

Draft Proposal for the Improvement of Existing Data Bases on the Sre Pok River Basin

Consultancy Report

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Agriculture, Irrigation and Forestry Programme
Watershed Management Project (WSMP)

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Abbreviations and Acronyms

DARD	Department of Agriculture and Rural Development
DoC	Department of Construction
DoI	Department of Industry
DONRE	Department of Natural Resources and Environment
DPI	Department of Planning and Investment (provincial)
DoS	Department of Statistics
DOST	Department of Science and Technology
DoT	Department of Transport
EVN	Electricity of Viet Nam
GoV	Government of Viet Nam
GTZ	German Technical Cooperation
IKM	Information and Knowledge Management
IMC	Irrigation Management Company
IS	Information System
MARD	Ministry of Agriculture and Rural Development
MONRE	Ministry of Natural Resources and Environment
MRC	Mekong River Commission
NIAPP	National Institute of Agricultural Planning and Projection
PPC	Provincial People's Committees
RBO	River Basin Organisation
SPRBIS	Sre Pok River Basin Information System
UML	Unified Modelling Language
VNMC	Viet Nam National Mekong Committee
Water SPS	Water Sector Program Support
WSMP	Watershed Management Project of the MRC-GTZ

1 Rationale

The Watershed Management Project of the MRC-GTZ Cooperation Programme has agreed to support the improvement of existing data bases toward the development of a Sre Pok River Basin Information System (SPRBIS). The Sre Pok river basin, part of the Mekong catchment area, covers the 4 provinces Dak Lak, Dak Nong, Gia Lai, Lam Dong in central highland of Viet Nam.

The SPRBIS should support and strengthen the collaboration between the different target groups and support the exchange of relevant information to enable a sustainable management of river basin resources.

The overall objective of this project is:

- Improve the existing databases / information systems on the Sre Pok river basin, by developing tools for information dissemination and extraction, to provide decision makers and line agencies on province and district level a tool for a more effective management of river basin resources.

This objective led to formalisation of the following Watershed Management Project (WSMP) country indicator for Viet Nam: “Existing database on Sre Pok River Basin is reviewed and improved. Tools for information dissemination and extraction are developed and used by decision makers and line agencies at provincial and district level.”

Approach

The report is structured as follows:

Review and discussion of the existing situation. This includes a review of existing data bases, software and technical infrastructure, spatial coverage, target groups and their roles as data providers, users and their existing mandates.

Clarifications of expectations. This was done mainly in the form of a survey and additional direct discussions. A questionnaire was distributed to 69 people of different agencies in the 4 provinces. The questionnaire covered questions regarding their expectations towards a SPRBIS, data needs, but also questions which would help during the evaluation of different options.

Discussion of solutions. A possible solution is presented, based on the existing situation and the results of the survey.

Possible fields of support and estimation of needed resources

2 Executive Summary

The Sre Pok River Basin Information System can be an excellent tool for the support of decision makers and line agencies on province and district level towards a sustainable management of water resources in the Sre Pok river basin and also beyond the basin. Such an information system is a great opportunity because it can create more transparency on the available data, structures and actors.

A conducted survey clearly showed that all agencies and people do support the idea of a shared data base and information system. There is data available which can be shared and there exists the willingness to share this data. The hierarchical structures within the government seem to support the establishment of the SPRBIS.

The Sre Pok RBO seems to be the perfect location to lead and host the SPRBIS. The information system fits in very well in the concept and objectives of the RBO. But there needs to be done some substantial work on the RBO itself unless the implementation of the information system can and should be started.

Key Findings

The key findings of the **existing situation** can be summarised as follows:

- A predecessor project from Danida, the Integrated Water Resources Management in the Sre Pok River Basin project was carried out from 2004 until June 2006.
- The Danida project strongly supported the establishment of a river basin organisation (RBO) for the basin, an important institutional development, which has the potential to facilitate a more coordinated and effective approach to water resources management.
- One output the project (Output 1.2) was the establishment of effective data and information systems.
- The existing data base consists of:
 - A static HTML website, mainly in Vietnamese language
 - Geographical data sets like: climate, evapotranspiration, forest coverage, hydrometeorology stations, irrigation, sunshine + rainfall, population density, relief, groundwater, administrative boundaries, land use. These data sets are available from the Sre Pok region.
 - Statistical data sets in form of meteorology data, as: Evapotranspiration, sunshine, humidity, temperature, wind, rainfall and runoff data. Most of these sets are available of the period between the years 1977 and 2004.

- Various reports and information of different origin, mainly unstructured.
- Data of the base line study which was conducted by the WSMP.
- The existing data base can be characterised by:
 - A one-time collection, arrangement and activity of relevant data. It seems that many of these activities have been driven by the Danida project. The existing data can serve as a very good entry point and overview of existing relevant information.
 - No clear institutionalised collaboration between the agencies on province and inter-province level in regard to the data base is recognisable.
 - As it seems that the existing data base is related to one-time activities, only a limited effort towards the sustainability and updateability of the data base can be recognised.
 - There is some exchange of data and information. But this exchange is mainly limited to the inside of an agency.
- The following agencies have been identified as actors with some relevancy towards a SPRBIS.
 - Department of Natural Resources and Environment (DONRE)
 - Department of Agriculture and Rural Development (DARD)
 - Department of Statistics (DoS)
 - Centre for Hydro-meteorological Forecast
 - Department of Construction (DoC)
 - Irrigation Management Company(IMC)
 - Department of Industry (DoI)
 - Department of Transport (DoT)
 - Hydrogeological and groundwater Teams 704, 701, 707
 - Viet Nam National Mekong Committee (VNMC)
 - Electricity of Viet Nam (EVN)
 - Provincial People's Committees (PPCs) of the 4 provinces: Dak Lak, Dak Nong, Gia Lai and Lam Dong.
- The main actors on province level are the Department of Agriculture and Rural Development (DARD) and the Department of Natural Resources and Environment (DONRE).
- The actors have agreed and started to cooperate with each other in a formal way, in the form of the Sre Pok River Basin Organisation (RBO). The establishment of this inter-agency and inter-provincial organisation was a long process and its existence cannot be underestimated.
- The current status of the Sre Pok RBO can be characterised by:

- In the decision 2860/QD-BNN-TCCB dated 3 October 2006, it was decided by MARD that MONRE will not be a permanent member of the Sre Pok RBO. However, on the provincial level, there exists a close cooperation between DONRE and DARD.
 - On the 8.11.2006 there was the first meeting of the Sre Pok RBO, which was held in Dak Lak. The RBO agreed to have one common meeting each year.
 - Currently the RBO is still in its early stages and some start-up activities still have to be done.
 - Just recently, one office within DARD of Dak Lak was assigned to be the permanent office of the Sre Pok RBO.
 - The total budget for 2007 for the Sre Pok RBO from Vietnamese side is 30 Million VND. (30,000,000 VND = 1,870 USD)
- The Sre Pok RBO is very important for the further progress of a SPRBIS, as it provides an institutionalised framework for cooperation between different the stakeholders and between different provinces. Currently there seem to be some discrepancies between MARD and MONRE on the permanent members of the RBO. These discrepancies do not exist on the provincial level and an integration of DONRE into the RBO has already started. But as this integration is not settled yet, it cannot certainly be predicted how fast the integration continues and how it evolves.

