

FINAL REPORT

EUROPEAN FORESTRY COMMISSION

Marienbad,
Czech Republic
6-11
October
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Working Party on the Management of Mountain Watersheds Twenty-first session



Food
and
Agriculture
Organization
of
the
United
Nations

EUROPEAN FORESTRY COMMISSION

**WORKING PARTY ON THE
MANAGEMENT OF MOUNTAIN WATERSHEDS**

TWENTY-FIRST SESSION

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome, 1999

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INTRODUCTION

1. The twenty-first session of the European Forestry Commission's Working Party on the Management of Mountain Watersheds was held in Marienbad, from 6 to 9 October 1998, at the kind invitation of the Government of the Czech Republic. The session took place at the Hotel Villa Butterfly. It was followed on 10 and 11 October by a study tour, organised by the Host Government, illustrating integrated watershed management, the impact of atmospheric pollution on forests, forest hydrology issues, acidification of natural mountain lakes and sustainable reclamation strategies in the western part of the Czech Republic. Mr J. Krecek and Mrs Z. Horicka from Charles University, Mrs M. Prchalova from the Ministry of Environment and Mr M. Tucek of the Watershed Authority of the Ohre river prepared and serviced the tour (see *Annex D*).

2. The session was attended by 37 delegates and observers from 12 EFC member countries and the European Commission (see *Annex C*): the Czech Republic, France, Germany, Latvia, Norway, Poland, Romania, Spain, Switzerland, the United Kingdom and the European Commission, and from six non-member countries: Japan, Morocco, Nepal, Peru, the Russian Federation and Venezuela. One representative of the International Union of Forestry Research Organisations and one representative from the United Nations University participated.

3. Mr A. Göttle (Germany) chaired the session with the assistance of the Vice-Chairman, Mr E. Beheim (Norway). Mr E. H. Sène, Chief, Forest Conservation, Research and Education Service of the Forest Resources Division (FORC), Mr D. McGuire, FORC, and Mr Peter Qvist-Hoffmann, Consultant FORC, serviced the meeting with the invaluable support of Mr J. Krecek and Ms J. Vukic from Charles University and Ms A. Pondelickova, Forest Management Department, Ministry of Agriculture.

4. Mr Göttle welcomed participants and observers from EFC member countries, the EC and non-member countries. He stressed the long history covering 40 years of cooperation in the framework of the Working Party and the central importance of watershed management as recalled by a number of disasters that had happened in the last months; he also stressed the importance of public information and awareness on issues of watershed management and the need to approach the latter in an integrated way. He reviewed the functions of the Working Party as a forum for extensive exchange and the need to find alternative ways of maintaining it and further focusing its work on its fundamental functions that aim at understanding forest hydrology and torrent behaviour and preventing unwelcome events such as floods, landslides and other disastrous events.

5. The Mayor of Marienbad, Mr L. Nosek, welcomed the participants to Marienbad and wished them a fruitful stay. He stressed the importance of water resources although his city had no water problem as the area was rich in streams and had a wealth of thermal resources. He stressed the importance of the city which had been known as a spa for 200 years, hosting around 100,000 guests annually.

6. Mr Sène welcomed participants on behalf of both the Director-General of FAO and of the Assistant Director-General and Head of the Forestry Department, and thanked the Government of the Czech Republic for preparing and hosting this session. He expressed appreciation to the town for its hospitality. He informed the meeting that the agenda for this session had been developed according to the recommendations of the previous session in Lillehammer under the guidance of the Steering Group during a preparatory meeting in Rome in February 1998. The overriding theme, integrated watershed management, was introduced with three secretariat notes completed by a number of voluntary contributions on concepts and approaches of integrated watershed management, restoring mountain ecosystems and conservation of mountain ecosystems. Mr Sène further recalled that the twenty-ninth session of the European Forestry Commission (Lahti, Finland, 19-23 October 1998) would discuss the future of the Working Party, and this meeting should elaborate objective professional advice to the Commission in the interest of stronger and coherent cooperation on mountain forests and watershed management in Europe.

7. Mr P. Rybníček, Deputy Minister of Agriculture, welcomed participants to the Czech Republic. He recalled that his country had a long tradition in the management of mountain watersheds with

experience dating from the end of the last century. He indicated that acid atmospheric deposition had significantly affected mountain watersheds. Currently the Czech Republic was facing the challenge of recovering these watersheds and their forests.

8. Mr Rybníček then declared open the twenty-first session of the European Forestry Commission's Working Party on Mountain Watersheds.

