

# **INTERNATIONAL ASSOCIATION OF HYDROLOGICAL SCIENCES**

## **Draft Final Report of the IAHS Task Force for Scientific Programmes (TFSP)**

**June 1995**

### 1. Introduction

1.1 The Task Force for Scientific Programmes (TFSP) was set up at the IAHS Bureau meeting in Karlsruhe on June 25, 1994. The following terms of reference of the TFSP were suggested by its instigator, Professor Shamir, President of IAHS, and endorsed by IAHS Bureau:

- Evaluate the present programmes and modes of execution.
- Indicate those areas of hydrology and water resources which should be addressed by IAHS, and emphasize those which deserve more or less attention than they receive today.
- Propose - if needed - modifications in the content of IAHS programmes and the modes in which they are carried out.

1.2 The Task Force consists of seven individuals: Professor Cornelius van den Akker, Professor D. Peter Loucks, Professor Zbigniew W. Kundzewicz, Professor Mark F. Meier, Professor Enda O'Connell, Professor Laszlo Somlyódy and Professor Brian Wilkinson. Professor Zbigniew W. Kundzewicz acted as Chairman of the Task Force.

1.3 The Task Force has worked entirely by correspondence (mail, facsimile, e-mail). In addition to the terms of reference listed in 1.1, which served as the basis of discussion, Professor Kundzewicz prepared a questionnaire, which contained 21 items and was aimed at helping members to structure their views. This questionnaire was distributed among the members of the TSFP on 8 November 1994. They forwarded their opinions on the matter to the Chairman who, in turn, synthesized the material and produced the present draft of the report. Rather than giving an example of a dozen specific problems labelled as the hot topics of today, a kind of systematic solution is devised, which could be of more universal use.

### 2. Is there such a thing as a IAHS scientific programme?

2.1 Despite some uncertainty in the meaning of the term in the IAHS context, the TFSP agreed that the "scientific programme" of IAHS was effectively non-existent. Most Task Force members felt that it would be helpful to have an articulated, organized and coordinated Core Science Programme for IAHS more clearly defined and periodically reviewed (e. g. every three to four years). The

Programme could include some themes in common with the well-defined hydrology programmes of WMO (Operational Hydrology Programme) and of UNESCO (International Hydrology Programme) but would also contain other elements in response to current scientific needs and opportunities.

2.2 The Programme could be sustained through Assembly Sessions and meetings held between these Sessions, so that there would be some continuity. There is a tendency for IAHS meetings to have titles completely different to those of previous meetings. There is nothing wrong in some continuity, provided that this is mixed with new topics in an appropriate way. IAHS should be promoting activities in those areas which are deemed to be of maximum priority. When a challenge emerges, it can be helpful to convene a forum within a meeting with leading players involved, to debate the issue and to postulate an amendment to the Core Programme.

2.3 There is a need for caution, however, that a codified "science programme" may be seen as fixed long-term edits from above ("top-down" mode). A Task Force Member who has had much experience in defining research programmes and priorities for the future stated that these proved, after the passage of a few years, to have been useless exercises or at least of marginal value. All fields evolve, some more rapidly than the others. IAHS should follow the "bottom-up" mode, going where the good scientists - those at the frontiers of knowledge - decide it should go, and these directions need not be codified in a bureaucratic "programme" of some assumed durability.

2.4 The Core Science Programme would serve to focus many of the programmes of meetings and publications of the Association. Moreover, IAHS could establish ad-hoc scientific bodies and even stimulate research endeavours by its Core Science Programme.

### 3. IAHS objectives, structure, targetted audience and science programme

3.1 The objectives of the IAHS, as stated in its statutes and bye-laws, the structure of the Association and the targetted audience were examined in the context of the scientific programme.

3.2 It was suggested that the objects (or perhaps: better objectives) of the Association should be re-worded. Several members saw the opportunity of revising and up-dating the objectives (e. g. by a small group of experts). Examples of the spirit of required specific revisions to Article 1 are presented in the Annex. IAHS might develop a relatively broad (long-term) mission statement combined with specific short-term goals to be updated regularly.