The key findings of the **expectations and risks part** can be summarised as follows:

- To ascertain the expectations, needs and opinions of the participating agencies, a questionnaire was developed, distributed and evaluated. The questionnaire was distributed to 69 people in 4 provinces and different agencies.
- The questioned people expressed their expectations about the proposed SPRBIS as:
- Sre Pok Website with relevant data and information
 - Information exchange
 - Biophysical Environmental procedures
 - Sustainable management of resources, development and planning
 - Monitor river basin status
 - Publish evaluation, reports and scientific information on the website
 - Usable for agricultural planning
 - Relevant legislation documents
 - Information on agencies and new documents
 - Impact monitoring for the river basin

- The most frequent answers about the possible risks of such a SPRBIS include:
 - Information not updated and of low accuracy
 - Not enough funding for the persons who are responsible for managing the data base and information system
 - Unauthorized access and usage of confidential information
 - The information is undependable
 - Virus, Hacker
 - To limited ability to supply to the public
- For most of the asked people, the SPRBIS must include:
 - Continuous, timely, exactly data and no data overlapping
 - There must be a stable organization and up-to-date information
 - The implementing agency must have permission from the authority
 - Roadmap and master plan for river basin management
- All, except one, of the questioned people answered that they would benefit from a SBRBIS.
- For nearly all agencies, the director must agree on all data and information which should be published.
- The vast majority of the questioned people would prefer to access the SPRBIS by Internet, followed by the local file system / intranet, CR-ROM and then hardcopies.

The key findings of the **solution scenarios part** can be summarised as follows:

- The Sre Pok river basin information system development process needs to address topics like:
 - Data Content, Structure, Format and Quality

The initial recommendation for the content, based on the survey, is:

- Geographical GIS data sets
- (Geographical) statistic data
- National laws
- Regulations
- Guidelines
- Sre Pok basin profile
- Projects activities (Danida project, GTZ...)

- Bilateral regional & multilateral agreements
- Publications, reports
- Reference documents
- Case studies
- Information, resources about capacity building
- Information about upcoming events
- National and international contacts

The initial recommendation for the technical format is:

- Documents (Microsoft office, PDF)
- Statistical data (Excel, Access, or HTML)
- Geographical Data (GIS raw data and ready rendered maps of different scale)

The initial recommendation for the publishing and updating schedules is:

- Each agency should define their own publishing and updating schedule.
- Data must be manageable by the publishing agencies to be adjusted to the custom schedules.

○ Conditions of Sharing

The initial recommendation is:

- The stored data is shared for free within the participating government agencies.

○ Security

The initial recommendation is:

- Data + Meta data is available to everybody.
- Data + Meta data is available to the participating agencies.
- Data + Meta data is available only to one agency.
- Data + Meta data is not available.
- Meta data is available to everybody, data is not available.

- Meta data is available to the participating agencies, data is not available.
- Meta data is available only to one agency, data is not available.

- Roadmap and Management of SPRBIS

The initial recommendation is:

- The Sre Pok RBO should be the central lead agency.

- Technology

The initial recommendation is:

- The Sre Pok RBO should be based on scalable internet technologies.

- Training, Coaching and Announcement

The initial recommendation is:

- Conduct Training and Coaching for participating data providers and line agencies on province and district level.
- Use data available from the MRC-GTZ base line study for training and coaching.

- The Sre Pok river basin information system development process is display in Figure 2

The key findings of the **fields of possible support and estimation of resources part** can be summarised as follows:

- There are fields and activities which could be supported by the WSMP.
- The actual system design and implementation depends on the future of the Sre Pok RBO.
- Dependent on the future of the Sre Pok RBO, a basic and sophisticated solution is presented (see chapter 6)

3 Existing Situation

From 2004 until June 2006, the project Integrated Water Resources Management in the Sre Pok River Basin was carried out by Danida. This project was the sub-component 3.1 of the Water Sector Program Support (Water SPS). The sub-component has attempted to assist the Government of Viet Nam (GoV) to implement sustainable water resources management in the Sre Pok River Basin, putting in place an important part of the national framework for the water sector and implementing key provisions of the Law on Water Resources at the river basin level.

The component was originally planned to last 48 months, but was later reduced to 25 months and ended June 2006.

The planned outputs of the sub-component have been:

Establishment of a river basin organisation

Establishment of effective data and information systems

Establishment of an integrated and participatory water resource planning process

Establishment of water resources regulation and management procedures

Capacity building and supporting model institutions and projects for small irrigation schemes

Importantly, the Danida project strongly supported the establishment of a river basin organisation (RBO) for the basin, an important institutional development, which has the potential to facilitate a more coordinated and effective approach to water resources management. The Sre Pok River Basin Organisation creates a legal framework for the inter-provincial governmental collaboration in Sre Pok.

It is mainly the outputs of the Danida project which have influenced the currently existing Sre Pok river basin data bases. And especially the output 1.2, *establishment of effective data and information systems*, is relevant for the establishment of the SPRBIS.

One result of the Danida project was the development of a simple website, which acts as a form of information system. This website went never public, but it is saved on 2 computers in Dak Lak.

When the Vietnamese side mentioned about the existence of data bases, it was mainly the above mentioned website, which stores information about the Sre Pok river basin, including geographical data sets (including Meta data) and statistical data. Additionally there exists a lot of data, geographical data sets, statistical data and reports on the computer and additional CD-ROMs of Mr Ha Pham Tan, technical advisor of the WSMP in Buon Me Thuot. This data does not only concern the MRC-GTZ project,

instead it provides a very good entry point and overview on existing information of different agencies and also different international cooperation programmes. (Note: It must be mentioned that during the survey, a lot of people answered that they find information in the information system of their own agency. But none of these systems could be reviewed in detail, due to limited time)

The existing data base is installed on 1 computer of the Sub-department for Water Resources within the Department of Agriculture and Rural Development (DARD) and on the computer of Mr Ha Pham Tan of the MRC-GTZ project.

The existing data base consists of:

A static HTML website, mainly in Vietnamese language (see Figure 1). Parts of the website are also available in English.

