Minutes of the 5th Steering Committee Meeting of the ASSESS-HKH Project, held in Bhutan, August 5-8th, 2007

List of participants

organisation	name	present at meeting
AHEC	Dr. M P Sharma	August 5th to 8th 2007
AHEC	Dr. Arun Kumar	August 5th to 6th 2007
BOKU	Dr. Otto Moog	August 5th to 8th 2007
BOKU	Dr. Thomas Ofenboeck	August 5th to 8th 2007
BOKU	Dr. Ilse Stubauer	August 5th to 8th 2007
BOKU	Dr. Leopold Fuereder	August 5th to 8th 2007
BUET	Dr. A B M Badruzzaman	August 5th to 8th 2007
BUET	Dr. M Fazlul Bari	August 5th 2007
EU Commission	Dr. Mario Scalet	August 5th to 8th 2007
ICIMOD	Mrs. Mandira Shrestha	August 5th to 8th 2007
ICIMOD	Dr. Bandana Kayastha Pradhan	August 5th to 8th 2007
KU	Dr. Subodh Sharma	August 5th to 8th 2007
KU	Dr. Roshan Man Bajracharya	August 5th to 8th 2007
KU	Prof. Suresh Raj Sharma	August 5th to 6th 2007
KU	Mr. Sitaram Adhikari	August 5th to 6th 2007
MU	Dr. Karel Brabec	August 5th to 8th 2007
NECS	Mr. G. Karma Chhopel	August 5th to 8th 2007
NECS	Mr. Passang Dema and colleagues	August 5th to 8th 2007
PCRWR	Dr. Muhammad Akram Kahlown	August 5th to 8th 2007
PCRWR	Dr. Muhammad Aslam Tahir	August 5th to 8th 2007
UDE	Mr. Thomas Korte	August 5th to 8th 2007
UMAG	Dr. Andreas Hoffmann	August 5th to 8th 2007

DAY 1: 05-08-07

Session 1: Opening

After a very auspicious opening ceremony addressed by His Excellency the Deputy Minister of Environment Bhutan, the Project Coordinator, Prof. Otto Moog (see presentation session1_Overview_Moog.pdf), the EU Scientific Officer Dr. Mario Scalet, the Vice Chancellor of KU, Prof. S.R. Sharma and the Regional Team Leader, Dr. Subodh Sharma (see presentation session1_Expectations_S_Sharma.pdf, the meeting got off to a good start.

Session 2: Biodiversity, Chaired by A. Hoffmann

K. Brabec: Biodiversity in the HKH rivers and status of macro-invertebrate taxa catalogue:

see presentation session2_Biodiversity_Brabec.pdf on web page

He indicated that the taxa list is in the process of compilation, with the initial list already available and being continuously updated with new data. It was suggested that additional new top taxonomists should be invited to contribute to taxa/species identification. Two additional top taxonomists: Dr. Emmy Woess (Bryozoa), Dr. Thomas Borckhaus (Odonata). Upcoming work: Need to try to separate the aquatic fauna from terrestrial fauna; also taxa list to address autoecological information linked to HKH taxa list.

In response to M. Shrestha's query, I. Stubauer indicated that whenever new species are discovered the taxa list would be updated on an ongoing basis and regarded as a living database. O. Moog reported that there is an understanding between MU and BOKU to keep the Asian Taxa Inventory alive even if there are periods of no funding.

Both Indian and Pakistani delegates indicated that they had completed and sent their taxa data to the project coordinator. I. Stubauer clarified that the taxa lists for each country are only a subset of the overall taxa list that stand on its own in the background. This background database is maintained by only one responsible partner to have a common status and to be able to integrate new scientific development (e.g. newly described taxa) centrally. The taxalists that were sent by partners are the taxa found in the single sites.

S. Sharma reiterated that India and Pakistan sent two reports based on literature review to BOKU. The question was raised as to these have been duly received and incorporated into the overall taxa list. Dr. Baduzzaman asked what should be done with the samples collected in Bangladesh (from water quality mapping exercise) – should they be sent to BOKU?

O. Moog pointed out that there was no specific agreement to send all samples to BOKU, but the offer stands that if any partner required verification or cross-check of identification, that they have the option to send samples to BOKU. The samples should be stored and preserved properly for future work and use; where should they be stored; usually only in a museum or an institute like AEC. All samples that have been shipped to Austria need to be sent back because there is no storing and maintaining capacity at BOKU. Anyhow, a sample is like a document and should be kept for future research as the taxonomic state of the art is increasing steadily.

Who will do the identification and incorporation of terrestrial taxa like Coleoptera and Diptera? (K. Brabec)

O. Moog: If they are really terrestrial fauna, then they should not be included in the main taxa list; but collect them separately. Try to preserve the sample and maintain this taxa list and also seek funds to give continuity to the updating of the living taxa list beyond the conclusion of the project.

Next steps:
- Check aquatic – terrestrial fauna (Coleoptera will be checked by M. Jäch; other groups: K. Brabec will send list to top-taxonomists)
- Integrate autecologcial information

T. Korte: Habitat and current preferences of selected benthic invertebrates –Evaluation of the Additional microhabitat-specific sampling (AMS)

see presentation session2_Habitat_preferences_Korte.pdf

Evaluation based on flow (current) velocities, substrate types (i.e., habitat). It involves a single application of the net-sampler in "near natural" and "moderate" sites. Consideration of 250 AMS samples: criteria for assigning preferences should be found in at least 10 samplings and 30 individual recorded. Statistical testing involved "contingence coefficient"; chi-square test, index of representation, Spearmann rank correlation and canonical correspondence analysis (CCA). Outcome: 61 species assigned for habitat preferences, 55 speicies for current velocity.10-point system will be applied for some species.

B. Pradhan questioned how to apply this technique to impaired sites having altered discharge and flow velocities which are quite common in the HKH region; and how is this method (AMS) linked with MHS?
It can be done on the basis on the information of the animals living in the stream (i.e., metrics).

How do you come up with ecological status (M.P. Sharma) – T. Korte answered that this question is more linked to using a multi-metric index, which is done in comparison with a reference site. Is there a way to give distinct class or category without comparing the site with another? O. Moog answered that our approach is based on reference conditions and the composition of the fauna there. Threshold values to be defined for the different types.

Dr. Kahlown asked how many types of substrates and velocity types were considered in the analysis done? How was velocity measured?
Velocities measured on class categories from 0-6 estimated by observation or where possible a current meter (values observed: 0 to more than 1 m/s); 250 samples considered.

Did you look for autocorrelation between the two parameters (flow velocity and substrate type)? (A. Hoffmann) Not specifically, but only a few sites exhibited autocorrelation.

Announcements were made by G. K. Chhopel regarding travel, meals and awards ceremony, before breaking for lunch.

Session 3: River Quality Mapping, Chaired by A.B.M. Badruzzaman

O. Moog: Fundamentals, application and outlook of the HKH screening method using the Rapid Field Bio-assessment for river quality assessment and for early warning of impacts/impairment.

see presentation session3_Screening_Moog.pdf

It is different from the more sophisticated HKH-BIOS scoring procedure or the multi-metric assessment methods. In this case the Screening method was used for river quality mapping (Task 7.2) at six "locations" in the five Asian countries. The maps are then used for Task 7.3. mitigation strategies.

How to proceed? 1) Presentation of screening results (maps) by the Asian partners; 2) evaluate the field & lab methodology; 3) plausibility of results; 4) contact the stakeholders & policy makers; 5) develop mitigation strategies. Discuss each of these points in the upcoming sessions.