ADOPTION OF AGENDA (Item 2)

9. The Working Party adopted the proposed agenda, which is shown in *Annex A*.

ADOPTION OF MISSION STATEMENT AND CREDO (Item 3)

10. Mr Sène introduced this subject; he reviewed the proposal and recalled that the initiative was started at the eighteenth session in Oberstdorf. At the twentieth session a more complete draft was elaborated, and delegations were requested to provide any further comments to the Secretariat prior to this session for finalisation. The Chairman opened the floor for comments or amendments to the present draft. Following a new and final suggestion from the meeting, the importance of involving interested communities in all aspects of the management of mountain watersheds was recognised and explicitly incorporated in the new draft. The Chairman then declared the Credo and Mission Statement adopted by the Working Party (see *Annex B*).

PROGRESS IN WATERSHED MANAGEMENT AND SUSTAINABLE MOUNTAIN DEVELOPMENT (Item 4)

Presentation of National Reports

11. National reports were presented by delegations from the following countries: Czech Republic, France, Germany, Latvia, Norway, Poland, Romania, Spain, Switzerland, and the United Kingdom. Major issues raised during discussion of the national reports included: the effects of natural disasters and the need for preventive measures including risk assessment, the role and current status of mountain forests, new policy and legislation, and privatisation of forest lands.

12. Several countries reported on natural disasters that had occurred since the previous session of the Working Party. These included flooding in the Czech Republic, France, Germany and, in particular, Poland. Switzerland emphasised their focus on safety considerations for human life and property in dealing with natural disasters. The presentation stressed the importance of risk assessment and mapping in disaster prevention. Both Switzerland and Poland discussed the high cost involved in repairing damaged infrastructure.

13. Several countries highlighted the important role of mountain forests in the management of mountain watersheds. Germany cited the decline and degradation of protection forests as a problem of some concern. Switzerland reported on forest inventory work it had carried out to determine priority areas that required urgent intervention. The conservation of mountain forests in Poland was also raised as an important issue currently being dealt with by the Polish Government.

14. Efforts to revise or develop new forestry policy and legislation over recent years were mentioned as important activities by a number of delegations. Switzerland noted new forestry legislation passed in 1993 which focused on protection from natural disasters. Poland adopted a new national policy on forests in 1997. In general, new forestry policy and legislation tended to give much fuller recognition to the multifunctional role played by forests, as compared to the more production-related focus of the past.

15. Increased privatisation of forest lands was cited as a very important phenomenon occurring today, especially in central and eastern European countries. Although there were many positive aspects to this trend, it was noted that many unresolved problems, some quite serious in their scope and dimension, were being faced by countries such as Poland and Latvia.

Presentations from observers

16. Observers were invited to make their declarations and seven people took the floor to report on various aspects of watershed management and mountain development in their organisations (United Nations University, ICIMOD) or countries (Peru, Venezuela, France, Russia and Morocco).

17. Mr L. Janský introduced the United Nations University and aspects of their involvement in mountain issues. UNU had been an important partner in documenting mountain issues and providing training and research opportunities in the subject. It had participated in the production of a number of key publications (books and journals) on mountain problems and issues.

18. Mr R. Allen presented the International Centre for Integrated Mountain Development, established since the early 1980s and whose research mandate is focused on the eight countries of the Hindu Kush Himalaya region¹. Its programme focuses on livelihood systems of mountain people, gender-balanced integrated development, integrated management of resources, capacity building, information and outreach. One of the specific projects of ICIMOD, the Peoples and Resources Dynamics, which carries out studies and research to better understand the processes and rationale of natural resources degradation, was presented.

19. The presentation by Mr M. J. Alcalde-Pineda highlighted efforts undertaken in Peru in watershed management and illustrated achievements with a slide presentation. An interesting feature was the use of agroforestry systems and tree planting along with conservation practices and promotion of people's participation. Efforts made to identify and tackle the constraints to successful planting were presented, demonstrating a 15 per cent increase in survival rate from an average of 60 to 75 per cent.

20. Mr F. Barroso presented key aspects of Venezuelan experience in watershed management. Overriding features of this experience were the efforts on the institutional set-up with an autonomous authority in charge of watershed management; inter-institutional cooperation, watershed inventory that identified 450 key watersheds; priority setting and planning; and international cooperation on trans-boundary watersheds, especially with Columbia.

21. On behalf of the French "Office national des forêts", Mr J. D. Spaak presented a draft publication *Mountain Soil Reclamation and Conservation*, a primer of 1000 pages in two volumes representing the lifelong experience of Professor André Poncet who taught land reclamation and conservation in the Nancy Forestry School for many years. This book will be published soon in French but cooperation is being sought for eventual translation into English.

