, size etc, are taken. Methods learned are: how to use a compass, lenses, measurements. Lichen have been chosen because they are ubiquitous and also very SO₂ sensitive which makes them ideal indicators for air pollution. What the students don't yet learn is to use meteorological data or graph charts in order to better determine the result of their study.

The question about distant teaching was raised because there are a number of Russian pupils who are also monitoring lichens. But so far the programme support is only local. Another question raised the context of monitoring and evaluation and biodiversity. Since lichen are to be found all over the world it would be an attractive approach to compare climate changes world-wide via monitoring lichen.

Horst Freiberg/Germany - Naturdetektive - combining nature observation with the Internet
<http://www.naturdetektive.de>

"Naturdetektive" has been developed by the German Clearing-House Mechanism National Focal Point 1998 in response to the needs identified on the rather unknown Convention on Biological Diversity in Germany aimed to raise public awareness about biodiversity. A two minute video gave an idea what **Naturdetektive** is all about: groups and individuals observe ie. single plants (dandelion), animals (honey bee) or ecosystems (water) "plot" their observation with a colored icon interactively on a map and write on-line a "Report" (Text, Images) about their observation. This is aimed to attract people and mainly students in schools with their teachers to work and communicate on "Biodiversity".

The project started in 1998 as "Pilot Model" with only two plants in order to "test" whether this idea of going out into nature and report back the observation via the Internet directly onto a map of Germany would work. In the course of the project development new partners joined the project ie. the German Schulen ans Netz (Schools to the Net) linking to the SchoolNet Germany and a scientific organisation GMD who provided an interactive Geographical Information-Management System.

Target groups are schools as well as individuals. Participant have to register by using a password and a name. The Internet pages contain elements ie.* thematic page * briefing and a task * more information about the subject * discussion forum (contact experts) * interactive map * input form and "individual report".

Naturdetektive offered further the chance to attract partners from associations and organisation so far not very familiar with the Convention on Biological Diversity to raise awareness on the CBD as well.

The specific objectives of the project can be described as: * practice and understanding of different observation methods * stimulation and feeling for interdisciplinary work * exchange of information, know-how, and experiences * participation in the development of the Naturdetektive platform * generate own information site and develop IT competence (important in Germany) * development of the feeling for the necessity of information technology in schools.

Gerald Hau/EURONATUR/Israel - Migrating Birds know no Boundaries - a multinational project which monitors white stork migrating to the Middle East.

http://www.euronatur.org/euro_engl/index.htm

This project is an international programme which has its origin in the Oslo Peace Agreement in whose wake it was founded in 1993 to bring together nature conservationists in Europe and in the Middle East. Neutral projects like this are used as a vehicle to connect people and regions. There are several projects currently: one on crane migration and one on the White Stork migration. The data of the migration are satellite transmitted and can after some remodelling be seen on the project's webpages. All European storks, about a billion birds, travelling eastward in September and in Spring are monitored that way and about 20 000 cranes. Many spend the winter in the Hula valley on the Golan heights. Their number increased from some 1 000 birds (1991) to 20 000 in 1995. To find an answer to these questions the project Migrating Birds know no Boundaries was created.

For this particular project 4 cranes were caught, measured and weighted. After marking them with rings they were fitted with transmitters. Palestinian and Israeli youth work together in an Internet project, communicating informally about the why and how. Detection and readings from the transmitters is quite difficult for military interference. But apparently the increase of birds is due to the fact that they find favourable food and hunting them is not allowed in Israel. As they cause considerable damage to agriculture, feeding was found as a solution. To support the population and to further intercultural understanding ecotourism in the form of bird watching is regarded as a possibility to promote the region.

Problems to overcome are (i) human: the main partners in this project are geographically quite close but the mental distance was all the bigger. And: (ii) technical and financial: the transmitters are solar based, but only working 50% of the time and only last about three years while being terribly expensive. radar based tracking allows tracking of night migration which particularly small birds do.

On the topic of GPS tracking, it was pointed out that follow the tracking route by satellite tracking gives added value in local observation to communicate on Internet. The importance of global networking initiatives was mentioned again, also a point to be discussed the following day. Two indications were made (i) that migratory tracking is not only done on birds, but on elephants (project in Malaysia), on whales, turtles and other species, and (ii) about a film project on crane migration from Russia to the Middle East.

Brian Craig/Canda - EMAN and Frogwatch - A Canadian nature monitoring project in the wider framework of a national nature conservation effort

<http://www.cciw.ca/eman-temp/intro.html>

EMAN stands for Ecological Monitoring and Assessment Network and is the Canadian effort to collect and united existing data into a network in the five Canadian regions where it exists. It sees its main objective in becoming an early warning network for the environment and to provide decision and policy makers with information about the consequences of ecological changes. They have set up a suite of 20 indicators for core monitoring on change and by putting out a Guide to World Resources 2000-2001 which allows only one conclusion: man is wasting fast natural resources and thus damaging our natural habitats sustainably.

How can that be remedied? By reconnecting people to their natural environment by taking part in a monitoring programme. Such an experience could be data collection using scientifically valid and reliable methods. These reliable data then give scientists a basis for further studies. So it is a cooperation of science and general public, it is cost effective, and it allows a wider range of coverage.