Maps as presented in the following table:

Map Name	Available Format
Soil map	Arc Map & Mapinfo
Existing Land use map	Arc Map & Mapinfo
Administrative map	Arc Map & Mapinfo
Subcatchment map	Arc Map & Mapinfo
Climate region map	Arc Map & Mapinfo
Evapotranspiration map	Arc Map & Mapinfo
Forest coverage map	Arc Map & Mapinfo
Hydrometeorology station map	Arc Map & Mapinfo
Irrigated area per total crop plants area	Arc Map & Mapinfo
Existing irrigation head works map	Arc Map & Mapinfo
Sunshine map	Arc Map & Mapinfo
Population density map	Arc Map & Mapinfo
Rainfall map	Arc Map & Mapinfo
Relief map	Arc Map & Mapinfo
Temperature map	Arc Map & Mapinfo
Groundwater map	Arc Map & Mapinfo
Maximum discharge modunlus map	Arc Map & Mapinfo
Runoff modunlus map	Arc Map & Mapinfo
Data by Commune map	Arc Map & Mapinfo
Dak Lak, Existing Land use map 2005	Mapinfo
Dak Nong, Existing Land use map 2005	Mapinfo
Gia Lai, Existing Land use map 2005	Mapinfo

Statistical data sets in form of meteorology data, as: Evapotranspiration, sunshine, humidity, temperature, wind, rainfall and runoff data. Most of these sets are available of the period between the years 1977 and 2004. The data sets are available in yearly, monthly and daily statistics.

Data of the base line study which was conducted by the WSMP.

Various reports and information of different origin, mainly unstructured. These documents are stored on the Laptop of Mr Ha Pham Tan and additional CD-ROMs.



Figure 1: Existing Static Sre Pok Website

The existing data base can be characterised by:

A one-time collection, arrangement and activity of relevant data. It seems that many of these activities have been driven by the Danida project. The existing data can serve as a very good entry point and overview of existing relevant information.

No clear institutionalised collaboration between the agencies on province and inter-province level in regard to the data base is recognisable.

As it seems that the existing data base is related to one-time activities, only a limited effort towards the sustainability and updateability of the data base can be recognised.

There is some exchange of data and information. But this exchange is mainly limited to the inside of an agency.

In combination with the review of the existing data bases, an overview of existing and used software was compiled. The different agencies rely mainly on the following software to get their work done:

Microsoft Office products

Web browsers like Internet Explorer or Firefox

MapInfo Professional

Arc-view, Arc-GIS

Instant collaboration tools like Skype, Yahoo Messenger, etc.

Microstation from Intergraph

Autocad

To identify the target groups of a SPRBIS, the decision makers, managers and technical staff have been considered in regards to their relevancy towards the project. This was mainly done based on the knowledge Mr Ha Pham Tan and Mr Minh Anh Nguyen. The following agencies have been identified as actors with some relevancy towards a SPRBIS.

Department of Natural Resources and Environment (DONRE)

Department of Agriculture and Rural Development (DARD)

Department of Statistics (DoS)

Centre for Hydro-meteorological Forecast

Department of Construction (DoC)

Irrigation Management Company(IMC)

Department of Industry (DoI)

Department of Transport (DoT)

Hydrogeological and groundwater Teams 704, 701, 707

Viet Nam National Mekong Committee (VNMC)

Electricity of Viet Nam (EVN)

Provincial People's Committees (PPCs) of the 4 provinces: Dak Lak, Dak Nong, Gia Lai and Lam Dong.

The main actors on province level are the Department of Agriculture and Rural Development (DARD) and the Department of Natural Resources and Environment (DONRE).

The mandate of DONRE is:

Implementing baseline study, inventory, assessment of water resources following the guideline of MONRE (Item 2.7.3 decision No 112/QĐ-UB of Dak Lak PPC dated 17/10/2003)

Implementing survey, assessment, land use classification and development land use maps. Cadastral database management. (Item 2.5.4 decision No 112/QĐ-UB of Dak Lak PPC dated 17/10/2003)

. The mandate of DARD is:

Implementing river basin management rules, explores and uses water resources by integrated water resources management after the water resources planning mechanisms and methodologies has been approved by higher authorities (MARD or MONRE) (Item 2.6.2 decision No 2155/QĐ-UB of Dak Lak PPC dated 24/11/2004)

The actors have agreed and started to cooperate with each other in a formal way, in the form of the Sre Pok River Basin Organisation (RBO), an agreement on the cooperation on water resources within the Sre Pok river basin. The establishment of this inter-agency and inter-provincial organisation was a long process and its existence cannot be underestimated.

The objectives of the Sre Pok RBO are [See Appendix I page 28]:

To promote and increase the productivity of all important water uses and sectors.

To apply measures for water use and water protection consistently throughout the Sre Pok River Basin and to recognise the impacts of upstream activities on downstream activities.

To avoid the unreasonable impact of any sector on other sectors and conversely to ensure as far as possible that the water needs of all sectors are maintained in a fair manner.

To ensure that the environment, human health and economic production are protected from adverse impacts of water pollution and the deterioration of the quality of water resources.

The Provincial People's Committees (PPCs) considered that the following organisations should be represented by permanent members on the board of the Sre Pok RBO.:

Electricity of Viet Nam

MARD

MONRE

The Viet Nam National Mekong Committee (VNMC)

These members will come from all of the 4 participating provinces.

In regard to the SPRBIS, there is also an important agreement. The PPCs have agreed to work to establish a water resources information base for the Sre Pok RB, which:

Links electronically and updates the data located within organisations of the four provinces.

Provides common access to the data, which will be used for river basin planning, to all participating organisations.

The current status of the Sre Pok RBO can be characterised by:

In the decision 2860/QD-BNN-TCCB dated 3 October 2006, it was decided by MARD that MONRE will not be a permanent member of the Sre Pok RBO. However, on the provincial level, there exists a close cooperation between DONRE and DARD. The integration of DONRE into the Sre Pok RBO has been started.

On the 8.11.2006 there was the first meeting of the Sre Pok RBO, which was held in Dak Lak. The RBO agreed to have one common meeting each year.

Currently the RBO is still in its early stages and some start-up activities still have to be done.

Just recently, one office within DARD of Dak Lak was assigned to be the permanent office of the Sre Pok RBO. It is located within the room of Mr. Chung.

The total budget for 2007 for the Sre Pok RBO from Vietnamese side is 30 Million VND. (30,000,000 VND = 1,870 USD)

The Sre Pok RBO is very important for the further progress of a SPRBIS, as it provides an institutionalised framework for cooperation between different the stakeholders and between different provinces. Currently there seem to be some discrepancies between MARD and MONRE on the permanent members of the RBO. These discrepancies do not exist on the provincial level and an integration of DONRE into the RBO has already started. But as this integration is not settled yet, it cannot certainly be predicted how fast the integration continues and how it evolves. Therefore, the solution scenario will discuss different options.

4 Expectations and risks

To ascertain the expectations, needs and opinions of the participating agencies, a questionnaire was developed, distributed and evaluated. This questionnaire proved as very useful tool for the definition of requirements and proposal of solutions. The questionnaire was distributed in two different versions, an executive version which contained 11 questions and a normal version with 31 questions. The normal version contains all of the executive questions.

For the sake of clarity, not all of these questions will be discussed here in detail; instead, this chapter presents the results of the questionnaire evaluation as needed to provide a

solution. A full version of the questionnaire, including a compact summary of the figures can be found in Appendix II page 33.