22. Mr A. Mandych introduced the Russian experience in watershed management and factors affecting it. He described the current watershed management system in Russia and illustrated some aspects of its present evolution. Key constraints were highlighted, including the weakness and inadequacy of the legal context, the poor quality of data regarding the status and use of forests today, and the extent of illegal cutting in Russian forests.

23. Mr A. Zitan provided a brief overview and showed a video illustrating participatory watershed management in Morocco with a number of interesting features regarding building up self-reliance by local people, partnership between government, NGOs and local populations, development of local employment opportunities, etc. The issue of "post project" sustainability of project achievements and their continued maintenance was discussed.

Theme: INTEGRATED WATERSHED MANAGEMENT – INTRODUCTION (Item 5)

24. Mr Sène introduced the topic of integrated watershed management as the overriding theme of the twenty-first session of the Working Party.

¹ Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal and Pakistan.

i. ***Integrated Watershed Management – Concepts and Approaches***

25. Mr P. Qwist-Hoffman presented this theme, based on a paper prepared by Mr S. Borelli, consultant, for the twenty-first session of the Working Party. A brief historical overview of watershed management was given, highlighting the shift in emphasis from a technical approach to a more multi-disciplinary one in recent years. The main types of land use in mountain ecosystems were described and institutional arrangements were compared between the two different approaches. Integrated watershed management calls for a common forum which allows for discussion and sharing of views and objectives by all stakeholders. Key elements of an integrated approach to watershed management include environmental sustainability and social acceptability. There is a need for greater exchange of information, including documentation of more case studies and best management practices in integrated watershed management. Commonly agreed-upon terminology is also an important consideration for further development of this concept.

26. A number of discussion points were raised following the presentation. These included the importance of paying adequate attention to the aspect of economic viability in integrated watershed management; the observation that the approach described was being used to a large extent in Switzerland, with significant financial contributions from both government and local communities; the observation that the concept of an integrated approach was not new, and in fact existed as early as late last century in Europe; stressing that the extent to which an integrated and multi-disciplinary approach can be applied depended largely on the context in which interventions were being planned and implemented; noting the importance of placing integrated watershed management planning into context with other land use planning processes that are defined in a wide variety of institutional settings; the need to consider downstream dimensions; the observation from Bavarian experience that follow-up support can be very important to success, even once implementation of work has been completed.

ii. ***Restoring Mountain Ecosystems***

27. Mr Martin Haigh of the World Association of Soil and Water Conservation (Europe) presented the Working Party theme: restoring mountain ecosystems. The presentation focused on current trends in and obstacles to effective environmental management and reconstruction in mountain areas, with consideration of the technological, institutional and management issues involved. Comparison was made of conventional mechanical or civil engineering strategies in watershed management, which appeared to be on the decline, with biotechnical and ecological engineering techniques that were becoming more accepted and widespread in their application, given their more self-sustaining nature and lower maintenance requirements. These latter approaches, however, can pose greater risk than conventional approaches, given the number of uncertainties involved, and may be less effective. A number of recent approaches to watershed management were described, including the Headwater Control Approach and Better Land Husbandry, both of which are multi-disciplinary and attempt to balance the needs of society and environment by providing integrated and sustainable solutions to complex environmental problems. Main challenges today include the need to achieve institutional reform that improves the management of mountain environments, given that present approaches and institutions are too often ineffective and obsolete. There is a clear need for a more holistic approach, with greater accountability and more locally controlled structures.

28. The presentation generated a number of comments and questions. These included an observation that some caution was required when using biological techniques and the need to find an appropriate balance of both mechanical and ecological approaches; noting that many areas of Bavaria have been successfully protected and or restored using mainly mechanical engineering approaches; the difficulty of being able to clearly distinguish between positive and negative impacts of interventions and assessing profitability; concern that the ecological engineering approach posed too great a risk due to too many unknown factors. Mr Haigh remarked that attention to broader development issues tended to be lacking in watershed management planning and implementation.

iii. *Mountain Ecosystems Conservation – Lessons Learned from Experience*

29. This item, introduced by Mr Sène, was prepared in response to the great interest of the group in environmental and conservation issues, their linkages with watershed management praxis and how the latter could further take conservation into account. The document stressed the importance of mountain ecosystems as a repository of a rich biological diversity, an essential link in the water resources cycle and areas of rich cultural diversity. Essential elements for effective conservation of mountains were reviewed and the role of protected areas in the conservation of mountain ecosystems delineated in *inter alia* the preservation of endemic and rare species, conservation of biological diversity, protection and enhancement of human culture and lore, recreational potential, protection of biologically essential corridors and facilitation of transboundary conservation. The ways in which watershed management should adapt to cater for mountain ecosystem conservation were also reviewed.