In the framework of the UNESCO Man Biosphere Programme in the Long Point World Biosphere Reserve a lot of the monitoring is done by volunteers, mainly students, who were asked to give a ranking of reasons why they took part in the programme. The answers which varied from 'doing something useful for the environment' to 'getting away from work at home' showed that the concept of the planners was successful. They also wanted to convey the following points as motivators:

(i) why the information gathered is useful and important, (ii) what organisations will be using the information, (iii) how the information is contributing to the monitoring programme and what is being learnt, and (iv) that they will be empowered to act in their communities by gathering the information

The EMAN programme offers to the community volunteers a list of 7 subjects to choose from: - Frogwatch - Icewatch - Plantwatch - Lichenwatch - Wormwatch - Riverwatch - SI/MAB a programme on forest biodiversity. Each observation programme has its own website and 'Nature' the magazine of the Canadian Nature Federation has regular reports on the programme.

When Frogwatch was started there were 1 200 observations entered on the website. There is a list of ten frogs whose calls can be listened to and participants can enter interactively on local maps the what call they heard and its quantity (1/10/chorus). There also is

information on setting up a Frog Survey route with the help of a co-ordinator. For those who just want information and fun there is a quiz on amphibians and reptiles.

The database is an interactive, searchable Oracle database, and as one of the objectives in the EMAN programme is to domicile orphan databases it is possible to have access to all sorts of data that would otherwise be unused. A short outlook was presented on the various other EMAN volunteer observation programmes such as the Icewatch, where citizens are asked to report on the ice out on the Yukon river, or Wormwatch. And finally Lichenwatch in Canada, where people are asked to monitor 6 specific lichens which all grow on Canada's national tree: the maple tree. And everyone can clearly see the change in our environment.

Georg Rudinger & Christian Rietz/Center for Evaluation and Methodology (University of Bonn) "Evaluation of Ecological Projects" <http://www.zem.uni-bonn.de>

The STORY of "The first evaluation": In the beginning God created the heaven and the earth. And God saw everything that He made. "Behold," God said, "it is very good." And the evening and the morning were the sixth day. And on the seventh day God rested from all His work. His archangel came then unto Him asking, "God, how do you know that what you have created is very good? What are your criteria? On what data you base your judgement? Aren't you a little close to the situation to make a fair and unbiased evaluation?" God thought about these questions all that day and His rest was greatly disturbed. On the eighth day God said, "Lucifer, go to hell."

The Goals of scientific evaluation are:

- to support for planning and decisions - assertion of alternatives - goal and purpose orientation - current scientific methodology and - evidence of impact.

Without an explicit operationalization of the goals, there is almost no opportunity to define indicators of goal attainment.

Without comprehensible indicators, there is almost no opportunity to check the appropriate realization of a programme.

To monitor and evaluate the impact of projects, one has to consider the problems concerning the indicators facilitating the evaluation. Indicators could be * resource or input indicators * output indicators * result indicators and/or impact indicators.

The evaluation should be divided into * Ex-Ante * Interim and * Ex-Post Evaluation.

The key function of the ex-ante evaluation is:

- the consideration of prior knowledge
- the consideration of the socio-economic context of the intervention
- the assessment of the main focus under different perspectives
- the empirical operation of the goals
- the estimation of the effects of the program and
- the development of an adequate system for operation.

Bernd Krieger, Wolfgang Lehnert (Fachdidaktik Biologie, Uni Frankfurt) "First results of the Questionnaire Naturdetektive 2000"

A questionnaire was prepared in order to evaluate the impact and the appropriateness as well the practicability of the "Naturdetektive" project to be used as practical working tool in classes. It was further the intention to identify "weak elements" in the actual realisation of the project. This should facilitate the better understanding of the expectations and needs of the schools, students and their teachers for future project development. The questionnaire was sent to those teachers who participated in the project and who were expected to have gained practical experiences. In total 187 questionnaires were mailed out in November 2000. About 40 questionnaires were sent back (end of December 2000). Questions ranged from "equipment available in schools to participate", "Layout of the web-pages and the practicability of its use", "how the project was used during lessons" and "which possible further developments, changes, or expectations do the teachers and students have towards the future of the project".

In general there was a positive reaction on the project's concept. The project "Naturdetektive" was used as concrete project during lessons linking between Biology, Language and Geography as well New Internet Technologies. It facilitated species recognition and stimulated interaction between participating schools and students. This "questionnaire" is part of an ex-ante and interim-evaluation and is supported by Center for Evaluation & Methodology of the University of Bonn.

Salvatore Arico/UNESCO/Man and Biosphere programme

<http://www.unesco.org/mab>

The presentation gave an overview on the recent developments related to the Global Initiative on Biological Diversity Education and Public Awareness (hereinafter referred to as 'the Initiative'), which is under development in the context of the Convention on Biological Diversity (CBD) with technical assistance from UNESCO. The Parties to the Convention called for such an initiative in 1998. After debating the issues of Article 13 of the Convention ('Public Education and Awareness') at two subsequent meetings of the Conference of the Parties to the Convention, it was decided that a CBD-UNESCO consultative working group on biodiversity education and public awareness (hereinafter referred to as 'the Group') would coordinate the Initiative's development and implementation. The Group has met twice so far, the first time in Paris in July and the second time in Bergen in November 2000. The initiative is being placed in the context of the strategic plan to be prepared and developed for the Convention (re. decision V/20 of the Conference of the Parties). This is the policy framework and process in which Internet-based initiative on biodiversity education and public awareness should be placed and to which they should ultimately contribute.

