

JAPAN INTERNATIONAL COOPERATION AGENCY

SLOVAK ENVIRONMENTAL AGENCY
THE SLOVAK REPUBLIC

THE STUDY
ON
THE REGIONAL ENVIRONMENTAL MANAGEMENT PLAN
FOR
THE HRON RIVER BASIN
IN
THE SLOVAK REPUBLIC

Final Report
MAIN REPORT

February 2000

PACIFIC CONSULTANTS INTERNATIONAL, TOKYO
OYO CORPORATION, TOKYO



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PREFACE

In response to a request from the Government of the Slovak Republic, the Government of Japan decided to conduct a master plan study on the Regional Environmental Management Plan for the Hron River Basin and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team headed by Dr. Akira UCHIDA of Pacific Consultants International (PCI) and composed of PCI and Oyo Corporation to Slovakia three times between March 1998 and February 2000. In addition, JICA set up an advisory committee headed by Mr. Shigeru ANDO, Director, Office of Groundwater and Land Environment, Planning Division, Water Quality Bureau, Environment Agency between March 1998 and February 2000, which examined the study from specialist and technical points of view.

The team held discussions with the officials concerned of the Government of Slovakia and conducted field surveys at the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the promotion of this project and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of Slovakia for their close cooperation extended to the Team.

February 2000



Kimio Fujita
President

Japan International Cooperation Agency

**MINISTERSTVO ŽIVOTNÉHO PROSTREDIA
SLOVENSKEJ REPUBLIKY**

László MIKLÓS
minister

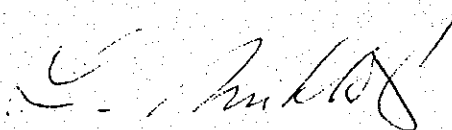
Bratislava January 19th, 2000

Dear Sirs,

The Ministry of the Environment of the Slovak Republic would like to thank hereby the Government of Japan for the comprehensive assistance with the Development Study on the Regional Environmental Management Plan for the Hron River Basin in the Slovak Republic. The output of this co-operation is the submitted Final Report that was successfully presented in the presence of the highest representatives of the Slovak Government and local self-governments on the state and regional level.

The Study was developed on the basis of the approved Memorandum of the Japanese Overseas Development Assistance to the Slovak Republic through the Japanese International Cooperation Agency by the International Study Team and I would like to express our sincere acknowledgement to everybody.

Yours sincerely



László Miklós

The Minister of the Environment

February 2000

Mr. Kimio Fujita
President
Japan International Cooperation Agency

LETTER OF TRANSMITTAL

Dear Sir,

We are pleased to submit to you the final report entitled "The Study on the Regional Environmental Management Plan for the Hron River Basin in the Slovak Republic." This report has been prepared by the Study Team in accordance with the contracts signed on 20 March 1998 and 28 April 1999 between the Japan International Cooperation Agency (JICA) and Pacific Consultants International (PCI).

The report describes the study results of developing the regional environmental management plan (REMP), a master plan for improvement of the environmental state of the Hron River Basin.

The report consists of the Main Report, Summary Report, Supporting Report and GIS Maps volume. The Main Report presents: i) the existing states of various environmental attributes to identify major environmental issues, ii) the REMP Core Plan with objectives and measures to tackle with those major environmental issues, and iii) Supporting Plans, as the common basis of promoting the Core Plan, which include improvements in institution, monitoring, environmental information system, environmental education and public participation. In addition, recommendations on financial strategy for the implementation of the REMP are also included. The Summary Report presents these results concisely. The Supporting Report includes detailed data concerning the existing environmental conditions and their analysis together with relevant existing plans and social and economic data to support reasoning of the plans and recommendations presented in the Main Report. The GIS Maps volume contains various environment related maps useful for the development of the REMP. These maps were prepared through extensive application of techniques of the geographic information system (GIS).

We wish to express grateful acknowledgements to the personnel of your Agency, Advisory Committee, Ministry of Foreign Affairs, Environment Agency, and Embassy of Japan in Prague. We also wish to express sincere appreciation to officials and individuals of the Slovak institutions concerned. We hope that the recommendations presented in this report will have a wide range of support by the people concerned with the environment of the Hron River Basin, and will be promoted for implementation to bring about the improvement of the environment.

Yours faithfully,

内田 顕

Dr. Akira UCHIDA
Team Leader

FRONTISPIECE

Extract from presentation by Peter Fowler entitled 'Cultural Landscape in Europe', given at the International Expert Meeting, Banska Stiavnica, Slovakia on 'Management Guidelines for Cultural Landscapes', 1 to 4 June 1999.

"Co-ordination: in some ways, this is the major European management challenge, especially in relation to size and scale. The problem is us, not the landscape; more specifically, in a continent relatively sophisticated in its governmental structure, the sheer complexity, inflexibility and often rivalry (not to mention occasional incompetence and corruption) within our bureaucratic hierarchies tend to place a large obstruction, rather than a facility, on the route to successful holistic management of large areas. Numerous authorities are likely to be involved because of the size, a huge and even disproportionate effort therefore being required to make the various bureaucratic parts function in any semblance of partnership."

"On Hadrian's Wall*, UK (not a Cultural Landscape but comparable in size and complexity), the breakthrough in management terms came not so much in the publication of a management plan (1996) but in the process of producing it. Over 2-3 years a motley, disparate and in part overtly hostile number of institutions and individuals sat down and threshed out a plan, of course a compromise but workable, and in the process they came not only to understand better the complexity with which they were dealing but also to realise that it was only by working together that they could best safeguard their own interests as well as, possibly, promote the sustainability of the whole area and its internationally-recognised resource".

* A very large, UNESCO-designated World Heritage Area in the north of England, stretching from the west to east coast and encompassing a defensive wall built in Roman times along the border with Scotland

FOREWORD

The Ministry of Environment, through the Slovak Environmental Agency (SAZP) and its other agencies and institutes, has a special responsibility and many duties to work with other organisations and the people of Slovakia to ensure a better environment for both present and future generations. This is an ambitious aim that involves both long and short term planning, the careful balancing of priorities and the wise use of resources. This will be made all the easier with the support and commitment of all those who use or manage the environment – the stakeholders.

As one way of helping the Slovak Environmental Agency to achieve this aim, an international Study Team, financed by the Japan International Cooperation Agency (JICA) and supported by a number of experts from Slovak institutions, has been developing a Regional Environmental Management Plan (REMP) for the Hron River Basin. This report is the Summary volume of the Final Report of the REMP.

A Main Report, Supporting Report and GIS Maps volume of A3 size have also been produced. The Supporting Report contains further details of the Study Area and of the data gathered during the course of the Study, the results of questionnaires and field investigations, planning and data analysis methodologies, etc. A Draft Final Report, consisting of a Summary in English and Slovak and three other volumes as above, was produced in November 1999 and circulated to interested parties. The Report was also presented to representatives of local and national governments, experts and others at meetings in Banska Bystrica and Bratislava in December 1999. A questionnaire, that invited comments and corrections, accompanied the Summary and both were publicly available through the Webpage of the SAZP. This Final Report takes into account the comments made on the Draft Final Report.

The feedback on the Draft Final Report has very much helped the Ministry of the Environment, the SAZP and the JICA Study Team, which has prepared the reports. The comments have provided general confirmation, from those familiar with the Basin and from technical specialists in the subjects covered, that the team, through its consultations and review and analysis of documents and databases, has identified major issues, has understood correctly the causes and has made recommendations that are reasonable.