Water quality maps and results of the rapid field bioassessment (screening) method were presented by each of the Asian partners:

- Bangladesh (A.B.M Badruzzaman): see presentation session3_BD_river_quality_map_Badruzzaman.pdf; Turag, Balu, Buriganga, Shitalakkya and Dhaleshwari rivers selected. 10 samples done at each site; physical & chemical parameters; sorting & identification. Sites selected based on: point-source & non-point source pollution (industries/municipal and agriculture/other). The method matched reasonably well with visible observations in the field. NEPBIOS did not work well for these rivers. US approach was also used and compared with ASSESS-HKH approach. Physiochemical data not represented in the maps. Seasonal variation needs to be addressed.
- Bhutan (G. K. Chhopel): see presentation session3_BH_river_quality_map_Chhopel.pdf; Haa, Paro and Thimpu river systems were sampled. 21 sites in the Haa, Paro and Thimpu districts and 4 additional sites sampled. Central Thimpu was the worst with water quality class 5 and other areas nearby had water quality classes of 3, 4 and 3-4. Some pristine sites were upstream with water quality class 1. Haa had mostly water quality classes 1 and 2. Paro had water quality classes of 1, 2 and 3. O. Moog suggested to include more pristine sites which are now missing. Will be better for presentation to public.
- India (M.P. Sharma): see presentation session3_IN_river_quality_map_MP_Sharma.pdf; Kosi river system was selected near Roorkee as it covers (flows through) three

ecoregions and two states. Main stressors found included: deforestation, rock mining, washing/bathing, municipal wastes and industrial effluents. 26 sites sampled in all for water quality mapping. O. Moog asked about the the sampling design. Reason: will enlarge the attractiveness of the outcome to politicians.

- Pakistan M.A. Tahir): see presentation session3_PK_river_quality_map_Tahir.pdf; Soan river in Islamabad was selected for mapping. Main stressor is urban municipal wastes including sewage. 43 sites were sampled of which 6, 13, 9, 5, and 10 sites each fell into water quality classes 1, 2, 3, 4, and 5, respectively. Eight orders of fauna were found. O. Moog asked to used the correct colours for the classes, as now in the map wrong colours are shown
- Nepal (B. Pradhan): see presentation session3_NP_river_quality_map_Pradhan.pdf; the Bagmati river system in Kathmandu and Seti river system in Pokhara were selected for the mapping exercise. Joint work of KU and ICIMOD. 77 sites from 29 streams and 60 sites from 23 streams were selected in Kathmandu and Pokhara, respectively. All 5 water quality classes were found in both river systems with class 5 dominating in most of the central part of the Kathmandu city, while water quality class 2 dominated in the Pokhara municipality area. ABM Badruzzaman asked about the use of a 250 µm meshsize net. O. Moog recommended to use the same mesh size as given by the method.

The chair person commented that colour coding should be kept consistent among all partners and maps; also the mesh size of sieve used should be the same (500µm). O. Moog announced that he will prepare a few slides discussing common procedures in this context.

In the afternoon, a field excursion was held to visit the pristine stream headwaters of the Thimpu river.

DAY 2: 06-08-07

Session 3 continued: O. Moog summarized the findings of the river quality mapping done by Asian partners.

see presentation session4_Summary_river_quality_maps_Moog.pdf.

Discussion of efficiency, problems and prospects of the method/approach with slides prepared by O. Moog (as announced above);

- ✓ How many sampling units were taken for screening per site?: (all partners took 10 units). In actuality 20 sampling units are to be pooled (composited) so as to cover all possible habitat/substrate types.

- ✓ Was 10 sampling units enough to represent each site? **DECISION:** The general feeling was: yes 10 units are enough.

- ✓ How to combine results of both water biology and chemistry? If the chemical and biological results differ, then accept the worst case (or lower quality result). But there should be a plausibility check to verify the results.
- ✓ Dr. Badruzzaman: How to correlate the water chemistry data with biological quality indication? For bigger rivers a variation was seen between biological and chemical water quality, perhaps due to the location of sampling (for biology benthic samples, while for chemical water was collected from near surface). B. Pradhan: wide range of values seen for different rivers; difficult to compare; highly variable. R.M. Bajracharya: chemistry varies much more rapidly than biology – so, more frequent chemical testing required (e.g. time of day; from day to day); also may consider a depth integrated water sample for deep or large rivers. O. Moog: the chemistry is intended only as an initial comparison rather than a calibration of the biological indicator. Since it varies highly on a diurnal cycle, we should not put too much stress/emphasis on the single chemical

observation of water quality. A direct comparison is only possible if continuously measured chemistry data are available.

- ✓ **ACTION** all Asian partners: if they have chemical standards in their country – send to O. Moog

- ✓ M.P. Sharma: What exactly is meant by ecological status of rivers – not clear? Prof. Moog: It must reflect the quality of the river in terms of the biology of the river in comparison to a reference (pristine) state – high ecological status.

- ✓ Seasonal aspects of sample: – multiple (visits) samplings at different times of the year with different results; then take the worst sampling quality as the water quality class (for colour coding). Will one map work for the whole year? O. Moog: need to establish rules as to when to sample (e.g. when flow becomes too low, the Screening method will not work as it is designed for flowing water conditions); a new system may be needed to classify standing waters (or rivers which do not flow any more in a season), which could be justification for a follow-up project. One river quality sampling during the dry season should be enough and a single map should be used.

DECISION: All Asian partners agreed to the above approach: multiple visits are recommended before a decision of the right sampling time for IMO 120 can be made. For other ecoregions, samples during low flow conditions show worst case in terms of organic pollution and is used for colour banding;

- ✓ Field vs. laboratory taxa comparison often varied. Should all samples be briefly re-checked (rapidly) for new taxa in the lab? The generally consensus was YES. The method must be done in the field; i.e., field work is essential, but this does not preclude laboratory re-checking. **ACTION:** add in manual

- ✓ **DECISION:** Harmonization of water quality classes: ASSESS-HKH follows the EU-Water Framework Directive (WFD) with 5 classes from best to worst:
  - o I: blue,
  - o II: green,
  - o III: yellow,
  - o IV: orange
  - o V: red.
  - o There was a proposal to have the colour black for rivers (sections) with no life, eg., completely dead.
- ✓ **ACTION:** add additional column for sixth class in Screening manual

- ✓ **DECISION**: NO intermediate classes should be used. If two same values occur in neighboring classes , use the HKH-BIOS to calculate the class.

- ✓ **DECISION** on Mesh size: 500µm are agreed; ASSESS-HKH follows the standards from previous EU funded projects.

- ✓ For large rivers, how to sample? Use a boat and grab sample or collect from the margins to wadeable depth. In principle, project was related to wadeable rivers; large rivers are regarded as a topic of follow up projects. As indicated by partners and local authorities, there is an urgent need to classify large rivers O. Moog suggests to include this in a possible follow-up project.

Session 4: Methodology Development (HKH BIOS and HKH Index)
Chaired by Dr. Badruzzaman

T. Ofenboeck: Fundamentals and development of HKH Biotic Score

see presentation session4_HKH_Biotic_Score_Ofenboeck.pdf

Overview on three tier methodology used for incrementally assessing complex ecology:

Screening, HKH-Bios, Multimetric Index

Biotic score is based on higher taxonomic levels (family, genus, species) and need of aquatic fauna of specific levels of DO (related to organic pollution) and many habitats (hydromorphology).