The Group has recently defined the Initiative's mission, specifically: **To create dynamics of awareness leading to participation and action in the conservation, sustainable use, and equitable sharing of benefits of biological diversity.** The objectives of the Initiative should be:

1. Increased cooperation and coordination among, within, and between ministries, sectors, stakeholders, Parties and governments, and international instruments, on biological diversity education and public awareness issues
2. Develop networking for a more efficient development and implementation of biological diversity education and public awareness plans, programmes, and projects
3. Highlight and integrate the communication and educational aspects of the programme of work of the Convention
4. Facilitate access to expertise in education and public awareness for the programme of work of the Convention
5. Development of practical models for education, both formal and informal, and public awareness through lessons learned and best practices

The implementation of the Initiative will take into account the following principles:

1. Implementation of article 13 is fundamental to the overall implementation of the CBD
2. Education and communication is context dependent. Therefore education and communication (including training) approaches should reflect the specific, context-dependent nature of each initiative
3. Education is a professional discipline. Thus professional education and communication experts should be included in all education/communication activities
4. Education should be viewed as a policy instrument in the same way that economic and legal instruments are

Ashley H. Kirk-Spriggs/Namibia - Insect@thon - A Namibian Competition Project
<http://www.natmus.cul.na/insectathon.html>

The entomology section of the Natural Museum Windhoek, Namibia had 70.000 paper based records on specimen and no funds to document these records. So they started a competition. They developed software which was user-friendly on a capture screen that allowed the participants to transfer the paper record into computerized data. They found enough sponsors (about 80) to come up with a fully outside financed competition with (i) computers at the disposition of the schools for the time of the competition of one day, (ii) the students got a three hours training in computer skills and menu driven data entry on a capture screen; and (iii) the winner was the school that entered most data within a given period.

In the 1999 competition 15 schools took part (of which one was a disabled school). The participants got free (co-operate) computers and two years of free Internet access, plus power and telephone lines where necessary plus range of other (computer-related) things. The 11-19 year-olds entered 21.000 records within 11,5 hours (which represents about 97.000 insect specimens). A handicap system assured that everyone had a fair chance in the competition. The winning team won a flight to Lund, Sweden where two institutes hold over 50.000 specimen originating from Namibia, the biggest collection of outside Namibia, and they did another Insect@thon on these records. The 2000 competition was extended to become more of a national event. The form of a road-show was chosen: a bus with the 22 i-MACs plus personnel went to the bush schools, because one aim was to make more underprivileged schools take part. 5 regional events allowed 280 pupils of 48 schools to participate. At the end 31.000 records of 150.000 specimen were documented. Is this method repeatable? Yes, for almost anything from weather data to mammals providing the background work is done, i.e. the software that provides the essential information so that the amount of actually entered data

is restricted and thus potentially error-free (quality assurance). Information gain of the students is not the first aim but in cooperation with the Namibia SchoolNet programme nature observation projects with insects such as agricultural pests monitoring is currently under way. Every participant get a poster on Namibian cultural entomology. More information can be found on the web of the Natural Museum of Namibia, the first in Africa to be online. Apart from the primary aim of the Insect@thon, the participants gained in team forming experience (there were three children per computer), increased their knowledge on computers and the Internet. The project started on the background of the Convention on Biological Diversity (CBD), to make access to information and technology information available, to do something for the repatriation of data and raise awareness within frame work of the Convention on Biodiversity.

One of the main problem for the developing countries is that about 70% of their species recorded are outside, mainly in First World countries. So computerising records would make it easier for the originating countries to gain access to them.

Marina Rykhlikova/Russia - Russian Children's Telecommunication Project "Ecological Cooperation" <http://www.ecocoop.ru>

The Ecological Cooperation Project is large-scale ecological educational and research network project in Russia. The activities of the Ecological Cooperation Project bring together children and adults to study and conserve nature. The Project also supports the development and introduction of innovative teaching methodologies. One of the goals of the program is to promote international consolidation of similar organizations. The Ecological Cooperation Project was established in 1997. The Project currently involved the collaboration 135 ecological organizations and educational establishments, including ecological centers, nature stations of young naturalists, schools, ecological clubs. The various participants are from 46 regions of Russia and 6 regions of Belarus and Ukraine. More than 3500 school children (1-11 forms, age from 7 to 17) and more than 270 teachers are participating now in this Project.

The complex ecological investigations in nature are the basis part of the Project. The exchange of results carries out by telecommunications. There are six branches of ecological researches in the Project: botanical research, zoological research, hydrobiological research, monitoring of land ecosystems, soil research, Nature Protected Areas.

A large part of the Project is devoted to support of children's nature conservancy projects. Participants of

the Ecological Cooperation Project carried out more than 300 steps towards guarding and protecting the environment such as promotion for establishment of new nature protected areas, working out the ecological maps of villages and micro-districts in cities, gardening of territories, feeding up birds in wintertime, reintroduction of rare plants.