The REMP describes some of the environmental problems faced in the Hron Basin, the activities that cause them and some of the development opportunities presented by the rich

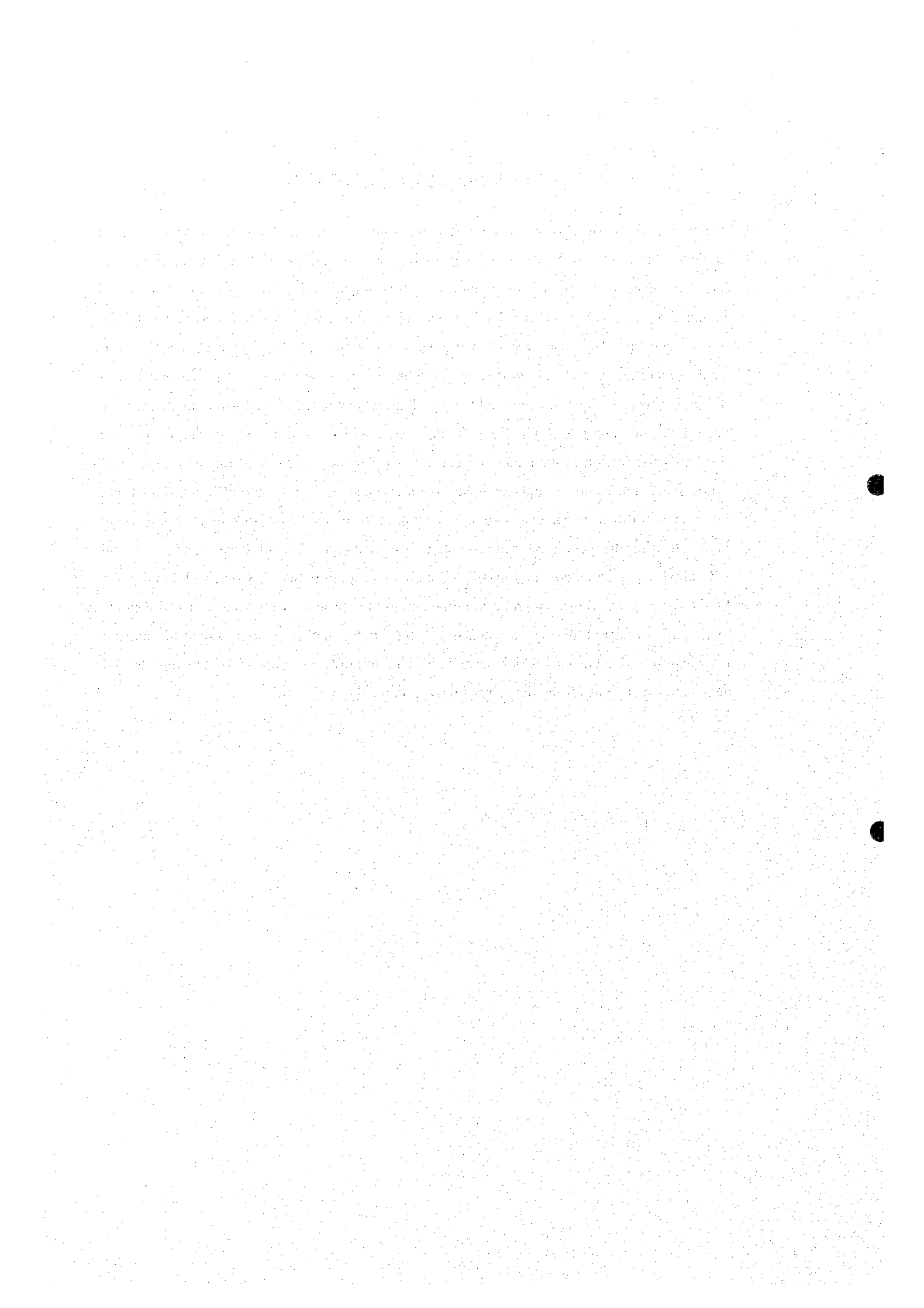
natural and cultural heritage of the area. A wide-ranging series of measures to address these problems and opportunities are then presented. Action on these recommendations will depend very much on the support and co-operation both of the people, local government and industries of the Hron River Basin and of national government. With the interest of these stakeholders, it is hoped that some technical and financial support, for follow-up studies and for implementation of projects, may be forthcoming from international sources.

This is the first such plan for a River Basin in Slovakia. With the time and resources available to it, the Study Team has made the best use that it can of the data with which it has been provided; but the team is well aware that their analyses and interpretation are not perfect and that the REMP does not cover all the environmental issues that occur in the Basin. Nevertheless it is hoped that this REMP will provide a basis for environmental action in the Hron River Basin and be used as a model, to be developed and refined, in other basins and/or regions of Slovakia.

Despite the environmental degradation that the Basin has experienced, the Study Team believes that its environmental resources are rich and of great value to its inhabitants and others. The Hron River Basin is therefore worthy of sound management for present and future generations. A range of environmental management initiatives are already underway and the team hereby expresses its hope that these will continue and be complemented by new projects and programmes, so that the environmental issues in the Basin are addressed in a comprehensive manner.

ACKNOWLEDGEMENTS

The Study Team should like to take this opportunity to thank, for their co-operation and kindness during the course of the REMP Study, the many individuals and organisations who have provided assistance - they include state government and its agencies in Bratislava and in the *Kraj* and *Okres* of Banska Bystrica, Nitra and elsewhere in Slovakia; local self-government ie *Mesto* and *Obec*; non-government organisations; industry/private sector. These organisations and individuals, by providing information and through their patience in discussing ideas with an international team with little knowledge of the Slovak language, have made this study possible. The Study Team is especially grateful to the Steering Committee for their participation in the study and constructive comments, to SAZP for the provision of office space and technical and administrative assistance, and to the project's translators and interpreters for their language and communication skills, which helped to keep the Study Team in touch with the people of Slovakia and their writings. To all these institutions and individuals the team extend their gratitude for all the hospitality that they received. Finally, the Study Team thanks those who took the time and trouble to answer the various questionnaires that were circulated during the course of the study; the responses provided valuable information and feedback, which have helped to improve the content of the reports and demonstrated support for the majority of the recommendations.



The Study on the Regional Environmental Development Plan for the Hron River Basin

OUTLINES OF THE PROPOSED PLAN

(1) Planning Area

Hron River basin area: Most of the Banska Bystrica Kraj area and about a half of the Nitra Kraj area.

(2) Target Year

A target year for the whole plan is not specified. Proposed measures have their own target year.

(3) Content of the Proposed Plan

The REMP (Regional Environmental Management Plan) consists of the following major components.

Core Plan: Covering the following attributes of the environment: surface water, groundwater, soil, air, waste, ecology/forests, and heritage/tourism resources

Supporting Plans: Covering the following aspects of the environmental management: institution, community participation and information dissemination, environmental education, environmental information network, and environmental monitoring

The Core Plan identifies the major issues in each of the environmental attributes indicated above, and then sets objectives and targets to tackle with those issues, and proposes specific measures to achieve the objectives and targets. The Supporting Plans are presented in similar manner in the Main and Summary Reports.

These issues and objectives, and the number of specific measures proposed in the Core Plan are summarised in the following table.

Environmental Issues and Objectives of the REMP Core Plan

Surface Water

GOAL: To improve surface water quality in the Hron River Basin, with all surface water for the Hron and its major tributaries attaining class III of the Slovak Water Quality Classification System (STN 75 7221), by 2010.

| Issue | Objective | Measures |
|---|--|------------|
| (SW1) Lack of concrete strategic objectives of water quality compatible with E.U directives | Development of water quality objectives to guide the management of the river | 1 measure |
| (SW2) Domestic waste water treatment | Up-grade of sewerage systems coupled with the expansion of sewerage treatment plants and improvements in their operation to reduce BOD input into Hron | 4 measures |
| (SW3) Industrial waste water treatment | To ensure proposed industrial plant effluents meet international and national standards. | 2 measures |
| | Improvement of industrial wastewater quality from each existing industrial plant | 3 measures |
| (SW4) Institutional and legal framework | Changes to legal framework to ensure improvement in industrial effluent quality | 2 measures |
| | Improvement and /or development of sewerage treatment system | 1 measure |
| | Interaction and data sharing between the many institutions involved in the water quality management of the Hron River Basin | 1 measure |

Soil and Groundwater

GOAL: To ensure that the quality of groundwater used for drinking and other purposes is in compliance with Slovak Standards, in order to protect human health and allow economic development of this resource on a sustainable basis.

| Issue | Objective | Measures |
|---|--|------------|
| (SG1) Information on quality of shallow groundwater incomplete and out of date | Provide an up-to-date definition of those areas, where groundwater is used for drinking, that do not comply with Slovak Standards for Drinking Water | 1 measure |
| (SG2) Groundwater quality monitoring system inadequate (for detection of trends in vulnerable/ contaminated areas used for drinking and other purposes) | Improve groundwater quality monitoring network and reporting system in those vulnerable areas where contamination has been identified | 1 measure |
| (SG3) Some settlements/households not connected to safe drinking water supply | Determine Priority Areas for Upgrading Public Water Supply to meet Slovak Standards | 1 measure |
| | To install Public Water Supply in Priority Areas | 2 measures |
| (SG4) Suspected contamination of soil and groundwater with POPs | To determine the current condition of soil and groundwater with respect to contamination with POPs | 1 measure |
| | As above and the prevention of further soil and groundwater contamination with POPs | 1 measure |
| | The remediation of soil and groundwater contamination with POPs | 1 measure |
| | The prevention of soil and groundwater contamination with POPs | 1 measure |
| (SG5) Contamination of groundwater and soil in existing industrial areas and at old environmental loads (OEL) | Remediation of contaminated soil and groundwater in vulnerable areas and protection from further contamination | 3 measures |