NEPBIOS has been applied and tested for the entire HKH dataset. Preliminary results show that there is a need for significant extension and modification to adapt to the whole region. Eco-region to be considered in giving scores to the various genera; recalculation of index sores and development of HKHbios/ASPT; ranking of values, etc., to be done. currently NEPBIOS uses 7 classes.
HKH-BIOS will use 5 classes and will take ecoregion concept into consideration.
It will be provided to partners before finalization and is open for correction and comments

T. Korte: Fundamentals and development of HKH Multi-metric Index

see presentation session4_HKH_Multimetric_Index_Korte.pdf

It is a tool for the purpose of integrated river quality assessment. It uses biological measures (metrics) that derive from the taxa list of a given sampling site in comparison to reference conditions.
Metric types:

1. Composition or abundance metrics
2. Richness or diversity (Shannon-Weaver Index)
3. Sensitivity or tolerance
4. Function metrics

A multi-metric index combines the results of different metrics to a single result (or value) with a final score always between 0 and 1. This can be sub-divided into quality classes.

Developing a multi-metric index:

1. Determine environmental gradients (stressor gradients) using a site protocol
2. Selection of environmental parameters
3. Analysis of environmental (stressor) gradients
4. Preparation of indices
5. Division of parameters into 4 groups [hydro-morphology, organic pollution, eutrophication, land use]
6. Analyse parameters to find those highly correlated, and eliminate overlapping (redundant) parameters.
7. Principal components analysis to reduce the number of parameters.

77 metrics taken into account
Correlation of metric and stressor gradient (Spearman Rank Correlation & U-test)
Selection of final metrics and calculation of Ecological Quality Rating (EQR)

<u>Discussion on HKH Mulitmetric Index</u>
ABM Badruzzaman: If an example was provided of how redundant parameters are discarded, it would have been easier to understand; clarification on how the EQR were calculated.
M. Shrestha: how many samples included in developing the index? All sampling sites (246) from all the (5) partner countries were considered.
B. Pradhan: how can you determine which parameters are measuring the same or similar factors? The parameters pointing in the same direction and are close together in the PCA

results enable us to determine the degree of correlation of parameters and the environmental gradient.
ABM Badruzzaman: How does the end-user finally apply or use the method? Enter the taxa information and other parameter values into a software program which will provide the EQR, which can then be determined as to which quality class it falls into.
M.A. Tahir: What is the difference between the decision support table used in the screening method and the MMI method? Screening is a preliminary rapid method used in the field, while, the MMI is a more comprehensive and robust method that will be more accurate.
S. Sharma: Which metric do consider as most suitable to depict hydro-morphological impairment due to water abstraction? Bank fixation and density of woody riparian vegetation are found to be the most influential parameters for this.
ABM Badruzzaman: Were those chosen because of having the longest/largest gradient.
S. Sharma: Will this be able to predict the impact of damming on the river quality? Due to impact of damming the flow volume and velocity will be altered and the substrate/bed types will be modified, so these will affect the numbers and types of organisms that inhabit the river stretch.
M.P. Sharma: What frequency of values of each parameter did you come across in the analyses?
Dr. M. Scalet: Was the data base processed and analyses done centrally? Yes.
Dr. Badruzzaman: Will the software be completed during the timeframe of the project? Yes, we think that we will be able to finish it.

<u>Discussion on the HKH biotic score</u>

How to convert from a 7 class scheme to a 5 class scheme? These were based on the guidelines proposed and adopted by the Austrian and Germans in implementing the EU-WFD as follows:

I & I-II	= 1
II	= 2
II-III	= 3
III & III-IV	= 4
IV	= 5

There are clear rules used for scoring taxa in different ecoregions. These are available and should be followed.

Weights can be used to refine the value of a taxon. This is a bio-indicative value of the taxon which is used as a multiplier:

Very good indicator	= 5
Good	= 4
Medium	= 3
Weak	= 2
Poor indicator	= 1

This is still in the process of development and not yet ready.

T. Ofenboeck: In relation to the field sampling and laboratory work, what effort is need to apply the HKHbios or HKH-MMI? It will depend upon the outcome of the results; if good results are obtained, the RFBA method could be used, if not, the full multi-habitat sampling technique should be recommended (O. Moog).

M.A. Tahir: overview of the parameters used in site protocol filling and field sampling, observations and recommendations based on the experiences of Pakistan. Not all parameters

were regarded as very practicable and modifications were felt to be needed for Pakistan. Some families found in abundance but not included in the Decision Support Table.
I. Stubauer: Have you made an evaluation of what families were found where and what they indicate?

Thomas Korte: Most of the families pointed out are included in the NEPBIOS which is a part of the screening method, so they are included.

O. Moog: Some of the families were not included because their bio-indicative values are very poor! The taxa selected were done so as to indicate for organic pollution specifically, not river hydro-morphology. All organisms will be included in the comprehensive taxa list even if they do not have a NEPbios score; the will later be given an HKHbios score. The use of Iron reducing bacteria as indicators (proposed by M. Tahir) should be tested if it can be included in the screening method (depending upon whether it is natural or human induced).

A. Hoffmann: It is usually related to irrigation and drainage, so if this is the case, it is human-made and should be included.

ACTION PCRWR: It was concluded from this discussion that the evaluations made by Pakistan should be sent in detail to the co-ordinator to be able to follow the evaluation steps the Pakistani team has done. For the currently discussion it seems that several animals are not included as they are not good indicators.

I. Stubauer: Status of the software development, validation and outlook

see presentation session4_Software_status_Stubauer.pdf

WP 6 – overview: HKH Eco-data management tool (ECODAT)
Four modules:

1. HKHdip (data entry and storage programme): completed successfully
2. HKH Screening – field evaluation/observation: also successfully completed
3. HKH-Bios (biotic score): calculation of specific biotic score – in progress
4. HKH-MMI (multi-metric index): software programme development underway

All modules will be possible to be accessed by HKHdip or separately.
Validations and problem solving/adaptation have been done through feedback from all partners.

ABM Badruzzaman: Due to problems of obtaining licensed versions of operating software, would it be possible to make the software compatible with other operating systems like Linux or Open web systems? Need to check with programmer – cannot say.

ABM Badruzzaman: From the user's perspective, a complete taxa list would have to be provided, which may not be entirely practical for river/water quality mapping.

M. Tahir: Two problems with the HKHdip: run-time error 363 while trying to save; difficulty in entering some numerical parameters. Also need to check with the programmer for solving problems.

ACTION all partners: I. Stubauer asks all partners to always report problems with software immediately via email to ilse.stubauer@boku.ac.at or astrid.schmidt-kloiber@boku.ac.at

Lunch break

Session 5: Sustainable management strategies, Chaired by A. Kumar

Asian partners presented policy recommendations for mitigation strategies for sustainable river water quality management.