The questionnaire was distributed to 69 people in the following agencies and provinces:

Dak Lak:

Department of Natural Resources and Environment (DONRE)
Resource and Environment Planning Centre of DONRE
Department of Agriculture and Rural Development (DARD)
Forestry Sub-department of DARD
Water Resources Sub-department DARD
Department of Statistics (DoS)
National Institute of Agricultural Planning and Projection (NIAPP)
Centre for Hydro-meteorological Forecast
Team 704 Hydrogeology
Department of Planning and Investment (DPI)
Department of Science and Technology (DOST)

Dak Nong:

Department of Natural Resources and Environment (DONRE)
Department of Agriculture and Rural Development (DARD)
Forestry Sub-department of DARD
Water Resources Sub-department DARD

Gia Lai:

Department of Natural Resources and Environment (DONRE)

Lam Dong:

Water Resources Sub-department DARD
Department of Natural Resources and Environment (DONRE)

Kon Tum:

Department of Natural Resources and Environment (DONRE)

Khanh Hoa:

National Institute of Agricultural Planning and Projection (NIAPP)
Soil, Soil Environment and Manure Research Centre

The questioned people expressed their expectations about the proposed SPRBIS with answers to open text questions. The most frequent answers include:

Expectation	Occurrence
Sre Pok Website with relevant data and information	25
Information exchange	17
Biophysical Environmental procedures	15
Sustainable management of resources, development and planning	9
Monitor river basin status	7
Publish evaluation, reports and scientific information on the website	5
Usable for agricultural planning	5
Relevant legislation documents	4
Information on agencies and new documents	4
Impact monitoring for the river basin	4

The most frequent answers about the possible risks of such a SPRBIS include:

Possible Risks	Occurrence
Information not updated and of low accuracy	14
Not enough funding for the persons who are responsible for managing the data base and information system	12
Unauthorized access and usage of confidential information	10
The information is undependable	8
Virus, Hacker	8
To limited ability to supply to the public	5

For most of the asked people, the SPRBIS must include:

Must-have functionality	Occurrence
Continuous, timely, exactly data and no data overlapping	15
There must be a stable organization and up-to-date information	9
The implementing agency must have permission from the authority	8
Roadmap and master plan for river basin management	4

The questioned people need data as follows:

Data needs	Occurrence
Existing land use	16
Hydrometeorology data	14
Biophysical Environment data	11
Socio – economic development master plan	10
Existing irrigation and planning on water resources	9
Surface water resources and sub-catchments areas	7
Environmental resources information	7
Water usage for different sectors	7
Existing forestry resources	6
Sector development planning (forest, water resources, agriculture...)	6
Existing river environment management data	5
Geology data	4
Agricultural production in the national scope	4
Data about the national agriculture production market	4

They will need this data mainly to:

Data purpose	Mainly	Occasionally
Work implementation	40	8
Write report	29	18
Work planning	26	14
Research	23	22
Administration management	22	13
Data analysis	21	20
Development of proposals	21	28
Drafting of legal documents	20	17
To keep up to date with development and changes	14	21
Policy formulation	13	21

All, except one, of the questioned people answered that they would benefit from a SBRBIS.

Nearly all of the questioned people think that their agency could share some data; and their agency has also the authority to do so.

The clear focus of the sharing scope is within the own agency, followed by sharing with other government agencies.

The vast majority agrees on that there must one central agency which will be responsible for collecting, compiling, verification, laying out, storing and managing of data and information.

For nearly all agencies, the director must agree on all data and information which should be published.

To be able to share information, the questioned people say that they could need support for:

- Support to collect / compile missing pieces of information
- Support with Information Technology
- Support with Information Technology training

The vast majority of the questioned people would prefer to access the SPRBIS by Internet, followed by the local file system / intranet, CR-ROM and then hardcopies.

5 Solution Scenarios

Based on the outcomes of the conducted survey, a possible solution will be presented within this chapter. This solution will be presented in the form of a development process which has to be accomplished, in order to successfully improve the existing data bases on the Sre Pok river basin and to successfully implement and operate the SPRBIS.

The Sre Pok river basin information system development process needs to address topics like content, content structure, data quality, sharing conditions, security, training, management and technology. These topics will be discussed in detail below. A flow chart of this development process can be found at Figure 2.

The presented solution is only a proposal on which the participating agencies have to formally agree, during the development process. But as the presented solution is based on the outcomes of the survey, there can be already well-formed options which will speed up the further dialogue and decision making process.

5.1 Data Content, Structure, Format and Quality (incl. publishing + update schedule)

The data which is stored in the SPRBIS must be:

Relevant and comprehensive

Reliable

Timely

Accessible (to all authorised users)

Basin-wide (could be even wider, for instance Vietnamese wide, Mekong area or International).

To accomplish these characteristics, the participating actors must discuss and agree on different data aspects as:

Kind of content which should be managed and shared by the SBRBIS

Format and structure of the data.

Meta data which should be stored together with the actual data

Publishing and updating schedules for the data

Date quality assurance process

An initial recommendation for the content, based on the survey, is:

- Geographical GIS data sets
- (Geographical) statistic data
- National laws
- Regulations
- Guidelines
- Sre Pok basin profile
- SKAW baseline report
- Projects activities (Danida project, GTZ...)
- Bilateral regional & multilateral agreements
- Publications, reports
- Reference documents
- Case studies
- Information, resources about capacity building
- Information about upcoming events
- National and international contacts

An initial recommendation for the technical format is:

- Documents (Microsoft office, PDF)
- Statistical data (Excel, Access, or HTML)
- Geographical Data (GIS raw data and ready rendered maps of different scale)

An initial recommendation for the publishing and updating schedules is:

- Each agency should define their own publishing and updating schedule.
- Data must be manageable by the publishing agencies to be adjusted to the custom schedules.

5.2 Conditions of sharing

There must be a clear statement about the conditions of sharing the data and information.

An initial recommendation for sharing conditions is:

- The stored data is shared for free within the participating government agencies.

5.3 Security

Security is a very important requirement for the SPRBIS. The security model must be adequate and sufficient for the stored data. It is important to note that security is an ongoing process. On the one hand, the security features have to be considered during the system design phase, but also afterwards, during the operational phase. There needs to be sustainable resources to monitor and update the system.

An initial recommendation for the SPRBIS security model is:

- Data + Meta data is available to everybody.
- Data + Meta data is available to the participating agencies.
- Data + Meta data is available only to one agency.
- Data + Meta data is not available.
- Meta data is available to everybody, data is not available.
- Meta data is available to the participating agencies, data is not available.
- Meta data is available only to one agency, data is not available.

5.4 Roadmap and Management of SPRBIS

The MRC-GTZ will provide support and advice for the SPRBIS. But the SPRBIS will not be operated by the WSMP. Therefore there needs to be a clear roadmap and vision on how the SPRBIS will be integrated in the existing organisational landscape in order to ensure a sustainable mode of operation. There need to sufficient resources available to guarantee a long-term operation. These resources will have an impact on the system design.