Air

GOAL: To improve the ambient air quality in the Hron Basin so as to meet all the national air quality standards and for all stationary sources to comply with emission standards.

| Issue | Objective | Measures |
|--|--|------------|
| (A1) A number of plants are still not able to meet the emission standards | Reduction of pollutant emissions from stationary sources not complying with the emission standards | 2 measures |
| (A2) The NOX concentration exceeds the short-term air quality standards in the town of Banska Bystrica and heavy traffic roadside areas. | Reduction of ambient NOx levels in the town of Banska Bystrica and heavy traffic roadside areas | 6 measures |
| (A3) The TSP concentration exceeds the long-term air quality standard in certain areas in the town of Banska Bystrica. | Reduction of ambient dust levels in the town of Banska Bystrica | 3 measures |
| (A4) The number of operable air quality monitoring stations is decreasing due to the budgetary shortage | To monitor any changes in the air quality that may have negative effects on the human health | 2 measures |

Waste

GOAL: To ensure that the methods and approaches adapted lead to the long term, effective management, treatment, and disposal of solid waste within the Study Area, such that human health is safe-guarded, but using the waste as a resource where possible

| Issue | Objective | Measures |
|--|---|-----------|
| (W1.1) Waste Classification | To rationalise the waste classification system further, in order to simplify completion of the waste statistic forms | 1 measure |
| (W1.2) Creation of Waste Statistics | To develop a waste-disposal based statistical record, removing double-accounting for waste production figures and placing the onus on data collection in the hands of the waste disposal operators | 1 measure |
| (W1.3) Collation and Publication of Waste Statistics | To rationalise the collection, collation and presentation of waste disposal statistics, so that one organisation takes responsibility for the management of the data, even if another publishes the information | 1 measure |
| (W2) Regional or Sub-regional Waste Plans | To develop a clear and quantified understanding of the future waste management requirements for the Study Area, either as a whole or on suitable sub-regional bases | 1 measure |
| (W3) Old Environmental Loads | To develop a prioritisation for the reclamation or removal of OELs | 1 measure |
| (W4) Medical Incinerator Operation | To provide safe, effective treatment of medical wastes | 1 measure |
| (W5) Monitoring of Landfill Sites | To establish a comprehensive monitoring programme for all major landfill facilities and OELs, in order to identify significant environmental risks in the Study Area | 1 measure |
| (W6) Alternative Waste Treatment | To improve public awareness with respect to waste recycling and improve industries adoption of waste minimisation, through educational programmes and realistic pricing mechanisms for waste disposal | 1 measure |
| | To identify alternative methods of waste treatment and re-use | 1 measure |
| (W7) Waste Transfer | To investigate the potential development of a rationalised waste handling and transport network within the Study Area | 1 measure |

Ecology

GOAL: To improve the management measures for ecology and biodiversity in major aquatic and terrestrial ecosystems of the Hron basin.

| Issue | Objective | Measures |
|--|---|------------|
| (E1) Forestry: ecologisation | Improve ecology and biodiversity in all forests | 3 measures |
| (E2) Lower Hron valley: scarcity of protected areas and reduced biodiversity | Improved nature protection and conservation and landscape management | 3 measures |
| (E3) Hron river and dependent habitats: impacts of river engineering | Use of knowledge gained from the past development of the Hron river for improving present and future management of the river and wetland habitats | 2 measures |
| (E4) National Parks and Protected Landscape Areas: lack of management plans | Improved management for ecology and biodiversity | 1 measure |

Heritage and Tourism Resources

GOAL: The protection and improved management of major tourism and heritage resources as the basis for their sustainable use and economic development.

| Issue | Objective | Measures |
|---|---|------------|
| (H1) National parks and protected landscape areas: lack of tourism development plans | Improved management of tourism in NPs and PLAs | 2 measures |
| (H2) Caves: lack of full protection | Improved protection and management of caves | 2 measures |
| (H3) Hron river: poor microbiological water quality | Water quality suitable for all water contact sports | 1 measure |
| (H4) Negative effects of economic change on listed monuments | Protection of Cultural Heritage from Negative effects of economic change | 1 measure |
| | As above and to ensure consensus on the management proposals and priorities | 2 measures |
| (H5) Deficiencies in institutional system and legislation for the protection of monuments | Improve decisions and actions by state and self-government administrators | 1 measure |
| | To streamline and strengthen legislation and procedures for the protection of monuments | 2 measures |
| | Stricter Monitoring and Enforcement of Conservation Consents | 1 measure |
| (H6) Monument protection and development: resource and skill shortages | Increase the available funds for conservation | 4 measures |
| | Ensure the conservation / integrity of the most Endangered Monuments | 1 measure |
| | Promote tourism development within the basin | 1 measure |
| | Improve the skills of state and local self-government employees, builders, developers etc involved in Monument Conservation | 2 measures |

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ABBREVIATIONS

| | | |
|--------|---|--|
| CEEV | : | Centre for Environmental Policy and Environmental Education, SAZP |
| CEHOVT | : | Centre for Environmental Evaluation and Labelling, SAZP |
| COH | : | Centre for Waste Management, SAZP |
| COKOO | : | Centre for Revitalisation of Endangered Landscape Areas, SAZP |
| COKPD | : | Centre for the Protection of Natural and Cultural Heritage |
| COPK | : | Centre for Nature and Landscape Protection, SAZP |
| CUPER | : | Centre for Physical Planning and Environmental Regionalisation, SAZP |
| GSSR | : | Geological Survey of the Slovak Republic |
| ISZP | : | Environmental Information System |
| JICA | : | Japan International Cooperation Agency |
| LVU | : | Forest Research Institute |
| MDPT | : | Ministry of Transport, Posts and Telecommunications |
| MP | : | Ministry of Agriculture |
| MZP | : | Ministry of Environment |
| NGO | : | Non-Government Organisation |
| PH | : | Hron River Basin Authority (Povodie Hrona), a branch of SVP |
| REDISP | : | Regional Development and Institutional Strengthening Project |
| SAD | : | Bus Transport Agency |
| SAZP | : | Slovak Environmental Agency |
| SFZP | : | The State Environmental Fund |
| SHMU | : | Slovak Hydrometeorological Institute |
| SIZP | : | Slovak Environmental Inspectorate |
| StVak | : | Central Slovak Water Supply and Sewerage Company |
| SVP | : | Slovak Water Management Authority |
| SZU | : | State Health Institute |
| VUDI | : | Research Institute of Transport Engineering |
| VUPOP | : | Soil Science and Conservation Research Institute |
| VUVH | : | Slovak Water Research Institute |
| ZsVak | : | Western Slovak Water Supply and Sewerage Company |

PART I
BACKGROUND

CHAPTER 1
INTRODUCTION

1.1 THE REMP PROJECT AND WORK PROGRAMME

The Hron River rises in the Low Tatra Mountains and flows through central Slovakia to the Danube. It has a total length of about 290 km, a catchment area of 5,465 km² with a population of around 500,000. In the basin, mineral mining and non-ferrous metal production industries have developed over several centuries. These industries have contributed to the pollution of soil, river water and groundwater, and to the deterioration of the abundant forests and other biological resources of the area. During recent years, other pressures on the environment have been added eg pollution sources in the form of factories, intensive agriculture, domestic wastewater and solid waste.

The Slovak Government is considering further both the development of the Hron River Basin area and measures to preserve and improve its existing environment. Therefore, it has recognised the need to prepare a Regional Environmental Management Plan (REMP) for the basin.

Through the Japan International Cooperation Agency (JICA), a Study Team has been commissioned to help prepare the Regional Environmental Management Plan for the Hron River Basin. Key members of the Study Team arrived in Slovakia on 31st March to start execution of the work programme. Most of the Study Team's investigations in Slovakia were carried out in the summer months of 1998 and 1999. The overall programme was set out in the Inception Report (March, 1998) with further details described in Progress Report (1) (August, 1998), the Interim Report (January, 1999) and Progress Report (2) (July, 1999); the work in Slovakia was completed at the end of July 1999. With the preparation of this Final Report the Study Team has completed the work on the Project.