30. The Working Party discussed the theme focusing on the following: the needs of people should be kept in mind and central to conservation initiatives which should be anchored in the national economy. The need to inventory biological diversity was discussed and it was recommended that forest inventories also consider the evaluation of biological diversity. Initiatives to support such initiatives in funding and research were signaled by Switzerland and the Space Applications Institute of the Joint Research Centre of the European Commission.

Identification and classification of European headwaters

31. On behalf of the Space Applications Institute of the Joint Research Centre of the European Commission, Ms Paracchini presented a study in the framework of rural development on the use of 1 km resolution digital data for mapping headwater areas at the European scale. The role of remote sensing as a source of information on land cover was also highlighted (e.g. the use of the CORINE land cover map). The results show that one third to half of the surface of all EU countries consists of headwater areas and that in mountainous areas the forest cover ranges from 46 to 65 per cent. The study also recommends the use of fine resolution digital elevation data in morphological analyses and for more accurate local applications.

Conservation of Mountain Ecosystems in Norway: the Protection Plans for River Systems and Mountain Forests

32. This paper was introduced by Mr Einar Beheim. It explained the initiatives of the Norwegian Government and parliament to protect river systems and mountain forests. A number of national plans had been established and adopted by parliament. These plans covered an extensive number of river systems distributed in the country and representing 20 per cent of the country's potential hydro-electric production. To support this the Environmental Ministry had established guidelines to cover various activities in protected river systems. The initiatives also covered the protection of mountain forests which cover 15 000 sq km, 20 per cent of which are classified protective forest. Around these, belts are established as buffer zones in which certain management restrictions apply. Such protective forests also helped protect the mountain side. The conservation of the ecology and biological diversity was also included in these initiatives of the Norwegian Government. The report predicts that in the long term the importance of traditional forestry in mountainous areas will decrease while leisure activities, such as fishing and hunting, mountain hiking and tourism will increase. Questions and discussion following the presentation focused on the criteria used to delineate protection forests and measures taken with respect to compensation for areas flooded due to hydropower installations.

FOLLOW-UP TO RESOLUTION 4 OF THE STRASBOURG CONFERENCE ON FOREST PROTECTION IN EUROPE AND PROGRESS IN THE IMPLEMENTATION OF UNCED AGENDA 21 (CHAPTER 13) (Items 6 and 7)

33. These items were introduced by Mr Sène in a secretariat note covering items 6 and 7 of the agenda of the Working Party. It reviewed activities developed to further implement chapter 13, support the Working Party and promote technical publications on mountain issues. The paper provided

background information on the CSD process and its new focus on major issues, the various initiatives on the development and conservation of European mountain resources, the normative and field activities of FAO and the activities of the Working Party in the intersessional period. It finally presented initiatives developed in relation to the implementation of Resolution S4 of the Ministerial Conference on the Protection of Forests in Europe. Discussion of the themes stressed the multiplicity of interventions and institutions involved in mountain issues and the need for closer cooperation and to minimize duplication. The necessary cooperation to be established between the Working Party and other players, including the European Observatory on Mountain Forests, the newly established European node of the Mountain Forum, and IUFRO Task Forces was stressed.

34. In anticipation of observers' presentations, and considering the need for a clearer view of the various players and processes in the European mountain agenda, the representative of IUFRO, Mr Martin Price, was invited to present the establishment process and the activities of the European mountain forum. He stressed the participatory nature of this process and the good return of the questionnaire circulated, which helped establish a work programme largely shared by all stakeholders. The European node of the Mountain Forum was perceived as an important potential player in cooperation and networking on mountains in Europe. The state of development of the IUFRO task force on mountain forests and its future activities were also introduced by the same speaker. The session took note of this information and again reiterated the importance of close cooperation and streamlining of activities whenever possible.

FAO/IUFRO SYMPOSIUM (Item 8)

"From debris source to bedload management in torrents"

35. Mr Göttle, convenor of the symposium, welcomed participants and stressed the importance of the FAO/IUFRO symposia as they permit fruitful exchanges to all participants and keep them abreast of developments; he also stressed the relevance of this year's theme before inviting Mr Sène to take the floor. The latter highlighted the good partnership between FAO and IUFRO and indicated the unique blend of dialogue in research and development that the symposia authorise. He wished that this cooperation would continue and provide real benefits to participants.

Documentation and evaluation of torrential disasters in Bavaria

36. Mr Loipersberger (Germany) presented this theme illustrating the importance of thorough and timely collection of information on disasters as soon as they happen. Using the case of the heavy thunderstorm that occurred on 26 June 1998 he described objectives, organisation and methods of such exercises and derived lessons learned from the Bavarian experience. The collection of post disaster information helps improve knowledge of systems and processes and updates documentation. It needs adequate organisation from the source of events upwards, competent field staff and reliable information. Documenting many factors helps improve prediction and prevent disaster damages. The discussion of the theme stressed the need to cater for funding, a number of factors not easy to document (e.g. peak flows), the need to better assess the influences of forest cover and the need to maintain adequate land use (e.g. preventing inadequate land on mountain areas).