All-the-year-round methodical program for ecological research work has been inculcated in the Project. Educational organizations receive a complete set of manuals on selected themes and use telecommunication consulting of the specialists - curators of directions. The course of research work is permanently presented on the web site of the Ecological Cooperation Project. The following methodical manuals have been published in the Project: "Early-blooming plants", "Rare and endangered plants of my native land", "Nature Protected Areas", complete set from four manuals for the pupils of Distant Lichen School, "Biological indication for the freshwater pools". The methodical materials of other organizations are also used in the Project.

The web site of the Ecological Cooperation Project is permanently renewing source of information. The interactive application forms for participation in the Project and teaching web pages "How to study pools", "Virtual album of insects and others invertebrates with the comments", computer system for definition lichen species have been created on the Project's web site. The connection of people and teachers, consultation of curators, discussion of ecological problems and ways for their solving, network competitions are realized in six sections of the webforum integrated with mailing list. All-Russian conference of children's ecological works "Children will conserve the nature of Russia" is carried out with success on the web site on November-December every year. The materials of this conference are published in the "Bulletin of Ecological Cooperation Project".

The Project Center is located in the Institute of Soil Sciences of Moscow State University and Russian Academy of Sciences. The staff of the Center consists of skilled specialists whose aims are environmental education as well as computer technology. The Project collaborates with educators and specialists of Moscow State University and other universities, the Foundation for Agrarian Development Research, the Center of Wild Nature Protection, the Yaroslavl Center for Distant Education, Russian national parks and nature reserves. The Russian Ministry of Nature Resources and regional committees for ecology and education support this Project.

Denis Brandjes/South Africa - SchoolNet SA - South African Television Programme for Schools
<http://www.school.za/>

What is SchoolNet SA?

SchoolNet SA is an organisation formed to create Learning Communities of Educators and Learners that use Information and Communication Technologies (ICTs) to enhance education.

Our Vision: SchoolNet SA seeks to support educators and learners in transforming education through the application of Information and Communication Technologies (ICTs) by providing leadership, expertise and developing effective partnerships in the areas of:

Internet connectivity and appropriate technology Human Resource Development and capacity building Content and curriculum management and development Advocacy and marketing SchoolNet and its partners will meet the challenge of transforming South Africa's education system from an industrial to a knowledge-based model, contributing to South Africa's global competitiveness.

Our Partners: SchoolNet SA is an exciting partnership with four national government departments with key stakes in the country's education and training system, the school networking, NGO and donor communities. Represented on SchoolNet's Board are:

Nine provincial schools networks (provincial educator-driven structures involved in implementation and rollout) or provincial Departments of Education Department of Education Department of Arts, Culture, Science and Technology Department of Communications Department of Trade and Industry International Development Research Centre (IDRC) SchoolNet SA is thus strategically positioned to contribute to the realisation of national priorities in the education and training system, working towards a knowledge-based society, developing universal access to telecommunications and information, and educating our youth for full participation in South African and international life.

The nature of the partnership allows SchoolNet to draw on a wide range of resources from the donor community, education, public and private sectors, while ensuring that the organization works within government policy and implementation frameworks.

Our funders: SchoolNet has core funding from the International Development Research Centre (IDRC) and Open Society Foundation for SA, with project funding from the World Bank Institute and a range of corporate partners.

More information: For more information about SchoolNet SA and how to become involved, please contact the SchoolNet office at (011) 403 3952, visit our website at <http://www.school.za>, or email info@school.za.

2nd Day

Presentations by European Clearing-House Mechanism National Focal Points (CHM-NFP) of the Convention on Biological Diversity (CBD)

Jackie van Goethem/ Belgium - Royal Belgian Institute of Natural Science, Department of Invertebrates, Bruxelles
<http://www.kbinirsnb.be/bcb-cbd/homepage.htm>

The Belgian NFP for the CBD at the above named institution in communication with the CBD secretariat started in 1995. The work of the NFP is now consolidated by establishing the website. In Oct 1996 the Belgian CHM was launched on the Internet. The Belgian CHM is split into **two columns**: the **right side** gives access to information about ie. the **implementation** of the convention, reports and competencies of the Belgian Regions; plus the Belgian Biosafety server since 1996. The latter is now a model for activities of the Cartagena Protocol and followed the obligations to develop a Clearing-House on Biosafety by each of the Parties to the Convention on Biodiversity. The **left side** of the Belgian web-site represents the **services** offered by the NFP with more than actually 1 500 links on CBD-related subjects. Belgian hosts based on the "Partnership Concept" the webpages of seven African countries and provides capacity building to its African partners. As an example for Internet-based nature observation projects the "Stork without boundaries-project" was shortly presented. In this project 40 birds were tagged with a transmitter to better trace their migration

Jukka-Pekka Jäppinen/Finland - Finnish Environment Institute, Nature and Land Use Division.

<http://www.vyh.fi/eng/environ/bdclearh/kan si.htm>

Finland established the CHM since 1998 with a Finnish and English version. But it has a scaled-down English version. Finland is currently developing a general action plan and strategy of Biodiversity in Finland and the educational public awareness questions are an essential part of this action plan. The public in general, but also schools need to be given a wider understanding of the concept of Biodiversity that it is not just nature conservation but that there also other aspects are "hidden", such as ie. genetic diversity. This needs a general screening of the existing education material. To promote this in a broader context, new tools and cooperative networks are needed. The use of Internet could play a considerable role in the "transfer" and communication of nature-based data and information among participants. Some international cooperation in this type of nature observation is already found where some 120 schools in Finland take part in the Globe-project. A further example represents the Regional Baltic Naturewatch project (WWF-driven). Other useful sources of environmental data are ornithologists, and above all the Finnish Natural Museum and its phenological data going back to 1848. They have established a phenology real time map service on the Internet on various species they monitor.