1. India (M.P. Sharma):
   see presentation session5_IN_Sustainable_strategies__MP_Sharma.pdf; Rapid urbanization rate; skewed distribution of population (32.5% in 23 metropolitan areas); precipitation unevenly distributed across country – overall water availability diminishing while demand is ever -increasing; industries, domestic discharges, hazardous wastes, salinity (coastal) & non-point pollution, all responsible for deterioration of water quality. Need for: a) sewage treatment facilities & proper sewage drainage networks; b) proper industrial effluent treatment prior to discharge; c) solid waste management (recycling, separation of bio-medical hazardous materials, composting, etc.); d) toxic/hazardous waste disposal procedures and facilities. Main focus is on interception and diversion of domestic sewage & treatment for safe disposal; low cost sanitation options.
2. Pakistan (M.A. Tahir):
   see presentation session5_PK_Sustainable_strategies_Tahir.pdf
   Ten stressors identified for Soan river: solid waste (bio-treatment, composting and use in agriculture, awareness/education/training programmes); waste water (need to improve treatment plants, capacity building of operators, monitoring network, establishment of waste water quality standards); poultry waste (waste water treatment, use in agriculture, ammonia gas emissions tapped, laws – monitoring and enforcement, capacity building of farmers); hospital wastes (separation & collection, incinerators, legislation & enforcement); industrial wastes (monitoring & enforcement of regulations, "information cells", workshops & training); river crossing (enforcement of laws, avoid by building bridges, awareness generation); construction (dumping of material, save clean sites); river impoundments ; land slides (stabilization measures & conservation to reduce, awareness and training, enforcement); vehicle washing (need to discourage; build washing stations).
3. Nepal (B. Pradhan):
   see presentation session5_NP_Sustainable_strategies_Pradhan.pdf
   21 stressors grouped into six categories identified, mitigation provided for short, medium and long-term strategies (5, 15 & 25 years). Mitigation options: awareness generation (hoarding boards, fliers, etc.), treatment plants (update and add), effluent standards, public toilets, bridges built across rivers, discourage/control squatting, prohibition of bathing/washing, prohibit quarrying, embankments, laws & regulations for fishing enforced, advocacy & pressure groups and community participation & empowerment.
4. Bhutan (G. K.Chhopel):
   see presentation session5_BH_sustainable_strategies_Chhopel.pdf
   stressors identified: domestic sewage (mostly urban areas), vehicle washing & workshops near rivers, industrial effluents (poor data), weekend vegetable market, diversions and dams, GLOF and agricultural non-point pollution (pesticides). Lack of standards for water quality. Mitigation: - setting of standards for discharges & industrial effluent, CTEM, pursue IPM & regulation, proper/safe disposal of out-dated chemicals, sewage management & treatment facilities, law/regulations enforced, collection, processing and recycling, awareness campaigning, and encourage public toilets.
5. Bangladesh (ABM. Badruzzaman):
   see presentation session5_BD_Sustainable_strategies_Badruzzaman.pdf
   8 major stressors identified. Industrial effluent discharge – proper treatment; sewage discharge – treatment plants; sand/gravel extracting; solid waste dumping. Mitigation should involve generation of awareness and motivation among regulatory agencies and the local public – incentives measures; regular monitoring (biological & chemical); enforcement of law/regulations & minimize corruption; compliance monitoring. All this needs a coordinated effort to develop realistic, achievable plans involving polluters, implementing partners, enforcing organizations and policy makers.

Questions:
M. Shrestha: Was the Bangladesh presentation general for the country or specific to the study area (mapped)? It was specific to the mapped area although generally applicable elsewhere too.

S. Sharma: Is there any single strategy that should be adopted in all partner countries? Yes, it should be enforcement of legal/governance system.

T. Korte: How does the water management system work in Asian countries? Rivers in general are not owned up by any one – i.e., common property resource, therefore, no one takes sufficient responsibility to take care of it. Local municipalities and communities have been ineffective in managing the rivers because of lack of enforcement and lack of ownership (A. Kumar). Users should be made to pay for management and mitigation services.

ABM. Badruzzaman agreed wholly with A. Kumar that there is a lack of enforcement. M. Tahir emphasized that in Asian countries enforcement is both a political and economic issue with many factors contributing to its ineffectiveness.

A. Hoffmann: Outlook on policy recommendations for mitigation strategies for sustainable water management

see presentation session5_Policy_recomm_Hoffmann_Shrestha.pdf

Water quality maps – useful tool, basis for interventions and investment
Water is the key to economic growth, health, and poverty reduction in the HKH. Water should be recognized as an economic good and must carry a cost for use, yet it is a basic human need and all people should have a right to safe and clean water. Efficient and cost-effective use of water should be encouraged and adequate emphasis placed on conservation and preservation.
Use values (drinking, irrigation, future use, & ecosystem services) vs. non-use values (ethical, religious or spiritual aspects).
Water is a public good (common pool resource) – cannot exclude use, which leads to tragedy of the commons.
Negative externalities: economic and environmental
Market prices may fail to reflect the actual value of water quality
MDG – to reduce to half the number of people without access to safe drinking water by 2015.
Evaluation matrix for classifying importance of stressor to develop mitigation strategy.

M. Shrestha: Analysis/Evaluation and Sustainable Management Strategies

see presentation session5_Sustainable_strategies_Shrestha_Hoffmann.pdf

Policy recommendations for sustainable water management strategies (based on framework):

1. Review of water resource management
2. River water quality status and stressors
3. Existing policies, acts & regulations
4. Enforcement, incentives, awareness
5. Mitigation measures
6. Pressure, state, impact & response framework
7. Policy outlook

Framework for Deliverable 15 and 16 ready;

ACTION Asian partners: to provide their corrected and finalized area and country reports to Mandira Shrestha by October 15 and 31, 2007, respectively.

ICIMOD and UMAG will prepare deliverables (D15 end November 2007, D16 end January 2008)

ACTION M. Shrestha: send Nepal report to all partners as example

M Scalet pointed out that Deliverable 6 should only be used as a basis, but text should not be repeated in the new deliverables. He requested to produce an effective deliverable and to avoid duplication; the focus should be on the target areas.

Afternoon: travel to Paro

DAY 3: 07-08-2007 meeting continued in Paro

Session 6: Dissemination and Conference; Chaired by R.M. Bajracharya

L. Fuereder: IRESA – Tropical river ecology and capacity building in Sri Lanka

see presentation session6_IRESA_Fuereder.pdf

L. Fuereder from Innsbruck, Austria, is the project leader of a similar project in Sri Lanka and invited to share his experiences and findings to the ASSESS-HKH group.
New approach to outreach activities and networking among the scientists and stakeholders (locals, NGOs and GOs).
Objectives:

- Initiation of river ecology at the scientific level
- Investigation of structure and trophic levels in aquatic ecosystems
- Networking with local people and scientists at University/Education of public

The project emphasized interaction with the locals and a detailed understanding of their lives, livelihoods, uses and needs of water and aspirations. Students at both school and university level were included and exposed to the various techniques and objectives of the project. Capacity building was done by the initiation of a Ph.D. for a faculty member of the University. The knowledge on the fauna is very poor, partly "morphotypes" were used (operational taxa units; co-operation with taxonomists is planned). Univ. of Kelania is willing to co-operate to improve knowledge.

Discussion:
M.A. Kahlown: What ecosystem services were the river systems providing the locals? Mainly domestic water, drinking water and irrigation water. The project was more of an awareness generation pilot project.
M.A.. Kahlown: What can be done to improve the water quality there? This is difficult to answer in short due to the complex society-environmental interactions. We have a comprehensive list of data on hydromorphology, fauna, trophic levels, etc., but the communities are not ready at this stage to use the information – first awareness is needed.

S. Sharma: The Sri Lankan people seem to depend heavily on rivers for water resources. Yes, they know about the bad water quality but have no other choice.

M. Shrestha: Have you done evaluation of river degradation? Yes, it is in the report.

K. Brabec: How did you do the radio-isotope analyses? Samples taken to Austria.

T. Korte: Do you think the ASSESS-HKH approach would be useful to apply in Sri Lanka? Yes.

O. Moog: Yes, the basic approach would work, but the river typologies are very different so it would need to be adapted to tropical rivers.

M.A. Kahlown: Most of the data present was based on questionnaires. Did you do sampling to verify the responses? Yes.

B. Pradhan: How did you involve people in the environmental protection, e.g., community institutions? Through workshops and field interactions.

Asian Partner presentations on future dissemination activities proposed:

1. Bangladesh (ABM. Badruzzaman): see presentation session6_BD_dissemination_Badruzzaman.pdf
   BUET intends to do various dissemination and awareness activities like: posters, flyers, newsletters, local events like workshops, demonstrations & trainings, and information events with questionnaires. Local people asked numerous questions like: what will happen after the project period (3 years); why large rivers not considered; do you suggest mitigation measures for river degradation; relationship between macro-invertebrates and chemical parameters; was any economic analyses done; communication between research group and government? Already established links with national and international organizations for future activities in this field.