3.3 We must keep IAHS flexible and yet show the specialists that they have a defined niche in the association. Forming transient task forces, ad hoc working groups and committees to respond to specific challenges is very important. The addition of new Committees improved the shape of IAHS. However the name "Committee" was found unfortunate. It has connotations of bureaucracy and is too similar phonetically and visually to Commission. Why not something more vibrant such as "Interdisciplinary Task Force" (working group, working party and so on).- The word "interdisciplinary" should occur in the title. In the interdisciplinary issues tackled, water could be seen in the context of environmental, geophysical, economic, socio-cultural and institutional-political systems. It would be useful to identify a number of specific interdisciplinary priority topics where IAHS could fruitfully collaborate.

3.4 The targetted audience follows directly from the objectives and the well-defined role of international volunteer scientific bodies: the working scientists (at all levels), educators in hydrological sciences, students, and those who may use the results of science (operational hydrology, water

resources and environmental planning and management, decision making). That is, the targeted audience of IAHS is the whole worldwide community of hydrologists, scientific and applied, and those who are a mixture of both. IAHS has not been very effective in reaching this community in the past. The Association should strive towards extending the audience to all those interested and working in areas related to hydrology.

3.5 There are two communities of hydrologists, one with an engineering background, and the other with a background in earth sciences. Some of the latter (for instance, hydrogeologists, soil scientists) do not typically identify themselves with IAHS since they have their own scientific communities. Many people working in these disciplines do not view IAHS as their first choice international society. Also a large group of engineering hydrologists have been concerned with local (or regional) issues and have had their needs met by local or national hydrological societies. This may change, however, as the importance of understanding global problems becomes more widely accepted, e.g. through the need for climate change impact studies. Many hydrologists teach and do research in fluid mechanics, hydraulics, geology, etc. Organizations such as IAHR or IAH manage to attract hydrologists to their meetings, because they view the Associations as covering their primary discipline. The interdisciplinary role of snow and ice is rather unique. Many glaciologists who participate in IUGG activities do not recognize the IAHS as "home" and register in other fluid earth or solid earth associations. Sometimes we have to preserve compartments without making them overly restrictive or adversely affecting interdisciplinary cooperation.

3.6 The IAHS has to keep working hard to make it possible for young scientists (including graduate students) to attend its meetings because they have new, fresh ideas. A good move would be offering low registration fees at IAHS symposia and workshops to young scientists, and an award for the best paper/presentation by a young scientist, in addition to the existing Tison award. It is very important to attract scientists from other fields because these interactions can be very profitable.

3.7 An increased emphasis on institutional, governmental, economic, regional development issues, and the like may well increase the membership within IAHS. While they are covered, one does not think of IAHS as an organization that is very interested in . If there is any one thing that is preventing us from better water management, it is this set of issues, not our lack of knowledge in hydrology. Perhaps these topics are not included in "scientific hydrology" (yet etymologically the notion "science of water" does not exclude this) and it may be that IAHS should not attempt to be everything to everyone. However, majority of Task Force members believe that we find it too easy to narrow our focus on "scientific hydrology" issues, often so as to make it easier to stay current, but at the cost of not being as relevant to those who need to use our science.

3.8 It is difficult for scientists to feel the sort of allegiance to IAHS as they do to AGU, which is largely a national society on a grand scale. EGS is in this mould as well, and it meets sufficiently frequently to form well-knit communities. This also has much to do with the choices of AGU or EGS session topics - they keep coming every year and there is therefore no need for long-horizon planning. Only a small percentage of the potential audience of IAHS make it to the meetings/assemblies. The purpose of IAHS Comms (a shorthand for both Commissions and Committees) is to try and create a community of people in each area. But some of the Comms may meet only once in four years and do not communicate with sufficient frequency.

3.9 It is not possible within the constitution of IAHS to charge a membership fee. The proposals to change the regulations and ask for a moderate membership fee have been raised many times throughout the decades. This would help making the Association more "professional". Alternatively, some members might be persuaded to make a voluntary annual contribution to IAHS. Members who make a financial contribution to an organization, take a greater interest in it and therefore enhance

their involvement in its activities. Some mechanism for a voluntary "subscription" could spread the influence of the IAHS and enable it to reach a wider targeted audience. This could, for instance, finance a more upmarket broadsheet Newsletter in the vein of EOS, full of hydrological news from around the world, or an electronic bulletin board. A major portion of funds that are available could be spent on increasing the publicity for IAHS. This would lead to a larger participating "membership" which would generate more scientific activities from which additional funds would flow. IAHS should urge its workshops and symposia organizers to pursue alternate funding sources (e.g. national science foundations and other regional, national and international organizations). This money may be available if a compelling case can be made. This in turn raises the question as to whether the event should be organized at all if a such case cannot be made.