Theodore Mardiris/Greece - Director of the Environmental Education Centre of Kastoria.

The Environmental Education Centre hosts the the Greece CHM. CBD related activities are carried out by various academic institutions in Greece. Currently there are 18 environmental education centres in Greece and it is planned to set up ten more until 2006. These centres shall cooperate with scientific institutions on local, national and international levels as well organize and imlement educational centres for educators and educational programmes, for students and adults in cooperation with governmental and non governmental institutions. The environmental education centres in Greece have been widely accepted by the educators and the students as well as by the local society and their development in the last years has been significant. The Environmental Centre would be interested in participating in the creation of a more specific CBD-centered European nature-based observation activity like the idea of "Eurodets" network".

Julijana Lebez-Lozej/Slovenia - Nature Conservation Office/Ministry of Environment and Spatial Planning (CHM-NFP)

<http://www.sigov.si/mop/vsebina/cbd/index.html>

The National Educational Institute together with the CHM-NFP of Slovenia develops a project on bio-indicators. The project looks now back on 10 years of duration. Data are available from the Slovenian Natural Science Society since 1930. To stimulate the activities on bio-diversity in Slovenia the Society has been organizing for more than 10 years an annual project of the "animal and plant of the year". The activities provided background information on the different species and user-driven own activities on conservation of the species or habitats. The activities are published in the National Proceedings of Nature and Science journal. The largest Slovenian project on bio-diversity was on epiphytic lichen, a bio-indicator species for assessing air pollution. This project was part of a big project named "Environment in Slovenia" investigating water, soil pollution and lichens. Through this project several benefits came up to the participants. Participants improve knowledge on biodiversity, planning and organizing, organizing own experiments, communicating and collecting data from several sources, search literature and use of the Internet. The project helped ie. to connect schools and facilitated their communication. But also communication started between schools and the interested public, which apperaed as a perfect method to create the raising of a broader awareness. The programme will continue and becomes accessible also on the Internet.

Severin ten Houde de Lange/The Netherlands - National Reference Centre for Nature Management <http://www.agro.stoas.nl/NICBN/>

The Dutch CHM website will be re-organised and newly edited during 2001, also in view of the fact that the next Conference of the Parties will take place in The Hague. Innumerable nature conservation activities are carried out in Dutch schools but they are not yet available on the Internet. Three aspects are being worked on the CHM which include ie. (i) stakeholder record: usually a lot of parties take an interest in the field of Biodiversity, conservation and sustainable use, such as the Government, NGOs, political parties, and private persons; (ii) facilitate direct communication between users in a stakeholder dialogue, and (iii) the creation of education modules.

**Michael Drabe/Schulen ans Netz - Germany:
"Schools to the Net - Germany"
<http://www.san-ev.de>**

The Federal German Ministry of Education and Research (BMBF) and Deutsche Telekom AG launched a social initiative to introduce multimedia technologies in schools by establishing the association "Schulen ans Netz" in April 1996. The aim of this association is to firmly establish the new media and the use of the Internet as an integral part of day-to-day teaching in schools.

Schulen ans Netz e.V. is a registered association which collaborates with the Ministries of Education and Cultural Affairs of Germany's individual federal states, the Standing Conference of the Ministers of Education and Cultural Affairs of the individual federal states of the Federal Republic of Germany, the representatives of schools' maintaining bodies and sponsors from industry. More than 13,000 German schools are already linked up to the Internet at the beginning of 2000 by Schulen ans Netz e.V.

Why Schools to the Net? Computers, data networks and other multimedia aids will play a more far-reaching role in shaping tomorrow's world than many technological revolutions which have gone before. An understanding of this technology will be a crucial requirement in virtually every profession in the 21st century. Only those who understand how to transform information into knowledge, i.e. to select and combine information, will be able to make use of the sea of information which multimedia sends our way. Schools must prepare their pupils for these requirements of the future. Learning with and in computer networks creates new opportunities - not only for the future but already for teaching today:

- Boundaries disappear: Pupils communicate and work together in networks on a local, regional and global level.
- Established roles take on new dimensions: Teachers and pupils are forced to reevaluate the positions they have held until now.
- New requirements emerge: Individual initiative and team skills are crucial to applying the new media in a useful and effective manner.

Schulen ans Netz e.V. provides schools with grants for the acquisition of multimedia workstations. Schulen ans Netz e.V. provides a Service "Lehrer Online" (<http://www.lehrer-online.de>) which is a contemporary on-line service for members of the teaching profession. Schulen ans Netz e.V. provides a fund of material for classroom teaching purposes here - both complete units and on-going national and international projects in which teachers are invited to participate. Fora and chat groups make "Lehrer Online" an interactive communications platform. What makes "Lehrer Online" really special is a team of specialists from the profession

and experts who oversee each topic in an editorial capacity and are on hand to contribute to the exchange of experience.

International activities: Even for a national initiative looking beyond the borders is important: Schulen ans Netz e.V. is member of the European Schoolnet EUN (<http://www.eun.org>) as well as national coordinator of the inter-national competition "ThinkQuest" (<http://www.thinkquest.de>) and of the "Netdays" (<http://www.netdays.de>), an initiative of the European Commission.