2. Bhutan (G. Karma): see presentation session6_BH_dissemination_Chhopel.pdf
   Covered all sectors of society during dissemination. NEC already doing water quality monitoring since 1997, but mostly chemical; this project has introduced bio-monitoring. Information events locally, workshops and trainings. Hope to follow up with colourful handbooks, field manuals, fliers, etc. Generate further awareness through presentations and seminars at school and college level.

O. Moog: Will these type of activities and cooperation between RSPN and NECS last beyond the project? Yes, we have already been collaborating in the past and will continue to do so.

I. Stubauer: How will you make more water quality maps for other parts of the country? We hope to replicate the process in other districts.

S. Sharma: You should produce pocket books with colour photos; how do you intend to do that? We are not fully ready, but we will start in a small way.
Could the project help in this respect? Could the taxonomic keys be provided to all partners?

O. Moog: The identification keys may not be of adequate quality (photos) for a pocket book, but still may be useful.

3. India (M.P. Sharma):
   AHEC has already conducted 3 dissemination workshops/local events already at schools and public places. We hope to have assistance from the project for future continuation of activities and larger river water quality mapping. We need the taxonomic keys to do additional work in river mapping.

O. Moog: I am happy that you wish to include aquatic ecology at the university level and we will try to help you in any way we can to ensure project impacts survive beyond the project life.
I. Stubauer: Is there no possibility to re-involve your biologist? We have no objection, but their parent organizations did not allow them to continue.

4. Pakistan (M.A. Tahir): see presentation session6_PK_dissemination_Tahir.pdf
   PCRWR has already held 5 public events covering a wide audience of locals, water quality professionals, schools and government organizations. Disseminations modes: poster, workshops, brochures, project briefing to visitors, web page of PCRWR, audio/video programmes, training & demonstrations.

5. Nepal (S. Sharma): see presentation session6_NP_dissemination_S_Sharma.pdf
   So far 3 local dissemination events and 2 workshops were conducted. Mode of dissemination: fliers, brochures, pamphlets, poster were effective; radio and television broadcasts were most effective; workshops and seminars less effective. Of the target groups, school students and teacher were most receptive, as well as, NGOs and INGOs.

The local communities, university level students and government organizations were less receptive. Lessons learnt include: public more concerned with drinking water quality; can the method be used to assess drinkability of water? Dissemination plans in future must address preservation of rivers for drinking water purpose as well. Hoarding boards, posters will also be used to generate awareness in conjunction with local school children who will be requested to adopt a stretch of the river and help protect it. Scientific presentations and posters to be organized in future. Maps and reports circulated to GOs and NGOs. Audio, video and national broadcasting on radio, TV and newspapers. Practical training course package to be delivered to school-level children.

A. Hoffmann: How did you measure the effectiveness of dissemination modes? Through a questionnaire.

O. Moog: KU has produced a handbook for taxonomy by Mr. Hasko Nesemann. All partners should have a copy. Cost: EUR 60; IRs. 1000 or NRs. 1500.

R.M. Bajracharya – Announcement of the upcoming international conference in March 2008.

see presentation session6_scientific_conference_Roshan.pdf

Brochures have been printed and are distributed to all partners that should forward the brochures to all relevant participants in their countries

Godavari resort was selected as venue place and a smaller hotel in Lalitpur for e.g. students (cheaper hotel)

tentative programme: 4 sessions, conference proceedings; each afternoon short excursion

- Conference co-chairs: O. Moog, S. Sharma
- Scientific committee should have on representative from each partner organization
  Action all partners: nominate person for scientific committee by 30th September 2007 to ilse.stubauer@boku.ac.at latests
- Local organizing committee

plan: 75 – 100 participants, 40-50 papers, 2-6 participants per partner

Discussion:

M.P. Sharma: Can papers other than those directly connected with the project be presented? Yes, as long as they fit into the session themes.

O. Moog: An announcement for posters will also be given to encourage students and young scientists.

G. K. Choopel: Will costs for other participants be borne by the project? No

Question on conference fee: what is included ? all meals, local transport

ACTION all partners: distribute information on conference to a wide audience and make advertisement for conference

O. Moog asks participants to think about What kinds of papers will each partner country present?

Decision for the deadlines associated with the conference:

1. Titles and Abstracts – latest by November 30th, 2007 to conference@assess-hkh.at
2. Full papers to be submitted at the time of the conference (March 3th, 2007)
3. Guidelines for submission of abstract are available via the web page.
4. Payment details – all pay on arrival at Kathmandu

UDE will compile abstracts in co-operation with KU. Decision on which talks are accepted will be done by scientific committee.

O. Moog pointed out that specific plans for dissemination and end-users and how they will be used were not adequately presented earlier session. We need to re-discuss these in the afternoon session.

Lunch break

Afternoon of Day 3: continuation of Session 6

O. Moog: All Asian partners should please provide a list of contacts (end-users) and specific plans for further dissemination and continuation of the work beyond the life of the project.
S. Sharma compiles answers in power point;
see presentation session6_Summary_dissemination_plans_S_Sharma.pdf

1. **Bangladesh**: contacts with Dept. of Environ. and Save to Environment who are keen to learn and apply the method of bio-assessment for river water quality monitoring. Also contacted World Bank and Energy Generation Corporation of Bangladesh (EGCB) who are willing to support further work on river bio-monitoring and applications in EIA. Dhaka Univ., Agriculture University of Bangladesh and BUET.

How will the tools be used? Mainly for water quality mapping and as an aid in EIA primarily for policy making related to water quality management and mitigation as well as for charging users for maintenance of good water quality.
Save the Environment will use it in education and training of public.
WB – only interested in supporting consultants in EIA studies who use this method.
Dept. of Fisheries – interested, but not sure how it will be used.
Moog suggested to contact fish biologists at the Dhaka University to probably start a cooperation on fish-fish food relations.

2. **Bhutan**: Royal Society for Protection of Nature and local Schools, Clubs and Bhutan Water Partnership, Ministry of Agriculture, Dept. of Energy and NECS.

How will the tools be used? RSPN will use it for conservation activities and as an awareness generation and monitoring tool. Dissemination to school children and other general public who are interested (part of the nature club curriculum). Bhutan Water Partnership will be involved in future dissemination to other organizations and the public. Min. of Agric. is interested to use it for irrigation water quality monitoring. DOE and NECs will use it for EIA and water management policy and decision recommendations.

3. **India**: CPCB – Central Pollution Control Board of India has been contacted and is interested in continuing and expanding work in river quality monitoring. IIT, Roorkee, environmental biology laboratory.

How will the tools be used? It will be used for expanding work in river quality monitoring & river water quality mapping. IIT, Roorkee, plans to have a bio-monitoring unit and wants to incorporate it into curriculum for Masters degrees.

4. **Nepal**: Ministry of Environment, Science & Technology, WWF Nepal, IUCN Nepal, Higher Secondary Schools, Nature Clubs, Community Medicine and Public Health Org., the Dept. of Hydrology & Meteorology and AEC-KU.

How will the tools be used? It will be used for EIA by the Ministry; for monitoring by WWF Nepal, IUCN, ENPHO and JICA; research and teaching (course curriculum) and consultancies by AEC-KU/TU-IOM; DHM – data base compilation and mapping; and for public awareness by schools and nature clubs.

5. **Pakistan**: PCRWR is the focal point for all river water monitoring for the entire nation through its 25 offices is a major end-user; Ministry of Environment; WAPDA – Water and Power Development Authority, and Universities/students (Faisalabad). Some NGOs are already working in this field and have shown interest in ASSESS-HKH methodology.

How will the tools be used? It will be used mainly for river water quality monitoring and mapping as aids for policy making and implementation; training and education (by universities); and for EIA applications. WAPDA already has maps based on chemical quality and may be interested in comparing it with the biological quality maps. The Natural History Museum (Pakistan) can store the fauna samples for reference studies.