It was arranged that members of the Study Team made presentations of the results of the Study, in early December 1999, (i) to stakeholders in the River Basin at a meeting in Banska Bystrica and (ii) to representatives of government and potential donors in Bratislava. The purpose of these meetings was, on the one hand, to obtain feedback on the results and recommendations of the Study and, on the other, to promote commitment to implementation of the plan by raising further the awareness and interest of the various stakeholders - from NGOs to potential funding agencies. These presentations were a key element of the participatory or consultative approach to planning that the Study Team had advocated as part of its study methodology.

The feedback on the report was generally constructive and positive, and has been taken into account during the preparation of this Final Report. Most of the verbal responses at the

meetings and the written responses to the questionnaire (which was circulated with the Summary of the Draft Final Report) demonstrated support for the majority of measures recommended in the REMP's Core Plan (Chapter 5) and in its Supporting Plans (Chapter 6). That a considerable effort was made to consult with a wide range of stakeholders during the course of the study, and that the recommendations of the Draft Final Report have received wide support, is good evidence that the REMP deserves the attention of the Government of the Slovak Republic, the private sector and international funding agencies and that efforts should be made to implement it in association with the citizens of the Basin.

This document is the Main Report of the project's Final Report and contains the principal results and recommendations of the REMP Study. It describes the Study Area, the main environmental management institutions in Slovakia and existing environmental policies and plans. Based on a review of activities affecting the environment, analyses of the state of the environment (water, soil, air etc) and environmental management practices, the main environmental issues have been identified and proposals to address them have been made. The overall approach to the study (the planning process) is outlined in section 1.4.

1.2 OBJECTIVES OF THE STUDY

According to the Scope of Work, the two main objectives of the Study are:-

- (1) To formulate a master plan for regional environmental management for the area of the Hron River Basin, and
- (2) To pursue technology transfer to the Slovakian counterpart personnel in the course of the Study.

In accordance with these main objectives is the wish of the Slovak Environment Agency that the methodology used for the production of the Regional Environmental Management Plan (REMP) for the Hron River Basin serve, as a model for the preparation of REMP's for other river basins in Slovakia. The Study Team supports this wish and hopes that the methodology will be applicable outside the Hron Basin.

As indicated above and discussed in Section 1.4 and Annex M of the Supporting Report, the preparation of the REMP is not just a technocratic process, but also one of consulting with those involved who might be involved in implementing the plan and those likely to be affected by its recommendations. Therefore 'technology transfer' has not been limited to transfer of skills in technologies such as Geographic Informations Systems (GIS) or soil, groundwater and surface water investigations (Annex F), but extends to improving:

- environmental education
- community participation
- the communication activities of SAZP (ie linkages between the SAZP and other organisations)

in the field of planning and environmental management.

Therefore training workshops on both GIS and Public Participation in Environmental Decision-Making have been organised for December 1999, in association with the REMP presentations.

1.3 HRON RIVER BASIN AND STUDY AREA BOUNDARIES

The main physical, natural and socio-economic features of the Study Area are described in Chapter 2, but the geographic extent of the Study Area, in terms of the Administrative Units of Slovakia, is explained in Table 1.3 - 1 and in the text which follows.

The total Hron River catchment area is 5 465 km²; this is 11.1% of the total area (49 035 km²) of the Slovak Republic. It is emphasised here that the Hron River Basin and the Study Area are not exactly the same. The Study Area is somewhat larger (6 031 km²) than the natural catchment and follows the basin boundaries quite closely, but with some minor adjustments to match the boundaries of the various administrative units that are recognised in Slovakia. These are, in descending order by size, *Kraj* (Region), *Okres* (District) and Municipality/Cadaster (their responsibilities are described in more detail in Chapter 3).

One main adjustment of the Study Area boundary relates to Trenčín *Kraj*. Since only 1.8% (82 km²) of Trenčín *Kraj* lies within the natural watershed of the Hron, this area has been completely excluded from the Study Area so as to simplify data collection and consultation. The other main adjustment relates to cadasters, which are the smallest units for gathering census and other statistical data (most cadasters correspond to municipalities, but the larger, urban municipalities typically encompass several cadasters). It was decided by the SAZP, at the outset of the study, that the Study Area would include the whole area of all those cadasters encompassed completely or partially by the natural catchment – even if the portion of the cadaster within the basin is 10% or less¹. The SAZP also decided to include all of the cadasters of Banská Stiažnica *mesto* within the Study Area, even though much of the settlement is outside the basin, in order to facilitate management proposals for this town, which is a World Heritage Site.

¹ A close examination of the cadaster and settlement boundaries in relation to the watershed boundary was subsequently undertaken on the Study Team's GIS. This showed that, for some cadasters which have been included within the Study Area, only a tiny fraction of the cadaster land actually falls within the Basin and that this land does not include any built up area. Nevertheless, by including the whole cadaster (as in the case of 2 cadasters of Zlaté Moravce *Okres*), some built-up areas that are clearly outside the Basin have now been included in the Study Area - which is inappropriate. Furthermore, an *obec/mesto* is often the smallest geographic unit for which socio-economic and other data (eg waste) is gathered, yet the *obec/mesto* may consist of more than one cadaster. Therefore, problems have arisen for the Study when, for example (again the case of Zlaté Moravce), only two cadasters out of several in the *mesto* have been included in the Study Area, but with the consequence that all data for the *mesto* is now included as in the Basin - when only a fraction should be included. Another problem identified by closer examination of the data and GIS, was that two cadasters/*obec* of Brezno *Okres* actually fell outside the Basin, when the Study Team had been led to believe that 100% of Brezno *Okres* was within the Basin (having all of Brezno *Okres* in the Study Area would have been easier for data gathering and analysis purposes). It was too late to adjust the cadasters/Municipalities being included in the Hron Study Area, since data have now been gathered according to the Study Area that was originally agreed, but part of the methodology for any future River Basin Study in Slovakia should be a careful GIS examination exercise (of settlement/built-up areas, cadaster/Municipality boundary and catchment boundary layers) to select exactly which cadasters should or should not be in the Study Area.

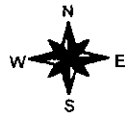
Both the Hron River Basin and the Study Area are referred to in this report, since some of the data available relates to the natural boundary (eg data on surface water flows) while other data, (notably on population and infrastructure) has been gathered according to administrative units and therefore relate more closely to the Study Area as defined by cadasters.

The names, areas and populations of the larger units (*Kraj* and *Okres*) are listed in Table 1.3-1, and they are shown in Map 1.3 - 1. As a result of the adjustments, the Study Area is restricted to Banska Bystrica and Nitra *Kraj*, with 70% (4,221 km²) of it falling in the former *Kraj* and 30% (1,810 km²) in the latter. The total Study Area is 6,031 km², which is 12.3% of the total area (49,035 km²) of the Slovak Republic.