**Bertold Durst/University Bonn: "White Storks flying through internet and classroom"
<http://www.zoologie.uni-bonn.dBdB/>**

The presentation showed some characteristics of the part "White Storks" of "Naturdetektive im Internet": Life migration data are provided in true colour, zoomable maps with animated tracks of the storks. The user can elect the individuals to be shown and gets additional information at each registered situation of a stork. Historical data are available on the CD-ROM distributed at the workshop.

Two models of using computers are explained, compared and situated in everyday German school life: Many computers in a room is the first one. Such an "Internet-Lab" is often occupied by classes of computer science but enables to work simultaneously with all students. The second model means a single computer in the classroom, connected to Internet. Only a few students can work with it, while the teacher has to organize different activities for the others. The computer is accessible at each day. This environment seems to be ideal to follow the storks during a complete season of migration.

Concerning these two models, we presented some ideas of teaching students of age 10-13 and age 16-18.

Motivated by the idea of "riding on a stork" and to get the experience of his achievements and needs (cf. Selma Lagerlöf's: Nils Holgersson's adventures with the wild geese) the students should look for phenomenological informations about distances, heights, velocity of the animals and their surroundings: mountains and waters to cross, landscapes and food etc.

For the older students we propose more scientific orientated lessons, which follow problems of evolution (what is the evolutionary advantage of migrating), of behaviour orientation, (inherited vs. learned behaviour) and ecology (which kind of resting areas do they need, habitat-protection) Besides these biological concepts the project offers many ways to work interdisciplinarily: Geographic information is needed, distance calculators

and the method of satellite-tracking itself call for mathematical and physical studies. Many of the needed informations are offered via Internet.

To proceed in using the project at high school and college, we pointed out some ideas for further development: Images and informations of resting areas and the African habitats would be very helpful. Webcams on nests are already offered by other projects (www.storchennest.de), but it would be interesting to get images of the tracked storks. A camera on a flying animal seems to be science fiction. But with very small cameras as they are sold in every airport for secret filming and with memory sticks© by Sony in the size of a chewing gum and capacities up to one MB it will be possible very soon.

Hans Voss, Gennady Andrienko (GMD, Dialogis)
- " **Naturdetektive 2001: GIS applet for presentation of observations**"
<http://www.gmd.de> & <http://www.dialogis.de>

Within the project "Naturdetektive" (URL: <http://www.naturdetektive.de>) schoolchildren report when and where they have made certain observations in nature. For some plants, e.g., different states are distinguished: appearing of first leaves, start of blossoming, appearing of fruits. The locations of observations are represented on a map. One of the requirements of the presentation was to also visualize the temporal dimension of the data collected.

The software tool has been implemented in the Java programming language, which allows users to run it from within all standard web browsers. The user interface consists of

- the map display frame for viewing and also entering new observations,
- a toolbar for map manipulation: zooming, panning, undoing, controlling the mouse behaviour;
- a toolbar for selection of the observation type,
- an active legend, and
- a panel with time controls.

The map can be zoomed in and out, and fitted to the window size by simply pressing the corresponding button. The mouse can be used to select an area of the map to zoom in, and to shift the viewpoint by dragging. These two different modes of mouse behaviour (select area and drag) are also located at the map control panel and are at user's disposal. There is an additional way of moving over the map, namely by clicking small arrows that appear around the map canvas.

Each operation performed can be cancelled using the "undo" button. Each interactive control of the Java applet has its own explanation ("tool tip") that appears

in a popup-window when the user allocates the mouse pointer over the control.

The popup-window technique has also been applied for presenting data about each individual entry of observations. Thus, when the cursor points at an icon representing an observation, the available information about the entry such as author, date, type of entry, etc., will be automatically shown. Beside seeing all entries of all types at once, the user can select the species to be shown through the panel with buttons allocated below the map.

An active legend contains descriptions of all geographic layers of the map, and provides tools to control the content of the map. For example, it is possible to switch on and off layer's visibility, to change layer's properties (if available), change the order of layers' appearance on the map, change the colors of filling and borders of geographical objects, and so on.

Special controls allow to watch hand analyze how new observations appeared with the flow of time. A time slider allows the selection of an interval or moment of time, and shows the relative position of the currently represented interval within the whole time span. The width of the slider is proportional to the length of the interval. The user can manipulate the presentation directly through the slider widget: one may, by mouse click, set the beginning of the interval to be represented, or gradually move the slider forth or back causing the map being dynamically repainted. The beginning of the interval can be specified more precisely through entering the date in the edit field below the slider area. Another edit field is for setting the length of the shown interval, and the field below it controls the step, i.e. the value to be added to the beginning and the end of the interval in the course of studying dynamics.

One of the ways to consider dynamics is to push repeatedly the buttons marked by left and right arrows. Upon each button operation the presentation "moves" forth or back in time, respectively, by the number of time units (in our example days) specified as the step. By pressing the button "fast forward" the user creates an animated presentation. In this case the display time runs forward with constant speed regulated by specifying the delay. There is an option to automatically re-start animation from the beginning after the end of the time span is reached. In this case the system will loop the animation until the user stops it by pushing the button "stop".