Distribution of Riffle-pool structures in a torrential river

37. Mr Ideaki Marui of the Niigata University presented this work. He explained the concept of riffle-pool structures, the conditions and processes governing their formation and the erosion and sedimentation processes that occur depending on the position of the pool. The characteristics of the pools were studied in function of their location on the river bed, the slope, water depth and the material carried by the river...etc. The good knowledge of the distribution of river pools is important not only for any corrective work but also for the biological management of the river. The presentation was discussed and found useful, particularly in view of the conservation of biological resources or physical correction of the riverbed.

River morphology as a basis for bedload management and river dynamics

38. Mr Bernard Schaipp from Germany introduced this presentation. He illustrated the case of the river Salzach straddling the German Austrian border. The morphology of a river is very important as regards the transport of bedload, control of river and river bank erosion. Interventions made on the bed, the banks or the overall profile affect transportation and discharge of sediments. In the case of the river Salzach a number of interventions have been made having in view many and sometimes apparently contradicting objectives, namely, groundwater resources replenishment, bedload reduction, biological benefits. Issues discussed included balancing objectives and options, sharing costs, and minimising impact on natural systems.

Network constructions for wood debris control in torrents

39. Mr Toni Loipersberger introduced this subject presenting the Bavarian experience in adapting avalanche control networks to the retention of wood debris in torrent control. The presentation discussed the behaviour of wood material and the design of networks through a number of models. Discussions addressed the linkages between good forest management and wood debris, the impact of structures built, and maintenance costs.

Surface water quality and control measures in Latvia

40. Mrs Dzidra Hadonina of the Latvian Ministry of Environmental Protection and Regional Development delivered this presentation. She stressed the importance of environmental issues in Latvia and the attention being paid especially to the reduction of pollution and the improvement of water quality. Investment programmes were described which aim at improving water supply and waste water treatment in small towns and rural areas. Water quality in small rivers and lakes was discussed, in relation to surface water quality objectives which have been established. It was noted that new water quality legislation was currently being developed in line with EU standards and that, overall, water quality was considered good in 80 per cent of Latvia's rivers.

Planning and development of the fieldwork for estimating sedimentation of the Guadalquivir wetlands

41. Mr J. Mintegui of Spain presented this topic focusing on this wetland ecosystem in the Donana National Park. A study of the sedimentation process occurring in these wetlands was described, which looks at the overall torrential geodynamics of the area through a terrain model which was developed in support of a hydrological model. It aims at understanding the processes taking place and to assess whether sedimentation has occurred in the wetlands as a result of land use changes in the surrounding area; it also attempts to examine alluvial fans that have resulted from channelling in streams and rivers which feed the lagoon. The analysis has shown slight variations in the longitudinal profiles of the lagoon which are attributed to a variety of factors, including water movement from wind.

Contributions to the underdimensioned dams stability and functionality study – A case analysis of a catastrophic storm flow

42. Mr I. Clinciu reported on this case from Romania which made a comparative study regarding the stability and functional parameters of two experimental "underdimensioned" dams that were destroyed in a torrential rainfall event in 1985. Technical explanations were provided of why the structures failed. Under the catastrophic conditions surrounding that event, the overturning and breakage of the dams were explainable as a consequence of the loads which considerably exceeded the design values. The study concluded that the assumptions on which the "underdimensioned" dams were conceived and experimentally built have proved their validity and that the use of underdimensioned dams should be considered only when and where the required quality of materials and execution of works can be assured. The need for long term monitoring of such works was also noted.

Influence de l'évolution de la surface forestière sur le régime des crues aperçu sur quelques bassins versants de la montagne française

43. Mr A. Hurand presented a report dealing with the effect of increased forest cover on the water regime associated with rainfall events in certain mountain watersheds in France, a country which has experienced a net increase of more than one million hectares in forest cover over the last century. Studies were carried out in several sites in small watersheds in different mountainous areas of the country, comparing the effects of forested and non-forested areas. Results have indicated that the effect of forest cover on water regime is generally quite significant under normal conditions, but this is less conclusive for exceptional torrential events. Modelling was also discussed as an approach that has been used in analysing transfer between rain and flow. The need for adequate data collection was stressed in order to gain a more thorough understanding of the processes involved.

Video session

44. A number of issues were illustrated through video sessions. They included the documentation of a landslide in Bavaria with measurement of temperature through infrared techniques, network constructions for wood debris control in torrents, and participatory watershed management in Morocco.