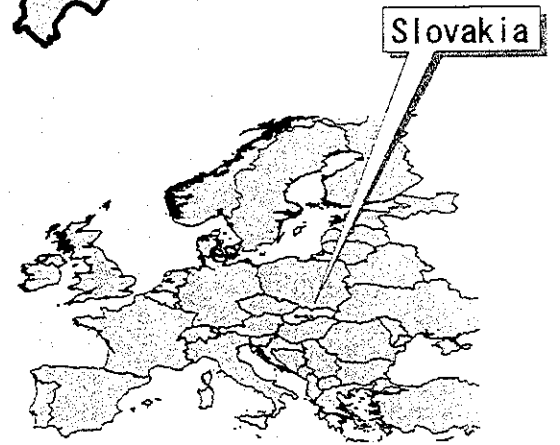
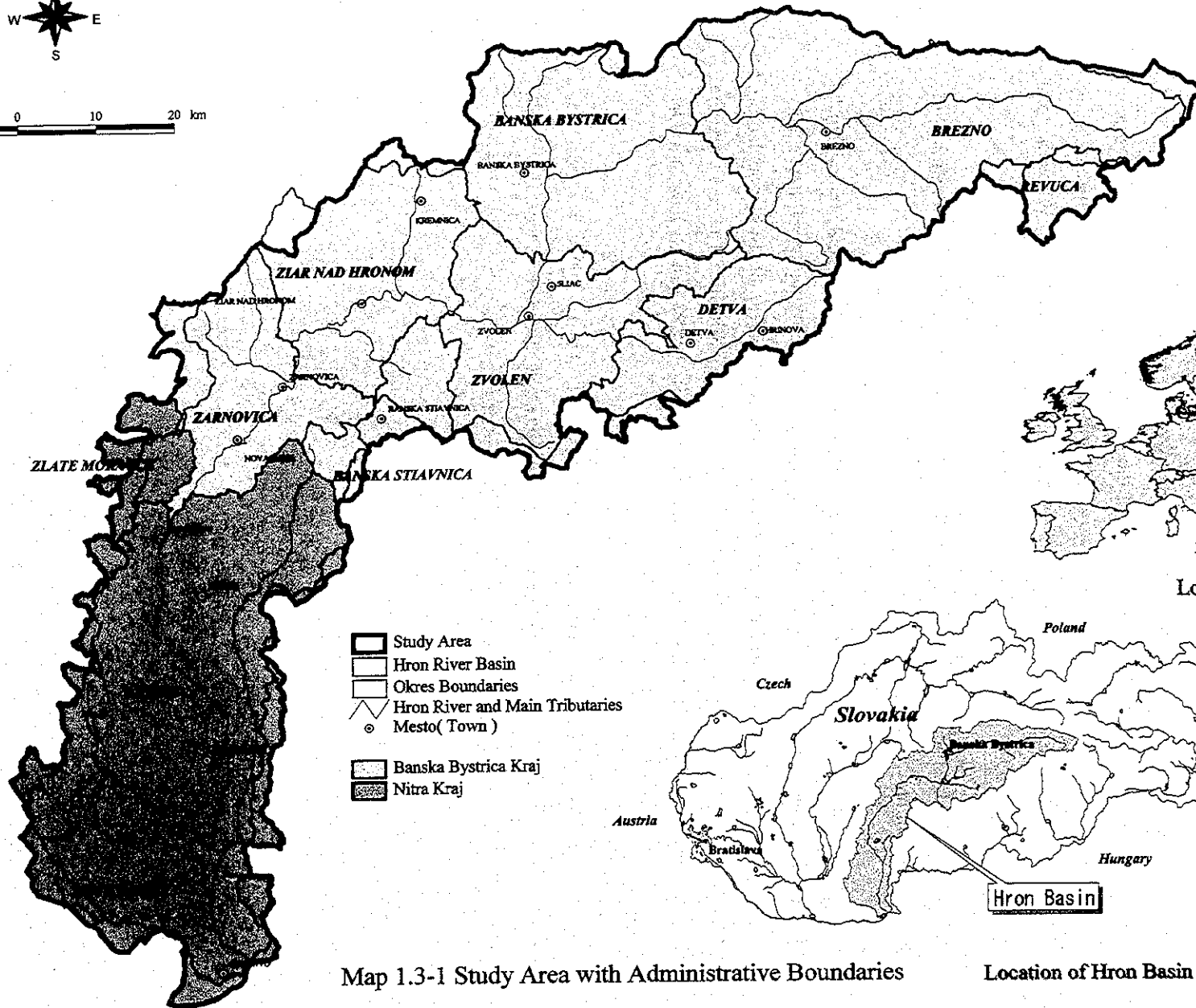
Eight of Banska Bystrica's 13 *Okres* fall partially or fully within the Hron River Basin and the Study Area, but only 3 of Nitra's 7 *Okres*.

From the table it can be seen that of the 11 *Okres* with territory in the Basin, only three (Banska Bystrica, Zarnovica and Ziar nad Hronom) lie completely within the Study Area; nevertheless the Study Area does include nearly all of Brezno *Okres* (98.3% by area, 99.1% by population). Of the remaining *Okres*, significant proportions (>40%) of Banska Stiavnica, Detva, Levice and Nove Zamky are within the Study Area, but only small parts (<25%) of Revuca and Zlate Moravce.

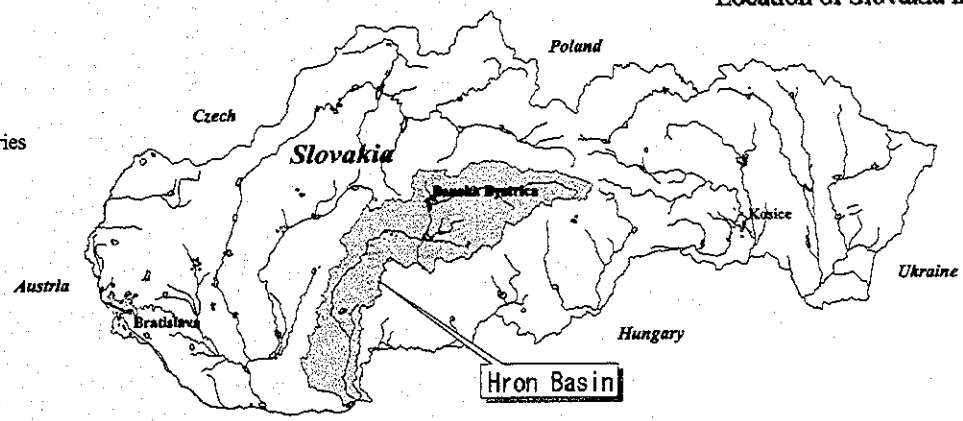
All or part of 264 municipalities occur within the study area (Table 1.3 - 1); a list of all these cadasters and municipalities, according to *Kraj* and *Okres*, is given in Annex B.2 of the Supporting Report.