Selection of the check box "keep showing old events" makes the map present the data from the very beginning of the total time span (i.e. the earliest moment referred to in the data set) up to the end of the currently selected interval. In fact, in this case specification of the starting moment of the interval has no impact on the presentation, and all operations (moving the slider, adding or subtracting the value of the step) are applied only to the end of the interval.

Annex 4) List of URL's of "internet-based nature/biodiversity observation projects"

A) Interactive Satellite & Public Projects presented at the Workshop

Russian Children`s Telecommunication "Ecological Cooperation"

http://www.ecocoop.ru/index_e.html

The activities of the Ecological Cooperation Project bring together adults and children to study and conserve nature, and to create and exchange information for the best possible ecological education.

WhaleNet

<http://whale.wheelock.edu/>

WhaleNet offers curriculum resources and is a source of data for interdisciplinary classroom activities. It gives interactive informational support utilizing telecommunications.

Waterwatch

<http://www.waterwatch.org.au>

Australian national volunteer water quality monitoring and education program. Many groups, schools and community groups are involved. Offers a Data Entry Program and Help on developing graphs and short reports about the data

Naturdetektive / Naturedetectives

<http://www.naturdetektive.de>

Platform for school children to enter their nature observations into an internet- and GIS-based database

Plantwatch

<http://www.devonian.ualberta.ca/pwatch/>

Engaging students and the general public in the study of spring flowering times

INSECT@THON

<http://www.natmus.cul.na/insectathon.html>

Computerization of insect records by Namibian school kids

SchoolNet SA

<http://www.school.za/>

Entry to various computer aided school projects

Migrating birds without boundaries

http://www.euronatur.org/euro_engl/index.htm

<http://www.birds.org.il/>

A contribution to the peaceprocess in the Middle East" by (EURONATUR/Israel)

African Odyssey Project

http://capi.internet.cz/resume_e.htm

In African Odyssey the life and long journeys of Black Storks (*Ciconia nigra*) are followed with participation of the Czech Radio 2 - PRAGUE and its listeners. Results are presented in the internet.

EMAN Home Page

<http://www.cciw.ca/eman-temp/intro.html>

Ecological Monitoring and Assessment Network, Canada - Terrestrial Vegetation Monitoring and frog watch

The Cascadia Lichen monitoring program

<http://www.re-resources.org/>

Helps in developing, implementing, and promoting opportunities for the public to take an active part in identifying and solving local environmental problems

B) list of internet-based projects & environmental education information sources

Classroom Connect Quest Channel - Project on all continents

<http://quest.classroom.com/>

Participate in expeditions in various parts of the world by virtual voyage, including audio and video

U.S. EPA Explorers Club

<http://www.epa.gov/kids/>

Children's WEB-Site to explore interactively nature and the environment

The GLOBE Program

<http://www.globe.gov>

Schools participate in environmental observations and share the results globally

Web Sites For Children and Teens

<http://interact.uoregon.edu/MediaLit/FA/MLChildren.html>

Collects many links to other interactive educational sites on biodiversity for kids

Center for Marine Conservation-Teachers and Students

<http://www.cmc-ocean.org/sitemap.php3>

Information about water and interactive games for Kids

Nature Mapping Program - Univ. of Washington

<http://www.fish.washington.edu/naturemapping>

The approach is to train individuals to become aware of their natural resources and to provide the tools to inventory and monitor their resources. Maps of the appearance of different species are presented according to the data collection by schools.

One Sky, Many Voices Project

<http://www.onesky.umich.edu/>

Create innovative, inquiry-based K-12 weather curricula that utilize current technologies such as CD-ROMs and the World Wide Web for the interactive study of current weather and air quality.

Netfrog-The Interactive Frog Dissection-Title Page

<http://curry.edschool.virginia.edu/go/frog/>
Saving the lives of thousands of frogs

Journey North 2000

<http://www.learner.org/jnorth>
250,000 students, participated in the Spring, 2000 Journey North Program. The journeys of a dozen migratory species are tracked each spring.

Interactive Weather Information Network

<http://iwin.nws.noaa.gov/iwin/graphicsversion/main.html>
Get your weather forecast and learn about the weather

AirNET

<http://www.airnet-us.org>
AirNET curriculum encourages participants to study both indoor and outdoor air quality, interpret the data collected and share it with other AirNET participants via the Internet

Elephant Satellite Tracking in Malaysia, Introduction

<http://www.natzoo.si.edu/zooview/crc/elephant/eleintro.htm>
Evaluating the success of the elephant trans-location program by the use of satellites

Education and Wildflowers

<http://www.nps.gov/plants/color/gallery.htm>
Online-coloring books - mail your colored drawing to be displayed in the On-Line Gallery

Netherlands Institute of Ecology: The Dutch Ringing Centre and the EURING database

<http://www.nioo.knaw.nl/euring.htm>
Bird Ringing - An important technique in ornithology and a bird watchers' hobby

Osprey project: Home

<http://www.ospreys.org.uk/AWOP/Home.htm>
Follow ospreys as they migrate by satellite observations

White Stork (Ciconia ciconia) - Research and Conservation

<http://home.t-online.de/home/nabu-inst.bergenhusen/index2htm>
Information on conservation projects for the white stork

Bat Conservation International

<http://www.batcon.org/>
All about bats

Butterfly Conservation in Action

<http://www.butterfly-conservation.org/bc/action/>
among others: A national (UK) recording project to produce a new atlas of butterflies in the year 2000