PROGRAMME/FUTURE OF THE WORKING PARTY (Item 9)

Future of the Working Party

45. The theme, presented by Mr Sène, was centred on the review of achievements of the Working Party through the years and its status and *modus operandi* in the future, in light of the FAO Conference resolution 13/97 *recommending to the parent bodies concerned that a number of subsidiary bodies, including the Working Party be abolished and calling on those parent bodies to take the necessary action unless they consider taking into account the financial and program implications, that there are overriding reasons for retaining any such bodies in existence...*. The document reviewed the long history of the Working Party and the role it has played to date. It also describes the present situation featuring a larger number of players on issues concerning mountain forests and watersheds. These included the Working Party itself, the recently created European Observatory of Mountain Forests, the European Node of the Mountain Forum, the IUFRO task force on forests in sustainable mountain development. After careful discussion of this topic, and considering the result of a thorough survey of participants' ideas and opinions on the major issues raised by the secretariat note and the FAO Conference resolution 13/97, the Working Party made the following conclusions:

- the functions implemented by the Working Party are still relevant and not really taken up by any other existing body;
- the existing cooperative arrangements and bodies that have been recently created (European Observatory of Mountain Forests, the IUFRO Task Force on Forests in Sustainable Mountain Development, the European node of the Mountain Forum) do not overlap, but strongly call for cooperation, with the Working Party including in the implementation of the pertinent recommendations of the Ministerial Conferences on the Protection of European Forests;
- the Working Party recommends that member countries consider a number of alternative measures that would reduce the costs of meetings to FAO, including reduced length of sessions, and the possibility of introducing registration fees to the sessions;

46. In view of the above, and considering the real vacuum that the termination of the Working Party would create, at a moment when very serious consideration is being given to mountain ecosystems and societies and an International Year of the Mountains is being proposed by the UN General Assembly, the Working Party recommends to the European Forestry Commission that it be maintained as a subsidiary body of that Commission and that, in servicing it, FAO help implement the decisions for change proposed by the twenty-first session of the Working Party, including *inter alia*,

- reduction of the length of meetings,
- examination of the possibility and legality of registration fees to the sessions,

- refocusing and streamlining the work of the Working Party;
- considering any further support countries, especially those hosting the sessions, could provide in the preparation of the meetings and the realization of the tasks of the working party.

Programme of the Working Party

47. The ideas assembled during the discussions of the session and the results obtained through a survey for the evaluation of the session have provided a number of elements and themes that helped delineate the topics to be discussed at future sessions of the Working Party should it be continued. It was clearly expressed i) the need for the Working Party not to lose track of its original objectives: further understanding torrent hydrology, watershed wide water related processes and resources management; ii) the Working party should open up to new issues and concerns that address overall socio-economic development of peoples and communities concerned and their social well-being in general, and the way watershed management, environmental protection and ecosystem conservation can contribute to it; iii) issues to be discussed at a single session should be reduced to one or two themes to gain focus and depth; iv) members should continue being involved in the identification and writing of themes, and relevance of themes with selected issues should be carefully checked; v) work should be maintained and steered between sessions and responsibilities assigned; vi) the unique blend that is offered by the twinning of the sessions of the Working Party with the FAO/IUFRO symposium authorize the possibility to be on one side focused on sharp scientific and narrow technical issues during the symposium and be closer to development and process oriented themes and discussions during sessions of the WP; vii) more participation of eastern European countries should be encouraged and intersessional activities geared to concrete cooperation activities as far as possible. The suggestions for areas to be further explored are grouped under the following four major clusters:

i. The science and techniques of watershed management²

- plant species for land stabilization and for soil improvement and restorative works;
- watershed management options combining hard and soft measures;
- environmental aspects and ecological control in torrent and avalanche work*;
- further understanding of Forest hydrology*
- silting up of reservoirs and their effects with special reference to the Mediterranean region;
- modelling Soil erosion in watersheds*;
- impact of vegetation on water flow; promoting vegetative measures in watershed management and torrent control.

ii. Resources assessment, management and conservation;

- preserving the vitality of mountain ecosystems;
- sustainable Development and environmental protection;
- upstream-downstream relationships (socio-economy- intersectoral relationships)
- mountain forest management, risk sensitive forest management in mountain areas; afforestation and bio-engineering in watershed management;
- effects of well managed mix of agriculture and animal husbandry on watershed balance.

iii. People and communities of the watershed: socio-economy, rural development and participation

- socio-economic impact; people's participation and group organisation;
- rural development and future land cover/land use; organisational and social problems in watersheds;
- land use changes in mountain areas and implication on run-off and erosion;
- integrated watershed management: investments, costs and socio-economic benefits;

iv. Institution and managerial aspects

- institutional and management aspects of watershed management.