1-1



Location of Slovakia in Europe



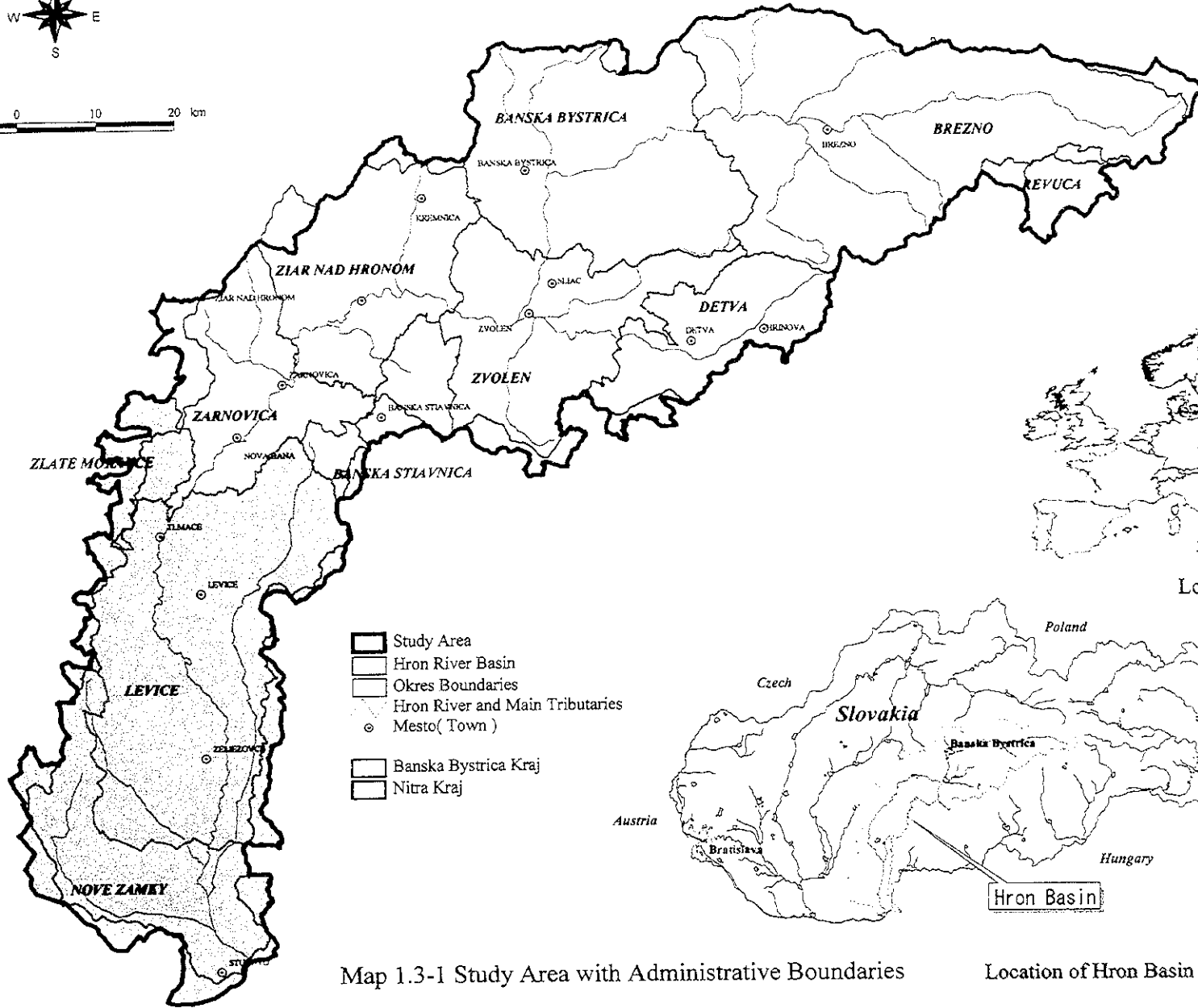
Location of Hron Basin in Slovakia

Map 1.3-1 Study Area with Administrative Boundaries

Data Source : SAZP , Map Prepared by JICA Study Team



1 - 6

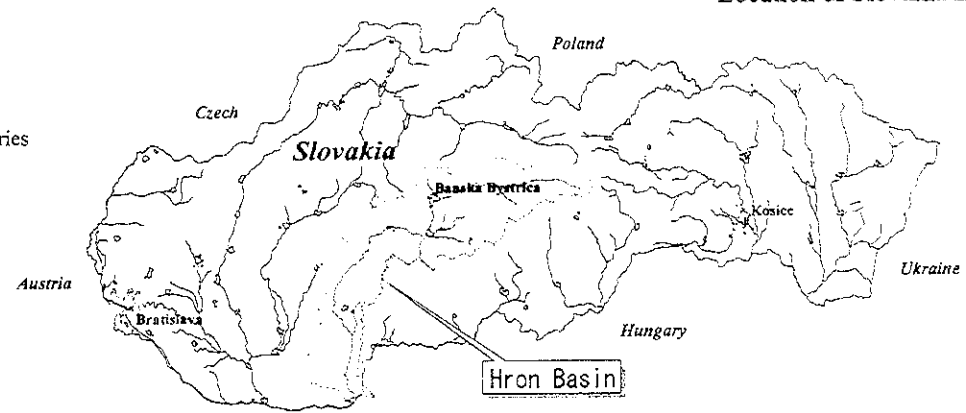


Map 1.3-1 Study Area with Administrative Boundaries

Data Source : SAZP , Map Prepared by JICA Study Team



Location of Slovakia in Europe



Location of Hron Basin in Slovakia

Table 1.3 - 1
Basic Population and Area Figures for *Kraj* and *Okres* of the Study Area.

| Okres | Okres Totals | | | Study Area | | | % within Study Area | |
|------------------------------|--------------|-------------------|-------------------------|------------|-------------------|-------------------------|---------------------|-------------------------|
| | No. of O/M | Population (1996) | Area (km ²) | No. of O/M | Population (1996) | Area (km ²) | Population (1996) | Area (km ²) |
| BANSKA BYSTRICA | 42 | 112 926 | 809 | 42 | 112 926 | 809 | 100.0% | 100.0% |
| BANSKA STIAVNICA | 15 | 16 934 | 279 | 10 | 14 419 | 183 | 85.1% | 65.6% |
| BREZNO | 30 | 66 078 | 1 265 | 28 | 65 483 | 1 243 | 99.1% | 98.3% |
| DETVA | 15 | 34 014 | 445 | 12 | 32 541 | 343 | 95.7% | 77.1% |
| REVUCA | 42 | 40 900 | 730 | 1 | 1 123 | 103 | 2.7% | 14.1% |
| ZARNOVICA | 18 | 27 780 | 425 | 18 | 27 780 | 425 | 100.0% | 100.0% |
| ZIAR NAD HRONOM | 34 | 48 617 | 531 | 34 | 48 617 | 531 | 100.0% | 100.0% |
| ZVOLEN * | 26 | 67 955 | 761 | 24 | 67 469 | 584 | 99.3% | 76.7% |
| Sub-total(BB Kraj) | 222 | 415 204 | 5 245 | 169 | 370 358 | 4 221 | 89.2% | 80.5% |
| LEVICE | 89 | 121 163 | 1 550 | 63 | 98 952 | 1 133 | 81.7% | 73.1% |
| NOVE ZAMKY | 64 | 162 136 | 1 346 | 25 | 40 109 | 548 | 24.7% | 40.7% |
| ZLATE MORAVCE * | 33 | 43 612 | 521 | 7 | 8 204 | 129 | 18.8% | 24.8% |
| Sub-total(Nitra Kraj) | 186 | 326 911 | 3 417 | 95 | 147 265 | 1 810 | 45.0% | 53.0% |
| Total | 408 | 742 115 | 8 662 | 264 | 517 623 | 6 031 | 69.7% | 69.6% |

| | | | | | | |
|-------------------------------|-----|-----------|--------|-----|-----|-----|
| Total of Banska Bystrica Kraj | 515 | 664 024 | 9 455 | 33% | 56% | 45% |
| Total of Nitra Kraj | 347 | 717 585 | 6 343 | 27% | 21% | 29% |
| Total of two Kraj | 862 | 1 381 609 | 15 798 | 31% | 37% | 38% |

Note: * population data are derived from Table 2.5 - 1

O/M - Municipalities *Obec* (village) / *Mesto* (town)

1.4 SCOPE OF STUDY AND OVERALL APPROACH

1.4.1 ENVIRONMENTAL ASPECTS COVERED

The overall scope of the study and methodology to be applied have been described in the Inception Report (March 1998) and these have, in general, remain unchanged. The main environmental aspects that the study has addressed are:

- Surface Water Quality
- Soil and Groundwater (especially their contamination status)
- Air Quality
- Waste Management
- Ecology and Biodiversity (including Forestry)
- Cultural Heritage (and Tourism)

A number of environmental topics have not been addressed, or have only been touched on, because specialists in these subjects were not included in the Study Team and/or because information on the topics was not available. Large amounts of environmental data are in fact gathered in Slovakia, on a diverse range of topics and by numerous institutions, but some of this information is not readily shared. A big effort was made by the Study Team and the SAZP to identify, obtain and use relevant data beyond that provided by the organisations on the original Steering Committee. Some organisations were very co-operative, but some data could not be obtained at all and some arrived too late to be incorporated within the study. Aspects not covered by the study, or just mentioned briefly, include hydraulic infrastructure (eg dams and reservoirs), renewable energy, radon, noise, odour, health, landscape restoration (especially of agricultural landscapes), physical impacts on the landscape (quarrying, erosion/landslides) and some elements of cultural heritage (eg folklore - traditional dancing, music literature etc).

1.4.2 OVERALL APPROACH TO THE REMP

The overall approach to the development of the REMP and the way in which the different elements of the study are linked together in this report are summarised in Figure 1.4 - 1.

The concept is quite logical and simple. The main physical, natural and socio-economic features of the Study Area are described (Chapter 2), in order to 'set the scene' for the REMP. Next are presented the five main determinants of the REMP proposals;

- The Overall Administrative and Legal System in Slovakia, especially in relation to Environmental Management - as described in Chapter 3.
- Existing Policies, Plans and Funding Arrangements for Environmental Management in Slovakia - as described in Chapter 4.

- Activities that are Affecting the Environment (pollution sources, resource management practices etc) - ie the Pressures, as described in the first section for each of the six environmental aspects covered in Chapter 5.
- The Existing State of Environmental Resources as determined by monitoring programmes and other studies and observations - presented in the second section for each of the six environmental aspects covered in Chapter 5.
- The Existing Legal and Institutional System specific to the environmental aspect in question - as presented in the third section for each of the six environmental aspects covered in Chapter 5.

In the light of these, the major issues for each environmental aspect/sector are identified and goals and objectives for the sector developed. Specific technical measures, with targets, are then proposed to address the issues and meet the various objectives. These Recommendations, which can include 'sector-specific' institutional and legal measures, constitute the **REMP's Core Plan** (the Response to the Pressures and State) and are presented in the fourth section for each of the six environmental aspects covered in Chapter 5. The Recommendations are also all drawn together in one table (Table S-2) in the Summary Report.

However, for the mostly 'technical measures' in the **Core Plan** to be implementable and effective, other supporting measures are required, some of a 'cross-cutting' nature ie to be applied to more than one environmental sector, as is the case for some institutional measures, community participation and environmental information and monitoring. These various measures have been set out in Chapter 6 as the **REMP's Supporting Plans**.

Finally attention has to be paid to the means of **Implementing the REMP**, especially with regard to sources of finance and any further pre-investment studies that may be required. This topic is covered in Chapter 7.

One result of this approach and report structure is that Chapter 5 becomes very large, and leads to the technical recommendations being presented separately and not together. However, outweighing this is the advantage that the text on each sector (from Pressures to Response) is kept together in one part of the report. This makes the report much easier to use by specialists and others interested in a particular environmental aspect. The SAZP expressed a preference for such a report structure. For those interested in acquiring an overall picture of the main environmental issues and recommendations, these can be found in the Summary Report.