3.10 There are examples of good collaboration of IAHS with some international organizations, both intergovernmental (UNESCO, WMO) and non-governmental, such as IAHR and AGU. However, lack of cooperation with other important organizations is noted, such as EGS. This may need to be re-thought, since we all need to raise the profile of hydrology as a science, and to achieve this in as many ways as possible.

#### 4. Emerging challenges and inter-disciplinary issues

4.1 The Task Force agreed that IAHS responds generally quite well to new scientific challenges. With the benefit of hindsight, it is always possible to say that IAHS should be more responsive; the climate change issue is a case in point. After a relatively early involvement in 1987 (Symposium at the Vancouver Assembly) there have been no major endeavours. The responsiveness has a lot to do with how close-knit the organization is, and how well its sensors work. Good communication with the grass-roots (scientists) is a pre-requisite for responsiveness.

4.2 IAHS has sometimes been a little too slow, too hidebound to respond/react to the new directions that geophysical and other sciences may take. Long-term planning is a drawback, as the current excitement in some matters may not have been foreseen at the time (or perhaps by the individuals present) when the decision was made two years before the meeting. Part of this slowness is the policy of setting deadlines for abstracts and manuscripts far in advance of meetings. Part of the problem may also be a lack of appreciation by many in the hydrological community that they can learn from other fields in geophysical science. Faster response times to emerging issues and better communication among members are needed. An electronic bulletin board and increasing use of Internet would help (e. g. e-mail conferences, work of IAHS bodies reducing the need for costly and time-consuming meetings).

4.3 There is the need to strengthen interdisciplinary links. The earth system crosses the boundaries of conventional scientific disciplines. We cannot hope to understand even individual parts of the system by working only within a given discipline, or within a given Union, Association, or Commission. The need to develop a new, interdisciplinary approach, a new paradigm of science, led to initiatives such as the International Geosphere-Biosphere Programme. Much of the current excitement of science is in fields - usually spanning two or more disciplines - that are not well represented in traditional organizational structures, whether they be in university departments, funding agencies, national research institutes or international scientific hierarchies. It is important to reach out for partnerships - joint symposia, workshops, international programmes - with other disciplines, involving several Comms of IAHS, other Associations of IUGG and other Unions and Scientific Committees of ICSU and UATI.

4.4 Interdisciplinary issues are always difficult to cover. We are locked into organizational structures with specific objectives at each level of the hierarchy. It is difficult to move out of one's disciplinary boundaries because of one's training, the organizational hierarchy in universities and institutions, and the pigeon-holes in funding agencies. It is hard working in a multi-disciplinary environment. It is also less rewarding when judged by others in our own scientific or technical disciplines. However, the most important progress in science can very often be made on interdisciplinary issues. An attempt should be made to give greater attention to these issues.

4.5 Many of the major items which are presently on the environmental agenda need an interdisciplinary approach. This means that hydrologists must work together with ecologists, biologists, chemists, etc. Interdisciplinary ad-hoc Committees, Working Groups and Task Forces could serve this need. IAHS has not succeeded in occupying the high ground in the domain of environmental management. One comes across chemists and biologists trying to define environmental management procedures (e. g. for in-stream and terrestrial species) without any proper understanding of the role that hydrology or a hydrological model should play in such work. Hydrologists should be more pro-active in the broader environmental context. They should choose relevant items (environmental problems) and highlight the role of hydrological sciences in tackling these problems. Examples of inter-disciplinary areas where IAHS should improve its profile are: non-point source pollution and material cycling.

4.6 It was pointed out that IAHS should play a role in guiding the research schools in hydrology. The query was raised as to the models of cooperation with research schools in hydrology for water and environmental management. The Association could serve as a collector of case studies that would be detailed enough to warrant them being used in the education of hydrologists. Many such case studies are summarized in IAHS "red books".

## 5. Meetings and publications

5.1 If the IAHS science programme to date is understood via its manifestation as the contents of the IAHS symposia, workshops and publications, then it can be seen as a rather random set of elements. This is inevitable, given the responsive mode associated with many IAHS meetings, where the topics are proposed by organizations or individuals. IAHS needs to be more pro-active in defining the content of its meetings.