In the survey, the questioned people clearly expressed their demand for one central agency which will be the lead agency for the SPRBIS and which will have responsibilities as:

Monitor, regulate and coordinate the complete process.

Support and advise the participating agencies

Monitor eventual data overlapping and gaps.

Work towards common guidelines on data formats and Meta data standards, taken the experiences of the ongoing activities into account.

Lead the discussion about the conditions of sharing

Observe the quality assurance process

Lead the discussions on how the available data can be used for watershed and river basin management.

An initial recommendation for the lead agency is:

- The Sre Pok RBO should be the central lead agency.

As described in chapter 3, the development progress of the RBO should be observed and evaluated. Before the actual system design and implementation phases are started, the question if the RBO is fully operational needs to be answered by the participating agencies. If the RBO is not operational and cannot fulfil its duties and responsibilities towards the SPRBIS, another leading agency needs to be selected. Depended on such an alternative leading agency, the system design must be adjusted.

During designing SPRBIS technical officers of SrePok RBO need participated, late when MRC-GTZ handover the system they can operation SPRBIS

5.5 Technology

There must be a decision about the implementing technology. During the survey, many people mentioned that the IS must be based on internet technologies. This does not mean that the SPRBIS must be immediately online and available on the Internet. But it must be clear, that the information system is scalable and internet-ready.

An initial recommendation for the used technology is:

- The Sre Pok RBO should be based on scalable internet technologies.

5.6 Training, Coaching and Announcement

After the implementation of the system, there needs to be some initial training and coaching on the SPRBIS. Such training can be related towards the usage and updateability of the system, data conversion and data quality assurance mechanisms, etc.

Target group of such a training and coaching can be all participating data providers and line agencies on province and district level, but also sole data users like Universities, etc.

During this phase, the official announcement on the SPRBIS is made. Such a public announcement should stimulate the collaboration and communication between the Sre Pok basin actors, but also beyond the basin.

Data which is already available by the MRC-GTZ project, like the base line data of the pilot watershed can be used during the training and coaching phase.

An initial recommendation for the used technology is:

- Conduct Training and Coaching for participating data providers and line agencies on province and district level.
- Use data available from the MRC-GTZ base line study for training and coaching.

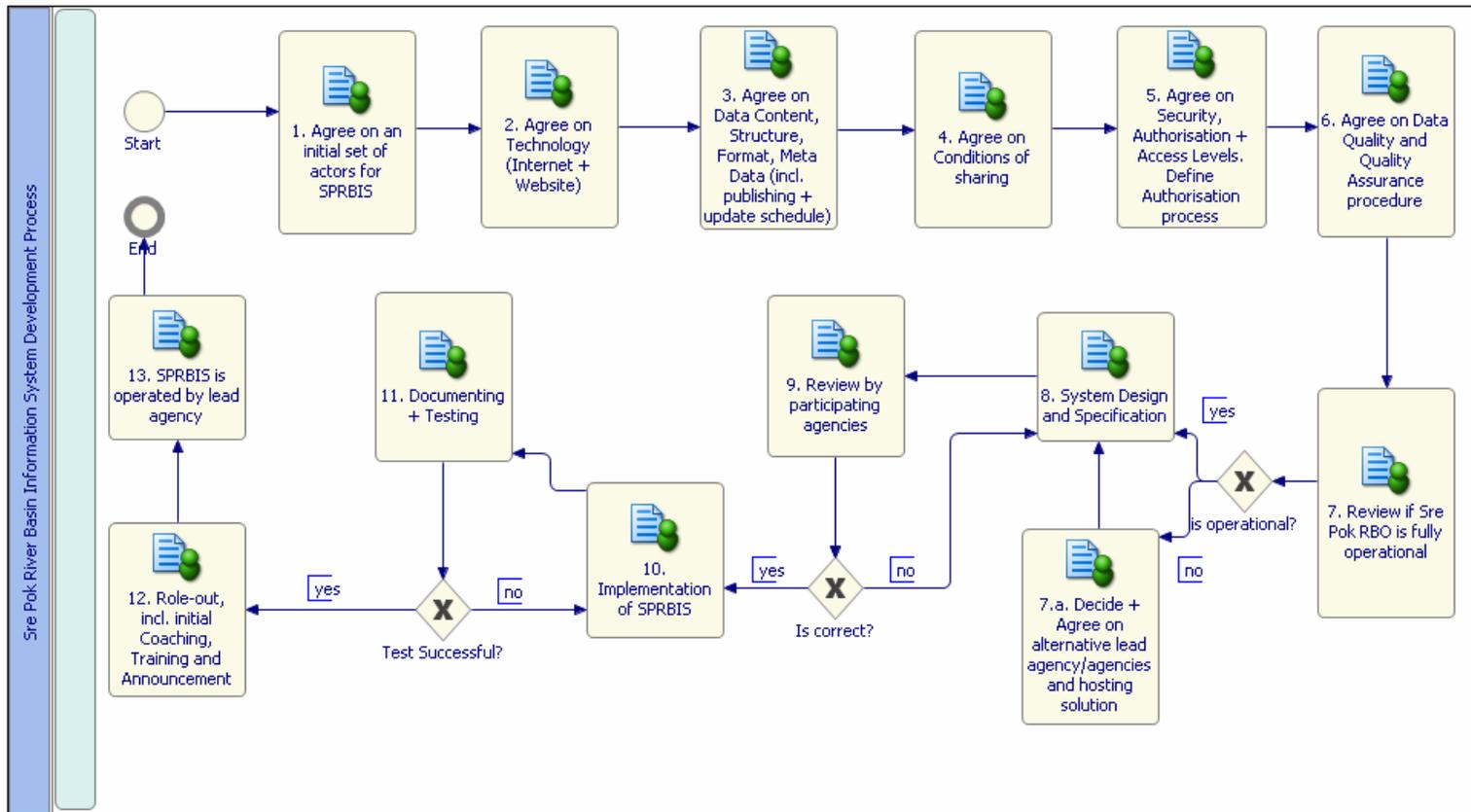


Figure 2: Sre Pok river basin information system development process

5.7 System design, implementation, documentation and testing

After the above mentioned decisions are made, the actual system design and implementation phases can be executed. There should be some feedback on the specified system design from the participating agencies.

Before the role-out phase, there needs to be done testing on the system. An important part of the testing can be the existing MRC-GTZ data of the pilot watershed.

Recommendations and Conclusion

- The SPRBIS can be an excellent tool for the support of decision makers towards a sustainable management of water resources in the Sre Pok river basin.
- The information system is a great opportunity because it can create more transparency on the available data, structures and actors.
- There is data, and the willingness to share that data available.
- The hierarchical structures within the government seem to support the establishment of the SPRBIS.
- The Sre Pok RBO seems to be the perfect location to host the SPRBIS. The information system fits in very well in the concept and objectives of the RBO. But there needs to be done some substantial work on the RBO itself unless the implementation of the information system can and should be started. The RBO is still a young organisation which is still in its initial stage and still subject to change. It has not started yet with its operational work. Therefore it is recommended that the SPRBIS still waits a while until the RBO is more settled and fully operational. Especially a more stable integration of DONRE, which has been started already, seems to be important.
- If the SPRBIS should become a solution which is also available for the public and organisations outside the Sre Pok river basin, it could help to create some understanding, awareness and finally more collaboration on a wider scale, for instance with the MRCS and the WSMP.