1.4.3 RECOMMENDED MEASURES, TARGETS AND COSTS

The measures constitute a co-ordinated set of actions, including the further surveys and studies that are needed to set priorities and which are, in general, essential before project 'ideas' are

'finalised' and costed so that they can proceed to implementation – as is explained below.

Though the Study Team have made a comprehensive set of recommendations, the recommended measures have not been elaborated in great detail, nor have project/programme costs been estimated. To do this is the work of pre-feasibility and/or investment studies, and requires close co-operation with those who know the local costs. The Steering Committee that was formally established to oversee the Study consisted principally of representatives of academic institutions and researchers/data gatherers, who were not directly responsible for environmental management. Lack of constructive contact with some of the key environmental managers has therefore prevented the Study Team providing great detail on these matters.

In some cases also (eg nitrate levels in groundwater in the Lower Hron Basin) the information has been available for some time, but no action taken, meaning that it will now be necessary to repeat the data-gathering exercise to obtain an up-to-date picture of the situation, as a basis for reliable planning.

Targets have been set for the various measures, many in the form of specified environmental improvements by certain dates. The Study Team believes that the targets set are the desirable ones. However the Study Team also recognises that, for the targets to be met, rapid approval of the report and early provision of funding are necessary. Therefore, given the prevailing economic circumstances in Slovakia and that the REMP is a 'Pilot' plan without any pre-arranged source of finance for implementation, the Study Team accepts that the targets are ambitious and will be difficult to achieve and that they should be the subject of further discussion at a national and local level. However, it is believed that successful implementation of the various measures will help Slovakia to meet its EU accession requirements in the field of environment, and therefore that every effort should be made to achieve as many of the targets as possible.

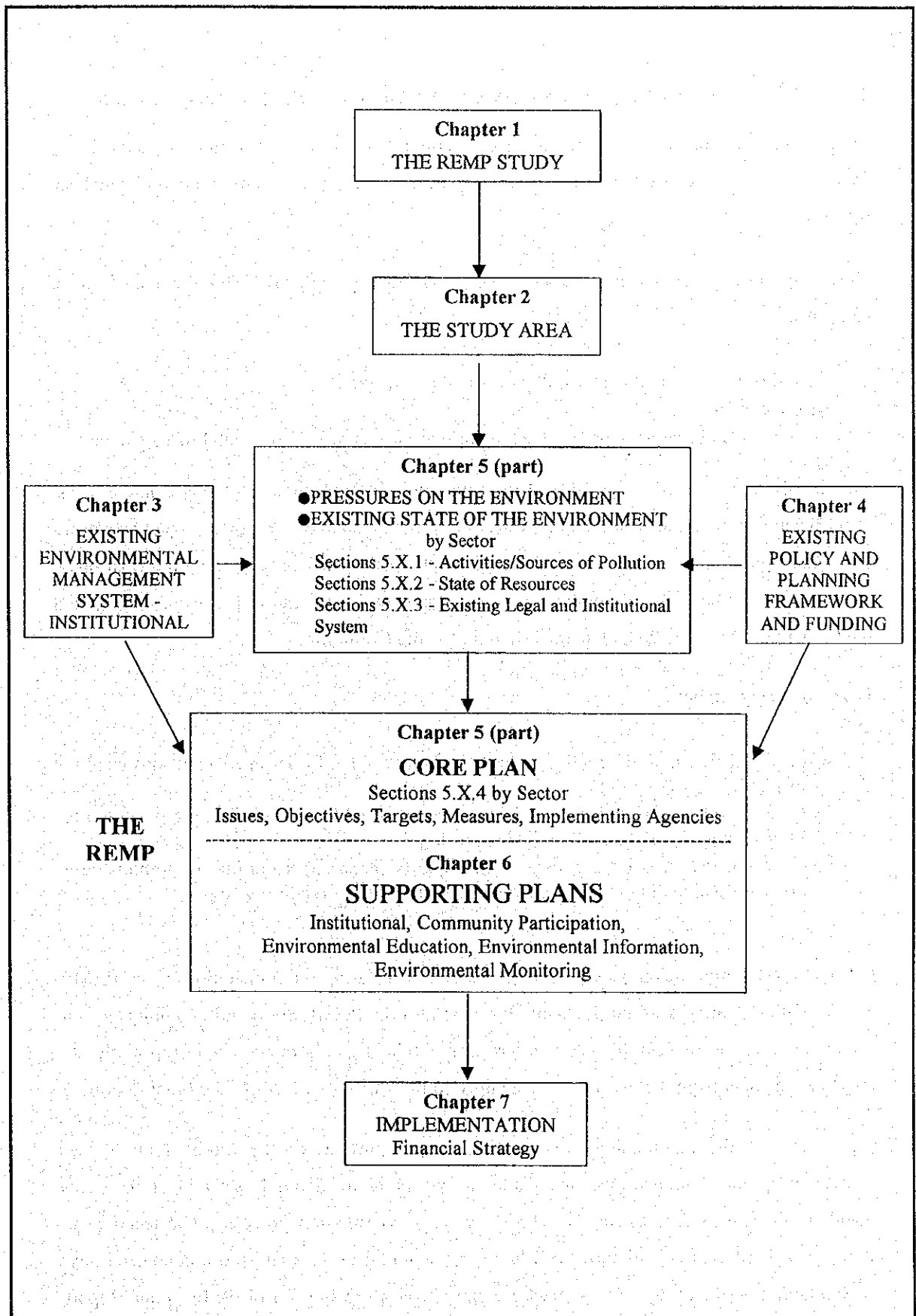


Figure 1.4 - 1

Framework for the REMP - Linkages between the Study Elements as Presented in the Main Report

1.4.4 KEY COMPONENTS OF THE STUDY METHODOLOGY - GIS AND CONSULTATION

Some of the components of the REMP Study methodology are described in more detail in the Supporting Report, especially Annexes M and N, but certain key items (and problems) are referred to here.

During the periods of work in Slovakia by the Study Team in 1998 and 1999, the main focus of effort was:

- the collection of existing data and maps (digital and text);
- field reconnaissance;
- meetings with organisations involved in various aspects of environmental management.

This involved the identification of, and meetings with, a large number of stakeholders in the Hron Basin and the identification and acquisition of many databases, reports, project proposals, etc. This required much effort due to the large number of organisations holding information on the basin (see Annex O) and involved in its management - many more than were identified at the Preparatory Study stage and on the original Steering Committee.

Progress was good, but:

- some digital data and reports (eg Water Management Plan for Hron River Basin) were not available;
- many of the relevant technical and planning reports (and the text of databases) were in the Slovak language and not all could be translated;
- much of the data had been gathered (and reports prepared) according to administrative divisions which did not correspond to the boundaries of the Study Area.

GIS and consultation techniques have been widely used during the preparation of the REMP, even though the latter were not formally designed into the REMP Study. GIS techniques were used to analyse and present the data that has been obtained during the course of this study; the results are evident from the many maps contained in the various volumes of the Final Report.

One aspect of the methodology that was developed further, as the Study Team gained knowledge of the administrative and planning system of the Hron Basin and of the many stakeholders with an interest in the REMP, was the consultation process. The frontispiece shows how important consultations can be in the planning process and those conducted have proved helpful to the Study. The subject was introduced in section 2.1 of the Inception Report, and was elaborated in Progress Reports (1) and (2) and in the Interim Report.

Thus proposals were made in the Progress Report (1) for consultation on the REMP with experts, government authorities, local municipalities, NGOs and members of the public. Such consultation on environmental and other regional and local development plans is considered standard practice in the UK and other countries of the European Union - and when it has been carried out it can strengthen requests for international funding.