² *indicate these suggestions for the themes of the FAO/IUFRO Symposium

ELECTION OF OFFICERS OF THE WORKING PARTY (Item 10)

48. The twenty-first session of the Working Party elected Mr Einar Beheim (Norway) as Chairman; Mr Josef Krecek (Czech Republic) as first Vice-Chairman and Mr Peter Greminger (Switzerland) as second Vice-Chairman.

DATE AND PLACE OF THE TWENTY-SECOND SESSION (Item 11)

49. Following the offers already made by Italian and French delegations in Lillehammer at the end of the twentieth session, Mr Hurand from France offered that France host the twenty-second session in 2000. The Working party noted and accepted the offer and requested FAO to engage in appropriate negotiations regarding a mutually suitable date (between September and October) and location. Further, the second Vice-Chairman, Mr Peter Greminger, on behalf of Switzerland, offered to host the twenty-third session, especially as this would probably coincide with 2002 being declared International Year of the Mountains.

OTHER MATTERS (Item 12)

50. No other matter was brought to the attention of the session. It should be noted, however, that a half-day local field trip was organized on 7 October by Mr P. Krám, Czech Geological Survey, illustrating aspects of biogeochemistry in the Slavkov Forest near Marienbad, classified as a Protected Landscape Area, which has special protection zones for the valuable curative mineral waters. The group visited ongoing research sites, discussing problems of soil and drainage water acidification, symptoms of forest decline, and forest management practices. Lastly, the Taiga nature trail and the Stinker mineral spring were visited.

ADOPTION OF REPORT (Item 13)

51. The report was adopted, the session requesting the Secretariat to edit and disseminate it as appropriate.

CLOSING OF THE SESSION (Item 14)

52. The outgoing president, Mr Göttle, the Secretariat, the representative of the host country, Mr J. Krecek, and the new chairman, Mr E. Beheim, took the floor. The good work done by the outgoing chairman was appreciated and recognised. The Secretariat was encouraged to continue and support the working party. The chairman sincerely hoped that this working party could be saved somehow. Efforts made by the host country were recognised. The new team promised to properly animate the group with support from all members and the Secretariat, and to effect the necessary changes that were considered to be needed.

AGENDA

1. Opening of the Session
2. Adoption of the Agenda
3. Adoption of the Mission Statement and Credo
4. Progress in Watershed Management and Sustainable Mountain Development
 - a. Presentation of National Reports
 - b. Discussions
5. Theme: *Integrated Watershed Management*.

Specific sub-themes will include:
 - i. *Integrated Watershed Management - Concepts and Approaches*
 - ii. *Restoring Mountain Ecosystems*
 - iii. *Mountain Ecosystems Conservation - Lessons Learned from Experience*
6. Follow-up to Resolution 4 of the Strasbourg Conference on Forest Protection in Europe: "Adapting the management of mountain forests to new environmental conditions"
7. Progress of the implementation of UNCED Agenda 21 Chapter 13 "Managing fragile Ecosystems: Sustainable Mountain Development"
8. FAO/IUFRO Symposium: Prevention of natural disasters, research and technical aspects
Theme: From debris source to bedload management in torrents
9. Programme of the Working Party
10. Election of officers of the Working Party
11. Date and place of the 22nd session and special symposium
12. Other matters
13. Adoption of the report
14. Closing of the session

MISSION STATEMENT

The mission of the Working Party:

1. Serve as a permanent forum where European countries can share their technical and scientific knowledge and the practical experience of local populations in the areas of *watershed management* and sustainable mountain development.
2. Provide a mechanism by which European countries can share their extensive knowledge of mountain watershed management and sustainable development with countries in other regions of the world and enhance cooperation in these topics.
3. Serve as a key repository of knowledge and skills in watershed management and sustainable mountain development, providing an institutional memory of expertise for institutions and individuals interested in these topics.