6 Fields of possible support and estimation of resources

There are fields and activities which could be supported by the WSMP. As the actual system design depends on the future of the Sre Pok RBO, different options will be presented within this chapter.

Independent from the complexity of the solution, the following activities could be supported:

There could be some support to the agencies by giving them advice on how to adjust their current processes about quality assurance, formats, standards and information technology. Such a support could be given by **Mr Ha Pham Tan and a local consultant like Mr Minh Anh Nguyen.**

Hardware support to the leading agency in the form of 1 computer, 1 scanner, 1 printer and setup support for an internet connection. This hardware is intended to be used for the initial installation and setup of the existing data base.

- Estimated costs: **2,000 to 4,000 USD**

For the hosting of the improved version of the SPRBIS an external hosting provider would be needed as the current internet reliability within the offices in Dak Lak is not sufficient. An external provider like GoDaddy (<http://www.godaddy.com/>), VPSland (<http://vpsland.com/>) or any other hosting provider which meets the technological requirements is needed.

- Setup fee: **200 USD**
- Estimated costs: **50 to 100 USD per month**

Support an introductory training and coaching for data users like universities and institutes in the 4 provinces.

- Estimated costs: **1,000 to 2,000 USD**

6.1 Basic-Solution:

A basic Internet-based IT system is implemented. Limited functionality, but also limited resources needed, as the future of the leading agency and therefore also the SPRBIS is mainly unknown.

Description	Estimated Resources National Consultant	Estimated Resources International Consultant
Designing phase	5 days	10 days
Implementation phase	15	20 days

Documenting and testing	20	20 days
Total	40 days	50 days

6.2 Sophisticated Solution (recommended)

A complex and sophisticated IT is implemented which meets the requirements and is looking forward to an effective, collaborative and communicative work environment within the Sre Pok river basin and beyond.

Description	Estimated Resources National Consultant	Estimated Resources International Consultant
Designing phase	5 days	20 days
Implementation phase	15 days	30 days
Documenting and testing	25 days	20 days
Total	45 days	70 days

7 Appendix I: Agreement for Water Resources Management Cooperation

SOCIALIST REPUBLIC OF VIETNAM
Independent – Freedom – Happiness

**THE PROVINCIAL PEOPLE'S COMMITTEES:
DAK LAK – DAK NONG – GIA LAI – LAM DONG**

**AGREEMENT
FOR WATER RESOURCES MANAGEMENT COOPERATION
WITHIN THE SRE POK RIVER BASIN**

SEPTEMBER 2005

Agreement for water resources management cooperation within the Sre Pok River Basin

Preamble

For the future benefit of the four province of Dak Lak, Dak Nong, Lam Dong and Gia Lai and the central highland region of Vietnam the PPCs of the four provinces enter into an agreement to coordinate the management of the water resources of the basin.

The PPCs of the four provinces of Dak Lak, Dak Nong, Lam Dong and Gia Lai (the provinces/the PPCs), share the territory of the Sre Pok River Basin, which forms one of the most important river basins in the central region of Vietnam. The PPCs recognise that the most effective water resources development and harmonised distribution of water benefits in the SPRB requires the water resources in the whole of the territory of the SPRB to be managed consistently and for each province to cooperate with the others in a common coordination arrangement.

The PPCs are responsible for many, although not all, water uses and water protection measures in the SPRB. These include irrigation, urban and industrial water supply, rural water supply, aquaculture and fisheries, tourism (add the others).

In addition, the PPCs consider that hydropower generation is one of the key water uses in the SPRB and that it should be managed consistently with the needs of other sectors and the health of the SPRB within Vietnam and downstream in Cambodia.

Matters to be covered

- Purpose of agreement
- Agreed objectives for water resources management in the Sre Pok River Basin
- Establishment of RBO, support and participation by the provinces
- River basin planning to be undertaken and provinces to participate and agree on common plans

Purpose of agreement

The following draft makes suggestions which may be included in an inter-provincial agreement between the provinces of Dak Lak, Dak Nong, Lam Dong and Gia Lai. The purpose of such an agreement would be:

1. to confirm the commitment of the provinces jointly to establish, support and participate in a river basin organisation for the Sre Pok River Basin;
2. to specify the main features of the RBO; and
3. to identify the actions that the provinces will take to establish, support and participate in the RBO.

Water management objectives

The PPCs agree to the following common objectives for water management in the Sre Pok River Basin as follows:

- to promote and increase the productivity of all important water uses and sectors,
- to apply measures for water use and water protection consistently throughout the Sre Pok River Basin and to recognise the impacts of upstream activities on downstream activities;
- to avoid the unreasonable impact of any sector on other sectors and conversely to ensure as far as possible that the water needs of all sectors are maintained in and fair manner;
- to ensure that the environment, human health and economic production are protected from adverse impacts of water pollution and the deterioration of the quality of water resources.

Establishment of river basin organisation (RBO)

In order to achieve the goals described in [article x of] this agreement, the PPCs resolve to establish an RBO for the Sre Pok River Basin which will coordinate the planning of water resources on a basin-wide basis and to make financial contributions to support the river basin organisation based on the participating area of each province.

The RBO will comprise a board which will recommend river basin plans to the central level and will agree to the actions to be recommended to the PPCs for coordinated planning and management of water resources of the Sre Pok River Basin.

The provinces agree that the board will be chaired by a member of one of the PPCs as agreed by all of the PPCs from time to time and that a vice-chair for the RBO board will be selected by the RBO board from time to time.

The RBO will be supported by an office which will provide technical and administrative support to the board of the RBO and will carry out the directives of the RBO board in respect of river basin planning and coordinated water resources management.

The PPCs consider that the following organisations should be represented by permanent members on the board of the Sre Pok River Basin RBO:

- Electricity of Vietnam
- The Ministry of Agriculture and Rural Development
- The Ministry of Natural Resources and Environment
- The Vietnam National Mekong Committee.

Participation in the RBO

The PPCs agree to approve the required legislation to implement the RBO with each province as follows:

- To nominate one member of the PPC as a member of the RBO board
- To assign other members to the river basin board from DARD, DONRE and other agencies as agreed by the provinces;
- To contribute members and technical inputs and resources, as agreed by the river basin coordinating committee from time to time;
- To adopt the water management measures, strategies and plans which the river basin coordinating committee agrees to from time to time;

- To implement the relevant parts of such water management measures, strategies and plans
- To direct the relevant provincial organisations to participate and contribute to the RBO as required by the board of the RBO from time to time;
- To provide information to the RBO on the status of and management of water resources within the territory of each province that lies within the Sre Pok River Basin and to share such information with the other provinces.