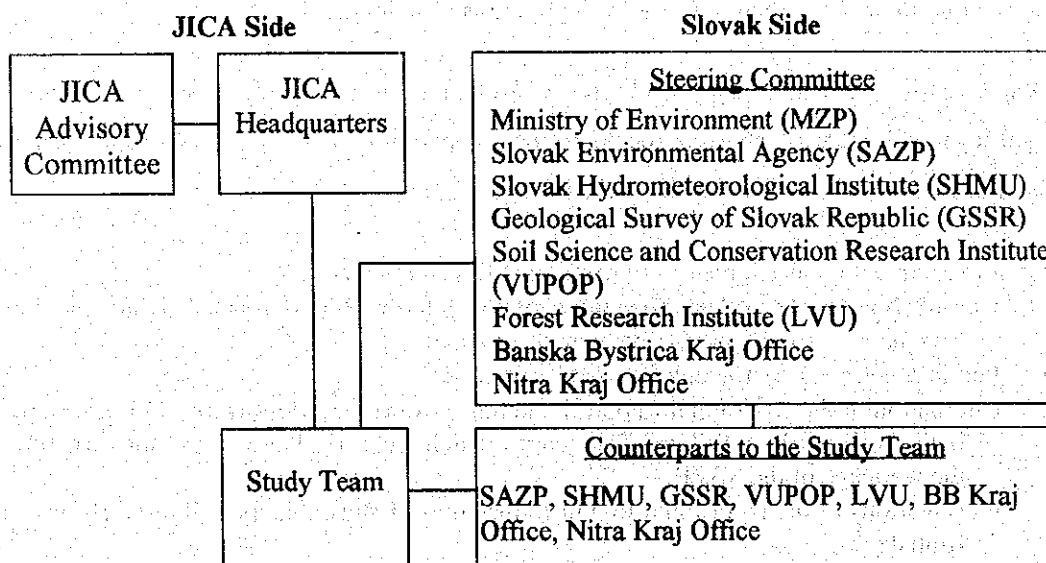
Despite little provision being made for consultation in the Study design and budget, a significant amount was achieved, thanks to the co-operation of the SAZP and to the benefit of the Study. The various elements have included:

- Environmental Questionnaires to Municipalities and others;
- **Comprehensive/Technical Summary** of the Interim Report translated into the Slovak Language, for widespread review and comment;
- Public Meetings in Nitra and Ziar nad Hronom;
- Circulation of the Draft Final Report, including a **Summary Report and Questionnaire** in both the English and Slovak Languages which were available on the internet, through the webpage of the SAZP;
- Presentations of the Draft Final Report to meetings of stakeholders in Banska Bystrica and Bratislava.

1.5 STUDY ORGANIZATION

1.5.1 GENERAL ORGANIZATION

A general organization for the implementation of the Study is as follows.



1.5.2 JICA ORGANIZATION

(1) Study Team

The members of the Study Team are as follows.

| Name | Field in Charge | Firm |
|-----------------------|--|------|
| Dr. Akira UCHIDA | Leader / Environmental Policy | PCI |
| Dr. Robert WHITCOMBE | Regional Environmental Management Planning | WSA |
| Mr. Satoshi NAKAMURA | Hydrology / Geology | OYO |
| Dr. Marcus CHAMBERS | Forest Vegetation / Ecology | WSA |
| Mr. Yuichi HARA | GIS Spatial Analysis | PCI |
| Mr. Richard COLLINSON | Environmental Monitoring / Institutional Development | WSA |
| Mr. Hiroshi MATSUO | Socio-economy / Land Use | PCI |
| Mr. Yukio OI | Soil Pollution / Soil Science | OYO |
| Mr. Kenji FUKUSHIMA | Water Quality / Sanitation | OYO |
| Dr. James HINDSON | Environmental Education | WSA |
| Dr. Gabor MOLNAR | GIS Database | PCI |
| Mr. Ryoichi OGAWA | Work Coordination | PCI |

Note: PCI : Pacific Consultants International, Japan
 OYO : OYO Corporation, Japan
 WSA : WS Atkins International, UK

(2) JICA Advisory Committee

The members of the JICA Advisory Committee are as follows.

| Name | Field | Present Position |
|-------------------|---|---|
| Mr. Shigeru ANDO | Chairman / Environmental Management Planning | Deputy Director, Management and Operations Department, Water Resources Development Public Corporation |
| Mr. Nobuhiko MIWA | Environmental Monitoring | Chief of Environment and Life Section, Ecological Life-Style Promotion Division, Department of Lake Biwa Environment, Shiga Prefectural Government |

1.5.3 SLOVAK ORGANIZATION

(1) Steering Committee

The members of the Slovak Steering Committee are as follows:

| Name | Present Position |
|----------------------------------|---|
| Mr. Vladimír BENKO (Chairman) | Director, Centre for Environmental Policy and Environmental Education (CEEV), Slovak Environmental Agency (SAZP) |
| Ms. Zuzana KASANICKA | Department of Environmental Projects Implementation, Ministry of Environment |
| Ms. Jana BECKOVA | Project Manager, Department of Environmental Monitoring and Informatics, CEEV, SAZP |
| Dr. Karol MARSINA | Head, Environmental Geology Division, Geological Survey of the Slovak Republic (GSSR) |
| Dr. Tomáš BUCHA | Authorized Deputy, Forest Research Institute (LVU) |
| Dr. Miroslav ONDRAS | Deputy Director for Meteorology and Climatology, Slovak Hydrometeorological Institute (SHMU) |
| Dr. Jan CURLIK | Authorized Deputy, Researcher, Soil Science and Conservation Research Institute (VUPOP) |
| Dr. Jaroslav SVOREN | Head, Department of Environment, Banská Bystrica Kraj Office |
| Mr. Vojtech KALLO | Head, Department of Environment, Nitra Kraj Office |

(2) Counterparts

The Slovak counterparts to the JICA Study Team are as follows:

| Name | Field | Organization |
|------------------------|------------------------------------|---------------------|
| Ms. Jana BECKOVA | Project Manager | SAZP |
| Ms. Zuzana LIESKOVSKA | Environmental Policy | SAZP |
| Ms. Vlasta HOLICOVA | Environmental Planning | SAZP |
| Ms. Tatiana HORNANOVA | Environmental Planning | SAZP |
| Dr. Juraj BEBEJ | Environmental Planning | SAZP |
| Dr. Peter BOHUS | Environmental Planning | SAZP |
| Ms. Dagmar RAJCANOVA | Environmental Education | SAZP |
| Ms. Viera SLIVKOVA | Environmental Education | SAZP |
| Ms. Alzbeta TRULIKOVA | Environmental Monitoring | SAZP |
| Mr. Rudolf NAVRATIL | GIS Database / Spatial Analysis | SAZP |
| Ms. Julia HAJDUOVA | GIS Database / Spatial Analysis | SAZP |
| Ms. Nada MACHKOVA | GIS / Remote Sensing | SAZP |
| Mr. Martin ZEMAN | GIS / GPS | SAZP |
| Mr. Peter RONCAK | Water Quality | SHMU |
| Ms. Miroslava UHRIKOVA | Water Quality | SAZP |
| Ms. Andrea GONDOVA | Water Quality | SAZP |
| Dr. Peter MALIK | Hydrogeology | GSSR |
| Dr. Matej GEDEON | Hydrogeology | GSSR |
| Dr. Helena SIPIKALOVA | Hydrology | SHMU |
| Dr. Jana PODOLINSKA | Hydrology | SHMU |
| Dr. Milan MYLBACHR | Hydrology | BB Kraj Office |
| Mr. Jan KAMENSKY | Meteorology | SHMU |
| Mr. Martin RYBAR | Water Management | SVP |
| Ms. Katarina MAGULOVA | Air Quality / Emission Sources | SHMU |
| Dr. Ivan ZUZULA | Air Quality / Simulation Modelling | SHMU |
| Dr. Pavel STASTNY | Air Quality / Meteorology | SHMU |
| Mr. Jan KLUKA | Air Quality | SHMU |
| Ms. Irena JANOSKOVA | Waste Management | SAZP |
| Dr. Jana HAUEROVA | Waste Management | SAZP |
| Dr. Jaroslav SCHWARZ | Waste Management | EnviGeo |
| Dr. Tomas BUCHA | Forest / Ecology / Nature | LVU |
| Mr. Josef MINDAS | Forest / Ecology / Nature | LVU |
| Ms. Blanka MANKOVSKA | Forest / Ecology / Nature | LVU |
| Mr. Pavel PAVLEND A | Forest / Ecology / Nature | LVU |
| Dr. Jan KLEINERT | Forest / Ecology / Nature | SAZP |
| Dr. Jan CURLIK | Soil Science / Soil Pollution | VUPOP |
| Dr. Peter SEFCIK | Soil Science / Soil Pollution | VUPOP |
| Dr. Pavol AUXT | Socio-economy / Land Use | SAZP |

| | | |
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| Ms. Miroslava SUPUKOVA | Socio-economy / Land Use | SAZP |
| Ms. Alexandra BERKOVA | Socio-economy / Land Use | SAZP |
| Dr. Helena RYCHLA | Socio-economy / Land Use | SAZP |
| Ms. Blazena KOVACOVA | Socio-economy / Land Use | SAZP |
| Mr. Jozef GABRHEL | Territorial Planning | Nitra Kraj Office |
| Mr. Miroslav GAJDOSIK | Territorial Planning | BB Kraj Office |