5.2 It is agreed that the existing practice of sponsoring (co-sponsoring) numerous events is rather passive. Incoming invitations from national or international partners are usually accepted. The members feel that co-sponsoring of other meetings addressing what falls under the scope of IAHS is an excellent idea. Such a "sponsoring" may do a great deal of good in bringing IAHS to the attention of those who may not normally come upon it. Maybe in some parts of the world there are just too many water meetings and publications, and some are judged to be more important than those originated by IAHS. Co-sponsoring some of these more local meetings might be a way to achieve better communication and coordination.

5.3 However, sometimes it is a mixed blessing. It raises the profile of IAHS in organizations and countries, but at the price of losing control to some extent and becoming more passive. A golden rule is suggested, where IAHS should adopt a "core programme" of meetings build around maintaining continuity for well-defined themes and ask for invitations to host these, while also preserving a more passive role in the remaining meetings.

5.4 A more active role for IAHS can be envisaged, rather than the practice that the only IAHS involvement in the event is a letter informing the organizers on the co-sponsorship. There is a suggestion that, if IAHS is to become a co-sponsor of an event, it should insist that a brief description of the relevant IAHS activities, together with an IAHS contact point should appear in the conference leaflet, programme or proceedings. This perhaps should be a condition of any sponsoring arrangement. A note of caution must be raised, however, to avoid unnecessary bureaucracy.

5.5 Some topics of IAHS events do not have a clear scientific focus. Sometimes the Assembly topics do not have headings well aligned with the leading scientific issues at that time. Sometimes the titles are very long-winded and convoluted, presumably because they are trying to be all things to all people. Appealing to a broad audience is at the cost of a clear and sharp focus. Maybe this results from the use of an exceedingly democratic (bureaucratic?) procedure: "too many cooks spoiling the broth".

5.6 There has been progress in choosing the topics for Boulder as compared to previous assemblies, which had too many "standard" topics whether or not there was much recent activity in these fields. The topics for these past assemblies obviously did not attract new people to IAHS meetings. The Boulder Assembly will include co-sponsorship by IAHS of many symposia organized by other associations, both liquid-earth and solid-earth, although the IAHS support is rather passive and marginal. However, even the interesting Boulder programme does not satisfy all subgroups of hydrologists. For instance, glaciologists are upset that three of their most active fields (glacier and ice sheet dynamics, sea-ice/ocean/atmosphere interactions, and palaeoenvironmental results from ice cores) are not represented.

5.7 There exist a number of recognized conflicts, such as those between:

- \* the requirement of high scientific standard of presentations at IAHS meetings and IAHS publications versus the need for broad and uniform geographical coverage (with participation of experts from developing countries); and

- \* early planning of meetings (early deadlines for submission of abstracts and full papers, which cannot be substantially accelerated if the aim is to produce a pre-published "red book") versus the wish to accommodate the most recent challenges. Authors often up-date their pre-published version in their oral presentations to show the most recent results of on-going work.

5.8 High scientific standard is of the utmost importance. Secondary is the need for broad and uniform geographical coverage. It is only by observing the generally high standard of presentations from the developed world countries that those from the developing world, some of whom, but not all, have rather poor presentation styles, will raise their performance. It is incumbent upon the coordinators of Symposia to help authors from developing countries to redraft their papers for inclusion in the proceedings, if it is necessary. A wide geographical coverage could and should be improved without lowering scientific standards. Does the fact that some fairly "poor" analyses that are being carried out in some places in the world, where we have no other papers and where we wish to learn more about what is going on, justify their inclusion in a conference and in a publication? The Task Force has assumed so more often than it would have liked to. Too much (self-imposed) pressure is placed on symposium organizers to produce, for example, the "red books", which mitigate against quality control, it seems. Awards for excellency (e. g. best paper, best presentation, attendance grant) should encourage scientists from less developed countries (e. g. those with GNP under some threshold level) to participate with interesting contributions.

5.9 There is a difference of opinion between the Task Force members as regards the IAHS publications. Some members believe that the "red books" are testimony to the pre-publication system which works well, brings a good income and is an excellent publicity machine. They are IAHS's

principal mechanism for reaching people. The "red books" represent the only formal record of the proceedings and are therefore of great value even though some papers may not be 100% up to date as regards information. There is no problem if one assumes that the discipline is advancing slowly with incremental progress, sometimes designated as latest results. However, the policy of pre-printed proceedings volumes may doom IAHS symposia to stale material. Why should one attend a meeting, if not to learn of new results and developments. Scientists are likely to be willing to spend their precious time and money at a major international assembly if it offers action and excitement. This is where they get new ideas, may "import" approaches and methodologies from other fields. It is more stimulating to hear what people are doing right now, rather than at the time when the "red book" was conceived, which may be two years earlier. Sometimes the presentation is an update. Sometimes it is not, as the work is finished. There seem to be quite a high number of hydrologists who prefer the approach made by AGU or EGS, with a short planning horizon, no manuscripts available at the meeting and a publication opportunity afterwards.