River basin planning

The PPCs agree to formulate, through the Sre Pok River Basin Organisation, a river basin plan with the following characteristics:

- A strategic guideline for managing the water resources of the Sre Pok River Basin in a coordinated manner;
- Water allocation and water protection guidelines and other water management guidelines as agreed from time to time;
- Procedures for decision-making on significant matters that affect water use, water allocation and protection, including the operation of structures that control the flow of water in the Sre Pok river and its major tributaries;
- Other matters of importance that the PPCs through the RBO board consider should form part of a river basin plan.

The PPCs agree to recommend river basin plans which have the support of all provinces and the key water sectors to the national level for authorisation and implementation.

The PPCs agree to implement the river basin plan within their territory and consistently with the overall planning for the Sre Pok River Basin;

The PPCs agree to establish a monitoring system for river basin planning and management and to report through the RBO on progress in implementing river basin plans and other agreed matters. The PPCs agree to ensure that their agencies provide the required information to assess progress in implementing the river basin plan.

Inter-provincial water resources data exchange system

The PPCs recognise that improved management of the water resources of the SPRB relies on the analysis of comprehensive data and information about water resources, water uses and their social, economic and environmental impacts. The PPCs agree to work to establish a water resources information base for the Sre Pok River Basin, which:

- Links electronically and updates the data in databases located within organisations of the four provinces;
- Provides common access to the data from databases by all participating organisations;

The data will be used for river basin planning and the databases will be accessible to all participating agencies.

The PPCs agree to take steps to set up such a water resources data sharing system and in due course to agree to the details of such a system for the mutual benefit of all the provinces. The PPCs further agree to seek the funding and support required to establish and maintain such a system.

International water management

The PPCs recognise the importance of the 'upper' Sre Pok River Basin located within Vietnam to the international arrangements for coordination of the Mekong River Basin, in which the Government of Vietnam is a participant.

The PPCs will work progressive, directly and through the RBO, with the national level and the VNMC to improve links and communication between the Vietnamese part of the SPRB and the Cambodian part of the Basin.

Provincial legislation required

The PPCs will consider and develop, as appropriate, legislation on the following matters, consistent with this agreement:

- Legislation establishing the offices of the RBO;
- Directives to the departments and organisations under provincial control that should participate with and cooperated with the RBO, to act in accordance with this agreement and legislation that establishes the RBO;
- An agreement on water resources data sharing for the purpose of river basin planning and management;
- Other legislation required to implement a water resources data sharing system for the Sre Pok River Basin.

FOR THE DAK LAK PPC

CHAIRMAN

NGUYEN VAN LANG

(Signed and Stamped)

FOR THE DAK NONG PPC

VICE CHAIRMAN

DO THE NHU

(Signed and Stamped)

FOR THE GIA LAI PPC

VICE CHAIRMAN

HOANG CONG LU

(Signed and Stamped)

FOR THE LAM DONG PPC

VICE CHAIRMAN

HOANG SI SON

(Signed and Stamped)

8 Appendix II: Questionnaire and Summary (normal version)

Province	Total				
	58				
Page	Question				
1	Contact Details [text]				
	Title (Mr, Ms, Dr, Prof, etc):				
	First name, family name:				
	Academic background:				
	Position:				
	Organization:				
	Programme / project:				
	Address:				
	City:				
	Country:				
	Tel:				
	Fax:				
	E-mail address(es):				
	Web address(es):				
2	Type of Organisation [x]	x			
	Inter-government agency	0			
	Government agency, national level	5			
	Government agency, province level	47			
	Government agency, district level	1			
	Academic institution (university etc)	1			
	Research institution	3			
	Multilateral organisation	0			
	Bilateral organisation	1			
	International NGO	0			
	National NGO	0			
	Community Organisation	0			
	Other, please specify:	0			
	Other, please specify: [copy text if any] Blank				
3	What is the scope of your organisation? [a,b,c]	Mainly	Occasionally	Never	blank
	International	0	16	24	18
	Regional	2	30	12	14
	National	9	34	4	11
	Local	55	3	0	0

	Srepok river basin	16	22	7	13
4	When you search information related to your work, for what do you normally need these? [a,b,c]	Often	Occasionally	Never	blank
	Development of proposals	21	28	6	3
	Preparation of presentations / papers	11	29	11	7
	Research	23	22	7	6
	Identification of financing sources	4	11	31	12
	Policy formulation	13	21	13	11
	Drafting of legal documents	20	17	15	6
	Work planning	26	14	12	6
	Work implementation	40	8	7	3
	Write report	29	18	6	5
	Administration management	22	13	14	9
	Data analysis	21	20	10	7
	Mapping	11	22	16	9
	Designing irrigation schemes	10	6	31	11
	To keep up to date with development and changes	14	21	13	10
	To find alternative solutions to problems	7	21	19	11
	To identify people sharing the same interests	12	22	15	9
	Other, please specify:	0	3	6	49
	Other, please specify: [copy text if any]	0	0	0	58
5	What kind of data and information do you need, and how difficult is it, to be accessed? [a,b,c]	Easy to access	Difficult to access	Impossible to access	blank
E, A (E=Excel, W=Word, G=GIS, WWW=Internet, A=Access) [Format added by Ha,FL]	Hydrometeorology data	7	7	0	44
E,A,W,G	Surface water resources and sub-catchments areas	1	6	0	51
E,W,A,G	Water usage for different sectors	2	4	1	51
E,W,A,G	Existing forestry resources	2	4	1	51
E,W,A,G	Existing land use	5	11	0	42
E,W,A,G	Existing irrigation and planning on water resources	5	4	0	49

W,E	Socio – economic development master plan	4	6	0	48
E,W,A,G	Biophysical Environment data	5	6	0	47
E,G	Region planning map	0	1	0	57
E,A,W,G	Groundwater dynamics data over time	0	1	0	57
W	Information about environment resource management software	1	1	0	56
W	Guidelines on usage and management of environmental resources	1	2	0	55
W	Environmental resources information	1	5	1	51
E,W,G	Base line data for ecological planning	0	3	1	54
W	The methodology on waste processing for the manufactory sector	0	0	1	57
E,A,W,G	River and stream attributes and parameters	0	2	1	55
W, WWW	Information on new technology about environmental protection	1	1	1	55
W,E,G	Existing river environment management data	0	4	1	53
W	Sustainable river basin planning	0	1	1	56
W,WWW	development resources	0	0	1	57
W,WWW	Factors related to the ecological environment in the watershed	1	1	1	55
W	Resolutions to solve bad impacts on watersheds	1	1	0	56
E,W,G	Sector development planning (forest, water resources, agriculture...)	2	4	0	52
E,A,G,W	Geology data	1	3	0	54
G	Remote sensing data	1	1	0	56
W,WWW	General Information on new materials	0	1	0	57
W,WWW	General information about policy and legislation	2	0	0	56
W	General knowledge related to work	1	0	0	57
W	Policy regulations issues related to daily work	0	1	0	57
HC,W,WWW	News	1	1	0	56
E,A,W,G	Agricultural production in the national scope	0	4	0	54
W,WWW	Production activities in the region and in the world	0	1	2	55
W,E,WWW	Data about the national agriculture production market	0	4	0	54
W,E,WWW	Data about the world agriculture production market	0	1	1	56
W	Processing and methodology on seed production	0	2	0	56
W	Information on post-harvesting and preservation technologies	0	2	0	56
W	Legislation documents	1	1	0	56
E,W	Poverty household data on the 132, 134 programmes	0	2	0	56