"CREDO"³

1. **Involvement of mountain peoples:** Those who live in mountain watersheds should be involved in decisions regarding planning and implementation of management activities in these watersheds.
2. **Awareness:** Decision-makers, the public and the media should be made aware of the value of sustainable development and management of mountain areas and the advantages of proper prevention and planning over control and restoration.
3. **The protection role of mountain watersheds:** Mountain watersheds should be managed to secure the quality and quantity of water and to maintain the role of mountain forest ecosystems for the protection of settlements, roads, recreation areas and other infrastructures against torrential floods, avalanches, sedimentation, mudflows, erosion and other impacts.
4. **Sustainable management of mountain watersheds:** Natural resources in mountain lands should be managed in a way and at a rate that maintains biological diversity, productivity of the land, regeneration capacity of forest ecosystems and the potential of watersheds to continue to serve their ecological, economic and social functions in perpetuity.
5. **Appropriate technology:** The value of using natural vegetative measures for watershed protection and correction is underscored, but it is recognized that in many cases engineering practices and combinations of physical and biological techniques can be most effective and also still be in harmony with nature.
6. **The economic values of mountain watersheds:** Economic mechanisms and investment strategies for managing fragile mountain ecosystems in headwater catchments should be designed on the basis of appreciating the "external" benefits provided downstream, with due consideration to the institutional and policy issues related to these "externalities."
7. **Mountain forest ecosystems:** sustainable management of forest ecosystems in mountain watersheds should have as one of its main objectives the maintenance and enhancement of its protective functions while mitigating the impact of insects, diseases, air pollution, overgrazing, improper forestry or other stresses. Preference should be given to indigenous species. Efforts should be made to keep the emissions of air pollutants and greenhouse gases below the expected tolerance level of forest ecosystems.
8. **Understanding mountain forest ecosystems:** research should be encouraged to improve our knowledge of the functioning of mountain forest ecosystems and their reaction to various silvicultural and management regimes.
9. **Understanding forest hydrology:** A better understanding of the physical and biological effects of vegetation, geology and soils on hydrologic processes in mountain watersheds should be promoted.

³ A number of the items here draw on the Helsinki Resolution No. 1 and the Strasbourg Resolution No 4 of the Ministerial Conference on the Protection of Forests in Europe or on the Alpine Convention on mountain forests.

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PROGRAMME OF STUDY TOUR

Fifteen persons participated in the two days study tour to the Sumava (Bohemian Forest) Mountains, Karlovy Vary (Karlsbad) Spa and the Krusne Hory (Ore) Mountains, which took place on October 10-11, 1998.

On 10 October, the study tour group was informed about results of three recent international projects (MOLAR - Mountain Lakes Research, ICP on Waters; Integrated Cooperative Program on Rivers and Lakes; and Global Environment Facility (GEF) Project on Protection of Biological Diversity) in the Sumava Mountains. Participants visited the Black Lake and walked approximately 10 km in the watersheds of the Black Lake and Devil's Lake natural reserves. The excursion was prepared by Z. Horicka, J. Krecek (both Charles University) and M. Prchalova, Director of the GEF funded programme in the Czech Republic. M. Prchalova and J. Krecek guided the trip. The lakes, with a current pH level of 3.9 to 4.9 were formerly stocked with brown trout, but have been fishless since the 1950's, due to significant acidification caused namely by sulphur emissions from soft coal (lignite) based powerplants. Monocultures of Norway spruce have replaced the natural vegetation of Common fir, Common beech and Norway spruce. Protection of forests in the Sumava Mountains has a very long history, which began in the Middle Ages in order to protect the border of the Bohemian Kingdom. Nowadays, a debate on whether to manage forests in the Sumava Mountains or just to leave them in a „natural“ way has led to a controversy between foresters and several ecological movements in the Czech Republic.

On 11 October, the first stop was made in Karlovy Vary (Karlsbad) Spa, an area with 12 hot mineral springs originating from significant depths. The spa and health facilities were established by Bohemian King (and Roman Emperor) Charles IV in the 14th century. The intensive mining of coal in the last 40 years has endangered the regime of the springs. The recharge of groundwater has been enhanced by regulation of the Tepla River (particularly through bottom infiltration). The next stop was made in the town of Chomutov to visit the Watershed Authority of the Ohre River (Povodi Ohre a.s.). A computerised monitoring system was demonstrated by V. Klecka, Director of the Dispatch Systems of Povodi Ohre a.s. The system monitors streamflows and basic climate parameters in the Ohre River and its tributaries for effective management of rivers and reservoirs in a watershed area of about 10,000 km². In the Ohre Watershed, a number of open cast mines have been utilised since the 17th century having significant impact on the landscape and the environment. The acid atmospheric deposition has been caused particularly by sulphur emissions and it was reported that one powerplant in this region currently has sulphur emission levels equal to the total sulphur emission in Scandinavia. In the afternoon, the Group was guided by M. Tucek to observe soil reclamation practices, i.e. diversion of rivers around the mining area, planting of different tree species and constructing reservoirs in a former open pit (Vrbenskeho jezero). As an example of the devastating impact of mining activities on local communities, the town of Most was demolished and relocated in the 1950's, since it was located on an area to be developed into a surface coalmine.

The study tour participants expressed their sincere thanks to the organisers and the resource persons, who facilitated a successful study tour.