5.10 IAHS is trying to follow a golden rule. Some Assembly events (typically symposia) are organized with pre-published "red books", while the others (some symposia and probably all workshops) with no pre-publications. Pre-published red book contributions should be written to a high scientific standard and, if possible, up-dated in an oral presentation. Through workshops, IAHS should be able to arrange for recent work to be presented at its meetings. There is always the possibility of publishing this material under the IAHS banner in the *Hydrological Sciences Journal* and, in rare cases, in post-published "red books".

5.11 There is no consensus of the Task Force on the matter of open sessions, where no specific single topic is dominating, i. e. any worthwhile contributions could be presented. This may be a viable alternative to efforts to "bend" contributions in order to fit a particular call for papers. A part of the Task Force thinks that it would be a good idea. This system is operated in EGS to absorb those papers which do not fit well elsewhere. Some guidance should be set to solicit "worthwhile" contributions on emerging hot topics, which might especially help to broaden our multi-disciplinary perspective. However, the conveners need to be watched to make sure that they play by the rules. They typically do not like to lose papers. Other members of the TFSP call for caution and advise that the structured approach existing at the present time should be retained. They feel that a framework is necessary as in open sessions one soon loses contacts with the subjects. They also note that there are relatively few proposed abstracts that "fall between the cracks".

5.12 The TFSP members agree that there should be more poster sessions at IAHS meetings, which allow an easy bilateral contact, but they must be well organized, not run in parallel with oral sessions and it must be the clear responsibility of the conveners to lead the viewing/discussion of the posters. It is harder to prepare good poster sessions than papers and overheads. It is necessary to change the tradition, according to which poster presentations are typically considered as contributions of lower status than oral presentations. It requires a concerted effort and requires that the leading scientists join in to achieve a better standing for posters. Poster sessions can and should have a very high scientific standard. It is recommended that the posters' authors have brief, say 3 to 4 minutes, oral presentations at a plenary session, as opposed to 15-20 minutes presentation time allotted for oral contributions. The possibility of including the posters in the "red books" could be also discussed. Some publication is appropriate, if the posters are to have the same status as oral presentations.

5.13 There have been criticisms of the level of some contributions to IAHS publications and calls for improving the standing (e. g. expressed by a citation index) and thus readability (measured also by the number of subscribers) of the *Hydrological Sciences Journal*. It is necessary to increase the flow of high quality contributions to this journal. Despite the considerable efforts of the Editor, the *Journal*, even though it contains some good quality papers, does not have a status corresponding to

IAHS ambitions. Majority of members of TFSP, but not all, endorsed the idea of inviting the best papers from IAHS symposia to be published in the *Journal*. One possible option is a prize/award: symposium conveners may nominate one paper (or more) from a symposium to be updated, subject to peer review and published in *HSJ* (even if it had already been published in a "red book"). A cautionary note was raised, however, that some scientists target their papers on those journals with the highest standings, as measured by citation indices and, while they attend IAHS symposia and publish their papers in the "red books", they may not be willing to publish both in the "red book" and in the *Journal*. Task Force members see the need to encourage all those involved with the Bureaus, Committees and Commissions to prepare papers for the *Journal*. It is surprising that even the leading officers do not appear to support the *Journal* in this way. IAHS has a good line-up of leading people involved at various levels and a regular sprinkling of papers from them would raise the standing of the *Journal*. In addition, eminent hydrologists should be invited to write state-of-the-art papers. Special issues on specific topics could also be a viable option. Why not convert a set of good papers prepared for a workshop into a special issue of *HSJ*, after having subjected them to a standard peer review? The idea of having mono-thematic special issues edited by Comms seems worthy of pursuing further. More attention should be paid to the reviewing of the publications.