Monarch Watch: Dedicated to Education, Conservation and Research

<http://www.monarchwatch.org/>
Educational outreach effort to engage citizen scientists in large-scale research projects that is producing real data through observations of migrating monarchs

Kangaroos - International Wildlife Magazine - National Wildlife Federation

<http://www.nwf.org/intlwild/kangaroo.html>
Everything you always wanted to know about kangaroos

5 TIGERS :The Tiger Information Center

<http://www.5tigers.org/>
Informs about the different tiger species and sets up conservation ideas and action

Sea Turtle Survival League/Caribbean Conservation

<http://www.cccturtle.org/>
Dedicated to the preservation of sea turtles and other wildlife

NatureWatch: A USDA Forest Service Nature Education and Nature Educational Curriculum Support Site

<http://www.fs.fed.us/outdoors/naturewatch/default.htm>
The NatureWatch program is for people to experience wildlife, fish, and flowers in their natural settings; to promote recreational viewing opportunities, facilitate learning about the environment, and to promote conservation efforts

Educating Young People About Water

<http://www.uwex.edu/erc/ywc/>
You find curricula summaries and check lists that help to prepare lessons

GREEN - Global Rivers Environmental Education Network

<http://www.green.org>
GREEN empowers young people to learn more about water quality

Ocean Ambassadors

<http://oneocean.org/ambassadors/>
Important marine species found in the Philippines: turtles - whales - dolphins - dugong - sharks - migratory - birds - fish tales

Welcome to SeaWeb

<http://www.seaweb.org/home.shtml>
SeaWeb is a multimedia public education project designed to raise awareness of the world ocean

Project WILD-Alaska

<http://www.state.ak.us/local/akpages/FISH.GAME/>
US Fish & Wildlife Service offers interdisciplinary conservation education programs focusing on wildlife in Alaska, designed for educators of kindergarten through twelfth grade

Educational Web Sites

<http://www.fgsd.winnipeg.mb.ca/libary/links.htm>
Internet Resources for students, teachers and parents

ThinkQuest

<http://www.thinkquest.org/index.html>
Encourages the advancement of education through the use of technology

Global Education Web Resources

<http://www.countryschool.com/gisig5.htm>
Just what it says

Study-WEB

<http://www.studyweb.com/links/>
Links for Learning

NBII - Education: Biodiversity & Environment

<http://www.nbii.gov/education/biodiversity.html>
Provides information and material for grades 3 to 12

Geoscience Education

http://www.geo.nsf.gov/search_site.htm
US National Science Foundation (NSF) links to education in geo-science

K-12 Sources - Curriculum - Lesson Plans

<http://www.execpc.com/~dboals/k-12.html>
Encourages the use of the World Wide Web as a tool for learning and teaching. Provides some help for K-12 classroom teachers in locating and using the resources of the Internet in the classroom

EE Link: Student Environmental Education Sites

<http://eelink.net/studentenvironmentaleducationsites.html>
Collects sources of environmental education in the Internet

Educational Web Sites

<http://www.fgsd.winnipeg.mb.ca/libary/links.htm>
These sites will aid teachers who are looking for an Internet project for their classes. Internet Projects typically involve some sort of joint venture in which students from different classes around the country, continent, or world work together

Internet Projects Education

http://www.cln.org/int_projects.html
Lists several online classrooms and education projects presented in the Internet

Internet Resources, Environmental Education

<http://www.igc.org/wri/enved/edulinks.html>
Internet Resources on education by World Resources Institute

Center for Environmental Education: Web Links

<http://www.cee-ane.org/www/index.html>
Environmental Education WEB Resources for various subjects with broader significance

Bio Online: Research & Education

<http://www.bio.com/resedu/educate.html>
Research & Academic Sites - Databases, Maps, & Tools - Education Resources

alpha3000 infodex - Education Page

<http://www.a3k.com/education/education.shtml>
Your place to start for what you want to know

Links to Resources for Educators and Naturalists

<http://www.ncascades.org/links.html>
Connecting People, Nature & Community Through Education - and lots of links

SNAPnet

<http://www.stolaf.edu/other/snap/SNAPnet.html>
School Nature Area Project links to many other WEB-Sites in environmental education

Learning conservation, helping nature, forming clubs

<http://www.nwf.org/rrick/helpearth.html>
Supports children in forming "Earthsaver" groups

Weisstorch/White-Stork

<http://www.sosstorch.ch/>
White Stork

Annex 5) List of Questions ...to facilitate project presentations and discussion:

- how long has the project been running?
- which steps were first in the planning, development and implementation?
- what was the driving "force" behind the project?
- what is the aim of your project?
- what are your main target groups?
- what were the challenges at the beginning and today?
- do you collaborate with other partner organisations in your country?
- how do you advertise your project activities?
- how many people are participating? Is the number growing?
- which technologies, tools and materials do you use?
- did you develop own materials, tools ,... for your project?
- how do you organise the feed-back (according concept and actions)?
- how participants interact between themselves and the project?
- is your project related to national educational programmes?
- is your project related to international Conventions ie. Biodiversity, CMS, Climate Change, Desertification?
- are you collaborating yet with other projects/networks abroad?
- how do you see your project developing in the future?
- how is your project resourced?
- what geographical and thematic areas does your project cover?