ACTION PCRWR: ask Natural History Museum in Islamabad if they are willing to store and maintain the benthic invertebrate specimen collected by the ASSESS-HKH project and to host the scientific collection

Presentation 4: M. Scalet (Scientific Officer – EU): **7th EU Research Framework Program (Water Research)**

General outline of presentation:

- Rationale for international cooperation
- Chronology of framework programmes 1984 to date
- In 25 years >3000 projects with over 45,000 researchers, mainly in the areas of agric., health, and natural resources.
- As of the 7th framework programme some changes in the structure and approach:
  - Defining a strategy
  - "Passive" opening = limited impact
  - Beyond the INCO approach
  - Spend more and in a better way
  - S&T agreements
- FP7 topics to integrate research activities when relevant
  - Emerging needs, policy
  - Dissemination activities
  - Strengthen the international cooperation with INCO countries
  - Small & Medium Enterprises participation
  - Cross thematic topics
- New approach:
  - Opening of all activities to third countries
  - Specific international cooperation actions dedicated to ICPCs
  - People specific programme
  - Capacity specific programme (S&T priorities; participation; coordinated approach among MS to S&T international cooperation)
  - Idea specific programme also open to third countries (managed independently by scientists) frontier research
- More inclusive, substantial, integrated, targeted, coordinated
- Budget of EUR 50,521 million (Environment = 1,800 million EUR)

DAY 4: 08-08-07

Session 7: Publication and Intellectual Property Rights Issues Chaired by K. Brabec

M. Shrestha: Overview of outstanding information events to be held – April 2005 to July 2007.

Nepal: Local, university and government level events held: 3 in 2005; 3 in 2007
Another planned event for Ministry level event October 2007
Two more schools to be included for dissemination in October/November 2007
Final international dissemination conference planned for March 3-7, 2008

Bhutan: 4 events held in 2006 (national level & local communities).

Publication of a field pocket book for quick reference (disseminate through local meetings) and a NECS brochure related to the ASSESS-HKH project.

Bangladesh: 4 in 2006 and one in 2007

A planned meeting with Dept. of Environment in September 2007; other events not yet dated (with Dept. of Fisheries and Local Gov't Rural Division), but to be done by December. School level events also planned, pending receipt of colourful keys (likely after Janurary 2008).

India: A post-graduate level university event planned later this year and incorporation of the contents into course curricula.

Pakistan: 4 in 2006 and 1 in 2007 (local, school and university levels)

Planned additional school-level events to be held in October/November 2007

ACTION all partners: please send the clips and articles from events published and press releases in the media to M. Shrestha for documentation?
ACTION M. Shrestha: please forward all these information to I. Stubauer for use in the reports to EU

T. Korte: Publication regulations and intellectual property issues.
see presentation session7_property aspects_Korte.pdf (Attention: presentation is partly different from decisions)
Intellectual property involves the protection of property (knowledge resulting from the project)

1. Project outputs:
   - The assessment system developed is the property of the EU (freely available to public)
   - Exception is the software (ECOPROF) which are derived from former project, therefore, are the property of the previous project (use of the software is free).
   - All products of the projects should be available by the end of the project, with the exception of the database (taxalist) – available 2 years after the project.
2. Publications:
   a. Must contain the EU contract number: INCO-CT-2005-003659
   b. Inform all partners via discussion before submission (for review regarding publication rights and authorship)
   c. Country specific results – inform the Project leader and get approval for authorship.
   d. Publications regarding HKH region and/or of assessment system – check with the concerned coordinators (Team leaders and Project coordinator/leader)
   e. All publications containing taxalists == Project coordinator will decide and inform responsible top taxonomist.
3. Authorship for scientific papers: Country specific – indicate titles, suggested lead author and co-authors and inform project coordination for documentation and record.
4. For taxonomic lists that are unpublished, then the Project Coordinator's responsibility to decide how the top taxonomist gets due credit/recognition.
5. In case of methodology development, this has already been done since 1999 in Austria (by O. Moog), thus the method should be cited as origin.

Intensive discussion was held on the topics of property rights and publications:
MA Kahlown: Are we simply using an existing methodology or are adapting and refining the methodology to fit the HKH (Asian) region? In some cases, the method worked fine without much modification, but some areas may require adaptation (O. Moog), if so, you should inform us that it did not work and perhaps it could be modified.

MA Tahir & MA Kahlown: In the case of Pakistan, some modification seem to be needed, eg., the inclusion of iron reducing bacteria. The method does not exactly fit without adaptation.

S. Sharma: Future papers will be of 3 types: Methodology formulation; application of methods; taxonomic lists.

O. Moog: In the case of the HKH-Methods (inclusive Screening), we want to develop eco-region-wise methodology rather than national methods.

ABM Badruzzaman: Asian partners should also be duly acknowledged when they provide significant contributions to method modifications.

T. Korte: In order to properly validate/justify the study at country level, the original methodologies on which the applications were done needs to be referred to, so the methodologies need to be presented to the scientific community and published first or at least simultaneously.

A. Hoffmann: The broader paper dealing with development of the methodology for the entire region should be decided and published first, so that other country-level work can refer to the original methods. ABM Badruzzaman, S. Sharma and R.M. Bajracharya all agreed to this statement.

Agreement of the steering committee that first method should be published, in order to be able to refer to the method when writing country specific papers

Agreement on the following topics is reached:

- EU contract number: INCO-CT-2005-003659 must be shown in the publication
- All country specific papers – inform the Project leader (indicate titles, suggested lead author and co-authors) and get approval for authorship.
- Publications regarding HKH region and/or of assessment system – check with the concerned coordinators (Team leaders and Project coordinator/leader)
- All publications containing taxalists: Project coordinator will decide and inform responsible top taxonomist as these activities have to be co-ordinated by one person to ensure high quality. For taxonomic lists that are unpublished, then the Project Coordinator's responsibility to decide how the top taxonomist gets due credit/recognition.

All water quality maps should be available on the website and in publications for public availability. The database will also be freely available to the public for 2 years after the project (in the initial 2 years, it will be only available to the consortium partners). All other completed deliverables D4-7 & 16, 18 will also be freely available to the public.

M. Shrestha: We need to publish the policy review paper for the entire region. ICIMOD's process is long, so could we start on it soon? Yes, consensus reached.

I. Stubauer: Overview of planned project publications
see presentation session7_planned_publications_Stubauer.pdf (Attention: presentation is partly different from decisions)

Projects success depends upon the practical outputs (methods, software & its application) and the scientific publications.
There is good scope for publications from ASSESS-HKH project due to a lack of knowledge on the topic in the region.

- Proceedings of the conference in March, Kathmandu (All papers and posters, along with a comprehensive overview of the project results & related activities; articles to be no more than 5 pages long and submitted at the time of the conference)
- KU to prepare guidelines for abstracts and papers
- Editorial Board: to be decided
- Of the proceeding papers, 10-15 will be selected and published in *Limnologica* journal.

A list of possible paper titles/topics were made at the last Steering Committee meeting and after the meeting via email from partners to D. Hering. Not all partners have sent suggestions, additionally Pakistan whishes to withdraw their suggestions so far and make new suggestions. It is decided that the topic on publications will be discussed in the following session more detailed (see presentation session7_Title_of_the_papers.pdf.