## 6. Conclusions and recommendations

- \* Judged by the contents of the symposia, workshops and publications, the "IAHS scientific programme" can be seen as non-existent, being a random set of elements. It is recommended to establish a "Core Science Programme" for IAHS which should have some continuity and be updated periodically. Although it needs to be co-ordinated with UNESCO, WMO and other programmes, yet it should have a separate and specific identity and contain other elements in response to current scientific needs, opportunities and interests.
- \* IAHS responds generally quite well to new scientific challenges, but has sometimes been too slow to react to new directions, partly due to the policy of setting deadlines for abstracts far in advance of meetings. With the benefit of hindsight one can say that IAHS should be more responsive to emerging issues. Climate change is a case in point, where, after a relatively early involvement in 1987, there have been no major endeavours.
- \* There is the need to strengthen interdisciplinary links. It is important to reach out for partnerships - joint symposia, workshops, international programmes - with other disciplines, involving several Comms of IAHS, other Associations of IUGG and other Unions and Scientific Committees of ICSU and UATI. The environmental agenda is an example of an area where an interdisciplinary approach is urgently needed, hydrologists must work together with ecologists, biologists, etc. IAHS has not succeeded in occupying the high ground in this area. Hydrologists should be more pro-active in the environmental context. They should highlight the role of hydrological sciences in tackling relevant environmental problems.
- \* IAHS needs to be more pro-active in defining the content of IAHS meetings and strive towards clearer scientific foci for meetings. The "golden rule" should be that IAHS adopts a "core programme" of meetings built around maintaining continuity for well-defined themes and asks for invitations to host these, while playing a more responsive role in relation to other meetings.

- \* It was noted that IAHS has not been very effective in reaching the world wide community of hydrologists. The Association should strive towards extending the audience to include all those interested and working in areas related to water resources.
- \* Given the resources available and volunteer nature of its activities, IAHS does a good job of maintaining communication among hydrologists and water management scientists throughout the world. This is achieved through its meetings and even more so through its publications. Yet, according to a Polish saying "the good is an enemy of the better", the present report aims at considering some means of improvement.

### Acknowledgements

Useful constructive remarks on the questionnaire (mentioned in 1.3) and on this draft report received by the Chairman from Dr Arthur J. Askew, Dr John C. Rodda, and Professor Uri Shamir are gratefully acknowledged.

## Annex

A.1 There were several proposals to revise Article 1.

A.2 The existing first clause in 1.1 referring to "the study of hydrology as an aspect of the earth sciences and water resources" makes hydrology sound as if it is on the periphery of other subjects. The need of stronger identity for hydrology as an earth science has been clearly recognized in IAHS and elsewhere, and this should be the main goal of IAHS. The important role for hydrology in water resources management and in engineering design should be mentioned as well. The present Article 1.1. mixes up the scientific and applied aspects in a rather unstructured way. One TFSP Member has suggested that Article 1 could be rewritten as follows:

- 1.1 To foster the development of hydrology as an earth science by promoting the study of:
  - the physical, chemical and biological processes characterizing water in all its forms within the hydrological cycle, and their relationship to climate and other physical and geographical factors;
  - exchanges of water and energy between the land surface and the atmosphere at all scales, and their influence on climate;
  - erosion and sedimentation within the framework of the hydrological cycle;
  - the impacts of man's activities on all the above aspects.
- 1.2 To provide a firm scientific basis for identifying policies for planning and managing sustainable water resource systems.
- 1.3 To promote the transfer of knowledge necessary to support the hydrological design of engineering structures.
- 1.4 To promote interdisciplinary research by collaborating with other scientific and engineering societies and organizations.

A.3 Another TFSP Member has suggested that the first phrase of Article 1 be rewritten as follows: "To promote and advance the hydrological sciences as an aspect of geophysical science and to improve the foundation of knowledge needed for efficient management of water resources". Such a wording would suggest a public-relations effort ("promote"), while showing the breadth of "hydrological sciences" and appealing to the IUGG context ("geophysical science"), with "water resources" as a tangible quantity rather than an intellectual pursuit. He criticized the second phrase of it. Further, he expressed the opinion that inclusion of a separate reference to erosion and sedimentation was awkward, it appears to be an afterthought, and that the last two phrases in 1.1 should be combined. He also suggested that a small Task Group be charged with defining the scope of the hydrological sciences including the world water balance and an emphasis on hydrological processes at or near the Earth's land surface as well as the interfaces between land and sea, water exchanges with biological systems, water-related interactions, and water in the frozen form.

A.4 Two other comments on the objectives delivered by TFSP Member referred to the need for mentioning the interdisciplinary context in the objectives of IAHS, and deleting the meaningless word "optimal" in the fourth object of 1.1.