Session 8: Future plans and activities (jointly by O. Moog and S. Sharma)
seen presentation session8_Future_Plans_and_Activities_S_Sharma_Moog.pdf
and presentation session7_Title_of_the_papers.pdf

The suggestions paper are once more discussed:
Example of articles from a previous project - STAR (for basing our own):

- Multi-author articles (22 authors) – general overview and methodology papers
- Other country-specific or narrow focus scientific papers – 2 to 5 or so authors

List of papers for the ASSESS-HKH project:

1. The ASSESS-HKH project: context, objectives and approach (authors: all lead scientists – O Moog, D Hering, I Stubauer, MF Bari, ABM Badruzzaman, G K Chhopel, P Dema, A Kumar, MP Sharma, S Sharma, R. Bajracharya, M Shrestha, B Pradhan, MA Kahlown, MA Tahir, H Rasheed, R Shilpakar, A Hoffmann, T Korte, C Feld, K Brabec)
2. Development assessment methodologies to evaluate ecological status of rivers in the HKH – overview and outlook (authors: O Moog, D Hering, I Stubauer, MF Bari, ABM Badruzzaman, G K Chhopel, P Dema, A Kumar, MP Sharma, S Sharma, R. Bajracharya, M Shrestha, B Pradhan, MA Kahlown, MA Tahir, H Rasheed, R Shilpakar, A Hoffmann, T Korte, C Feld, K Brabec)

Agreement on the above 2 papers is reached

3. Water quality policies, pressures and impacts in the HKH (authors: M Shrestha, B Pradhan, A Hoffmann, MF Bari, MA Kahlown, MP Sharma, GK Chhopel)
4. Policy recommendations for sustainable water management in the HKH (authors: M Shrestha, B Pradhan, A Hoffmann, MF Bari, MA Kahlown, MP Sharma, GK Chhopel)
5. Structure of the macro-invertebrate communities in the HKH region: functional structure, environmental preferences and impact sensitivities (authors: K Brabec, T Korte, W Graf, . . .)
6. Screening methodology for the streams in the HKH region (every author writing papers on this topic can cite the methodology in there and does not need to describe everything in his paper) (O. Moog, A. Hartmann, S. Sharma,….)
7. Development and application of HKH-BIOS in the HKH region (authors: T Ofenboeck, S Sharma, GK Chhopel, S Alam, India? Pakistan? . . .)
8. Development of a Multi-metric index for application in the HKH (authors: T Korte, ABM Baki, D. Hering, T. Ofenboeck…)
9. Habitat and current preferences of the macro-invertebrates in the HKH (authors: T Korte, D. Hering. . .)
10. Species inventory of the macro-invertebrate fauna in the HKH region (authors: O Moog, S Sharma, A Schmidt-Kloiber, K Brabec, . . . aims to be defined and others to be decided)
11. Country specific papers Bangladesh

12. Country specific papers Bhutan
13. Country specific papers India
14. Country specific papers Nepal
15. Country specific papers Pakistan

Suggestion from ABM Badruzzaman to give all field workers the opportunity to appear on papers: therefore another multi author paper is suggested:

16. The HKH data set - sampling design, content and taxonomic resolution (author: field workers) - partners are asked to provide a list with authors on this paper. The one who writes the paper should be the lead author

For some papers it would be better to first define contents of the article and then think about the authors

Overview on suggested papers so far by O. Moog:
- the content of the **scientific journal** could follow the structure of other EU funded projects.
- proposed scheme : start with 2-3 general papers with multi authors (see list above and agreed papers)
- lot of advantages: visible that such project needs a team and 2ndly everybody who contributed will appear
- next step: point out topics that are interesting for the scientific community
- start writing now, esp. first multi author papers

- Conference proceeding: should offer possibility to publish all topics of the project, but editorial board needed

Decision needed: Editorial board of Conference Journal and Editorial board of Scientific Journal

Duties for members of Boards (2 types): good knowledge on this field and others for language part;
- they must have time to contribute
- they are expert
- they have good skills of review

Agreement at the meeting in Lahore: large editorial board for the Conference Proceedings;

Agreement 5th meeting on editorial board: O. Moog, S. Sharma, D. Hering, M. Shrestha, R.M. Bajracharya, A. Hoffmann, T. Korte, M.F. Bari?, G.K. Chhopel, Pakistan?, India?

ACTION BUET; PCRWR; AHEC: provide information on the one person from each partner who will be in the editorial board for the conference proceedings

Editorial Board for Scientific Journal: should have few editors, with responsibility to look for good reviewers: O. Moog, D. Hering, S. Sharma

Agreement: think of members for editors for Sci. Journal, volunteers to be announced by 30th Sept 2007 to ilse.stubauer@boku.ac.at at the latest

Agreement and ACTION all partners: comments to the proposed papers / authors in the list above are welcome until 30th September 2007

All partners are asked to think about possible papers.

ACTION all partners: Deadline for submitting titles, authors & journal names where it is intended to be published for any other papers by all partners is September 30th 2007. These should be sent to ilse.stubauer@boku.ac.at

Lunch break

Future Activities Planned:

- Human resource availability in partner countries; contact person; future training and capacity building for new personnel; updating knowledge and quality control of staff members.
  - Pakistan has internalized the project staff and considering adding more staff to do biological monitoring of all rivers in the country (already have the resources and money); contact person: M.A. Tahir.
- HKH screening method software is **ready** (pending modification based on Pakistan's findings)
- Software with HKH-score and HKH-index finalization – these are foreseen for end December, 2007.
- Sustainable management strategies finalization – water quality maps ready, but need to harmonized (format, scale and appearance); could ICIMOD provide GIS support? This is too big a responsibility to take on! Why not each partner prepare their own GIS maps? Not possible for Bangladesh – all necessary data not available! Then we should opt for Google Earth maps. This idea was accepted by everyone.

- **ACTION ICIMOD:** check copy right for Google Earth maps

- Input of taxa lists from water quality mapping samples in HKHdip – have all partners completed this? Yes by Bhutan, Nepal and Pakistan.

- **ACTION all partners**: send database with all entered information on samples from water quality mapping to BOKU by Sept 30th 2007 (to anne.hartmann@boku.ac.at or ilse.stubauer@boku.ac.at)

- Transport of screening samples to BOKU, Vienna for preservation, further analysis and storage (WP7). Already done by Nepal. Moog provided the option to check the identifications (Quality control) and to distribute specimen to top taxonomists in Germany, Czech Republic, Slovak republic and Austria.
- Other regional samples are to be returned. MA. Kahlown will contact the Pakistani Natural History Museum if samples could be stored there (pending specification of the volume and numbers of samples). Moog: In the case of permission a contract should be signed that HKH partners are allowed to use the samples for their scientific work.

- Each partner should send reports (or necessary information) on mitigation measures for each country area (where mapping was done) – deadline October 15, 2007?.

- Dissemination and activities planned for implementation of the assessment system
  - Pocket book/hand book/field guide of taxonomic keys (H. Nesemann to be given the task; taxonomic, resolution, form, cost and date of completion is pending): This topic was not foreseen in the project, so it depends on availability of funds
- Deliverables

Final comments and observations by M. Scalet (EU Scientific Officer)

No special formal interventions to be made

- Evaluate the report (both interim and final) mainly the scientific aspects – are the completed activities in line with those proposed?

- Evaluate if the activities performed is in line with the costs claimed.
- If activities of a deliverable are significantly repetitive (or similar to) with a previous deliverable, then it cannot be counted as a separate deliverable. So please give attention to the presentations/reports so as to avoid duplication.
- Generally my feelings are positive about the project:
    - You have a very good team
    - There are no real problems with the partners and all seem to work well
    - There appears to be a good dialogue, but some specific points could be resolved
    - With regard to the scientific aspects: the second report is fine – nothing to be changed and is pending completion of evaluation by the financial officer.
    - My main observation regarding the project (closely related to the requests) is how to extend or continue the project into another phase. The project is very specific with the main objective to develop a tool to evaluate water/river quality. So the dissemination of this project is very important so as to create the conditions to lead to application of the tools developed in the project. Try to work in these last months of the project to impact/push the government (national) authorities in the region to make some mandates for implementation of the results (tools and recommendations put forward) of the project.
    - It will be very difficult to extend the project simply for the implementation of the outputs/tools of the project or to simply continue the same work done in the original project.
    - You have the base to ask for funds for some other aspects but not additional research in the same area/field.
    - If you are able to demonstrate that new knowledge and aspects will be developed in a follow-up project which is really necessary, it may be possible to get additional funds.
    - I ask you - will the results of this project really be implemented by local or national authorities? If you could report in the final report practical implementation by local authorities of the results of this project it would be very good for the project and interesting for EU.
    - There seems to be no real problem regarding the publications – I can say to you that if my contributions/inputs could be useful in any general publication of the project, I could possibly contribute to the publication.

O. Moog thanks M. Scalet for taking the time to come and for all you valuable suggestions and recommendations. I hope you really have a good impression of the active and hardworking group that is made up of such different and diverse partners. We will try to write a pre-proposal on large rivers and see if there is any possibility for getting EU funds, and if not EU then we can even seek other national and international funding. I once again thanks to our friend and host and his team for his perfect hospitality, we enjoyed every minute and every second in Bhutan. Thank you very much. I also want to thank all the participants for coming and actively participating.

Day 4 Evening Session

Topic: 6th and final Steeering Committee Meeeting:

O. Moog: Where should it be held?
Three possibilities: Vienna, Delhi or in Nepal
I. Stubauer stated that funds are insufficient as many of the partners have exceeded their travel budget (some by up to 150%), so it would be most cost efficient to have the meeting in Nepal along with the International Conference.
MA Kahlown: Indian and Pakistani partners are very keen to have the meeting in Vienna.

What is the possibility to shift/transfer additional funds from other activities to the travel budget?
M. Scalet: There are very limited possibilities to shift or augment the travel budget beyond 10-15%.
R.M. Bajracharya: e have thought all along that the final meeting should be a closing meeting, so logically it should be held after the conference to wrap up and discuss any final issues.
Moog: The meeting had always been planned from the beginning and will give us the last opportunity to make final decisions on our project's output or follow up activities, so we should go ahead with it. Last but not least we possibly can use information of the scientific conference for the final reports and/or publications.
Most of the delegates agreed that the most efficient and cost-effective way to do it was to have it at the time of the conference in Nepal.
S. Sharma: Could there be any other option apart from Vienna or Nepal? Yes, it could be held in New Delhi (R.M. Bajracharya)
S. Sharma & O. Moog: The problem with Delhi is that it may be difficult for the Pakistani partners to come to Delhi. So, the best choice is some place in Nepal – it need not be in Kathmandu; perhaps Pokara as it is a major sampling area.
B. Pradhan: I have no real preference, but Nepal would be logistically easier and best.
G. Karma: If there are no other financial options, then Nepal would be fine.
R.M. Bajracharya: Just as a brainstorming question: could the final meeting be held after the conference in late March? No, not possible from the time frame's perspective, as this is the time for reporting.
Kahlown: Why must the conference be held in Nepal? Why not in Vienna?
S. Sharma: Mainly to include other participants and students from the region. Costs would be prohibitive for many Asian partners and students if it were in Europe.
O. Moog: The Vice-Chancellor of KU also requested and was very keen to have the conference held in Nepal. Can we make the steering committee meeting before the conference?
S. Sharma: This would be logistically very difficult as it would have to be held in Kathmandu. There is an advantage of having it after the meeting as most outside partners will be gone and we can have the meeting elsewhere (e.g., in Pokhara or Jomsom).
I. Stubauer Yes, if it is held after the conference we would have hear all the presentations and could discuss about these and other matters too if it is held after the conference.

Agreement that venue for the last steering committee meeting will be Nepal and it will be held directly after the scientific conference

<u>Possible Future Projects and Funding Sources</u>
O. Moog: Could be all give their opinions about possible funding sources and nature of a follow-up projects?
T. Korte: It will depend upon the topic/nature of the new project. Perhaps we could focus on implementation of the technologies developed as well as filling some of the gaps remaining from the present project.
Hoffmann: We should try, if possible, to keep the consortium since we have worked so hard to build the capacity and know each other well.
MA Kahlown: Only if you think Pakistan can contribute, then we will be happy to join hands; otherwise we would be happy to be excluded.
K. Brabec: We could try to develop a new methodology for large rivers in a new project; also we could possibly try to combine it with the climate change issue.
O. Moog: It would be ideal to prepare such a proposal as this would be very new and unique to be able to develop such a methodology for the highest and steepest region of the world.
S. Sharma: I heard that a EU new call will be posted dealing with climate change in the Himalayan region, is this true? I am not sure, but will check what was the final version of the call.
K. Brabec: I heard that the final version had change and will no longer involve the Himalayan region.

I. Stubauer: The new approach of the EU with regard to the financial aspects is that the system and models have changed. Any proposed project will have to seek 25% matching funds from elsewhere.
O. Moog: Regarding climate change, I will provide the web link where you can find new calls and organizations that funds projects relevant to us (dealing with benthic macro-invertebrates).
T. Ofenboeck: This is a very powerful and good group and we should stay together; I have no comments on European funding.
Bajracharya: Possible topics could include large rivers or high-elevation lakes and rivers; whether or not to keep the consortium intact will depend to a large extent on the topic selected and the calls which we apply to for proposed funding.
S. Sharma: With regard to topics, we had discussed it before in Pakistan, so we should consider making a project dealing with large rivers. As the scientific officer said, perhaps we need to consider implementation of outputs of the first project, as many are donor driven.
B. Pradhan: Some aspects of impacts seem to be a bit missing in this project. So perhaps we could explore health impacts of water quality degradation in the next.
ABM Badruzzaman: With regard to implementation of the findings/outputs of the project, it is a bit concerning as it may be difficult to achieve in Bangladesh; we need to seek additional funds for implementation. About the topic, Bangladesh or lowland areas are equally if not more severely affected by climate change due to sea level rise and salt water intrusion which could affect benthic fauna.
O. Moog: Could we include a Tibetan partner? It would be important to include the headwaters of Brahmaputra and Mt. Kailash to get the entire picture.
G. Karma: About the consortium, I feel splitting up is not a good idea; we should stick together.
O. Moog: So it seems there is a consensus that we NOT change a winning team, rather we stay together. We could simply stick to application/implementation of the methodology developed; or we could move to large rivers which is a completely new area scientifically – nobody knows exactly how to deal with it even in Europe. If we focus on large rivers, nobody can say we are repeating the same activities; it is an entirely new and different area.
MA Tahir: In Pakistan, we will implement the methodology across the country, as MA Kahlown has already given his word. In this regard, we will look to the support and assistance from this consortium, which has been far better than any other organization I have worked with.
O. Moog: Climate change aspects presents a very interesting topic to study what will happen to the composition of the benthic faunal communities as climate change occurs from the headwaters to the outlets of the Indus, Brahmaputra and Ganges rivers systems, and in the case of Bangladesh the effects of sea-level rise. Another topic we could consider are health aspects/impacts on communities using river water resources with a focus on parasites and infectious diseases which are transferred by benthic invertebrates as malaria, river blindness etc.
It is agreed that we will all think more about the topics and keep our eyes open for relevant calls. We should devote one session to discuss this further in the next meeting (6^{th} steering committee meeting).
MA Kahlown: Why not consider other funding agencies and not be too dependent on EU alone?
ABM Badruzzaman: I think we should also look into the World Bank for potential funding.
Let's all keep in touch and inform each other of any relevant new developments.

O. Moog again appreciated the active contribution of all partners and closed the evening session.