E,W	Implementing the 661 programme in project management unit (PMU)	1	0	0	57
W,E,G,WWW	Information about programmes, projects, activities in the province	0	1	0	57
W,E	Information on budget and funding resources for science	0	1	0	57
W,E	Number and expertise of scientists in the province	0	2	0	56
W	Workshop documents	0	3	0	55
W	Information about related science and research organizations on national level	1	0	0	57
W	Information on sustainable forestry management at basin level of some other areas	0	2	0	56
W	Related legislation documents	1	0	0	57
W	Roadmap on Information development	0	1	0	57
W,E	Plants data on all levels	0	2	0	56
E,W,A,G	Household living standard and the gap between the rich and the poor	0	2	0	56
E,W	Data on existing services and services development	0	1	0	57
W,E	Socio-Economic data of the population and population quality	0	1	0	57
W,E	UTM coordinate system	2	1	0	55
W,E	Soil classification	0	1	0	57
W,E,G	Information on soil types cultivation	0	1	0	57
	Other, please specify: [copy text if any]	0	0	0	58
6	How do you retrieve the data and information you need for your work? [a,b,c]	Mainly	Occasionally	Never	blank
	Find it on the Internet	28	26	1	3
	Instant Collaboration tools, like Yahoo Messenger, Skype, Google Talk	14	28	13	3
	Email mailing lists	7	23	22	6
	Formal channels within my own agency	24	14	15	5
	Informal channels within my own agency	10	22	23	3
	Information System or data base of my own agency	31	11	12	4
	Shared file system of my own agency	35	9	10	4
	Formal channels with other government agencies	6	23	27	2
	Informal channels with other government agencies	3	14	36	5
	Formal channels with other private companies	4	21	28	5
	Informal channels with other private companies	3	17	33	5
	Data bases of other government agencies	3	16	35	4
	Formal channels with other NGOs	2	11	40	5

	Informal contacts with other NGOs	3	8	42	5
	CDs	14	30	11	3
	Books	32	18	5	3
	Subscription journals	20	26	9	3
	My own organisations library	12	15	25	6
	Other libraries	4	30	19	5
	Conferences / workshops	13	38	4	3
	Study tours	8	39	7	4
	Training events	7	35	8	8
	Other, please specify:	0	2	4	52
	Other, please specify: [copy text if any]	0	0	0	58
7	How would you characterize the quality of the data you currently use? [a,b,c]	Always	Mostly	Rarely	blank
	The quality of the data is sufficient for my work	7	34	15	2
	The data is up-to-date all the time	10	29	16	3
	The data is accurate enough	4	36	14	4
	The data is reliable	5	41	9	3
	The data is relevant for my work	13	32	9	4
	Other, please specify: [copy text if any]	0	0	0	58
8	Is your agency the publishing authority of some data and information? [a,b]	yes	no		blank
	Yes/no	48	10		0
9	If your agency publish some data and information, could you please specify what kind of data and information you currently publish?	X			
W,E,A,G	Geology data	2			
W,E,A,G	Hydrogeology data	4			
W,E,A,G	Geology Engineering data	2			
W,E,A,G	Environmental geology data	1			
W,E,A,G	Urbanisation geology data	1			
W,E	Evaluation data on environmental management in the basin	6			
W,E,G	Reports on existing land use	2			
W,E,G	Inventory data of natural resources	4			
W,E	Reports on land use planning	4			
W,E	Agricultural production data	2			
W,E	Plants cultivation data	1			
W	Plantation, management and forest protection data for the 661, 178 and 5 million hectare programmes	2			

W	Reports on science and technology research	5			
W	Documents, forms and guidelines for science and technology research	2			
W	Reports, executive reports	2			
W,E	Biophysical environment, socio-economic data	2			
W	Related programmes and projects data	4			
W,E,G	Forestry resources data over time	1			
W,E	Information about forest fire forecast	1			
W,E	Deforestation status data	1			
W,E	Intellectual property data	1			
W,HC	Science and technology information for the public	2			
HC	Soil science, fertilizer, environmental magazine	3			
W,E,G	Water resources data over time	1			
W,E,G	Data about existing irrigation schemes	3			
W,E	Agricultural extension services	1			
W,E	Changes of agriculture mechanisms	1			
W,E	Socio – economic information by year, quarter, month	2			
HC	Statistic books	1			
10	With whom do you currently share data and information? [a,b,c]	Mainly	Occasionally	Never	blank
	With other persons within my own agency	37	15	5	1
	With other national government agencies	4	15	35	4
	With other foreigner projects	2	27	26	3
	With other national private companies	3	31	23	1
	With other international private companies	1	4	50	3
	With other national NGOs	2	17	34	5
	With other international NGOs	2	9	41	6
	With everybody, for instance via the Internet	3	21	29	5
	Other, please specify:	0	1	15	42
11	11. Do you think that some of the data you currently use could be shared in the future with others? [Yes/no]	yes	no		
		52	6		
12	12. If you could share some data in the future, what kind of data would that be? [Text]	x			
	Mineral geology data	3			
	Hydrogeology data	7			

Engineering geology data	2
Urbanisation geology data	1
Environmental geology data	3
Information on soil resources	3
Report on land use planning	7
Approved (Environmental impact assessment) EIAs	5
Some reports	5
Statistic data	2
Data on existing irrigation schemes and water supply	3
Rural sanitation data	1
Related local policies	2
Sector survey data	1
Information on agricultural production	5
Executive report on 661 programme and forest land allocation according to the 178 decision	1
List of programmes, researches	2
Information about expert expertises and their abstracts	2
Forestry resources data over time	3
Forest prevention and forest fire prediction data	1
Legislation documents	1
Science and technology information	1
Strategy on agriculture and forestry development	2
Socio – economic data	2
Soil data	3
Information about agriculture and rural projects	1
Consultation information on technological aspects of agricultural production	1
Existing irrigation scheme data	3
Information on 3-type forestry planning	1
Water resources data	1
	0

13	Could you please specify with whom you could share this data in the future? [a,b,c]				
		Mainly	Occasionally	Never	blank
	With other persons within my own agency	38	16	3	1
	With other national government agencies	7	23	23	5
	With other foreigner projects	2	27	23	6
	With other national private companies	3	34	15	6

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26/03/2007

	With other international private companies	0	17	34	7
	With other national NGOs	1	20	30	7
	With other international NGOs	0	17	34	7
	With everybody, for instance via the Internet	3	28	19	8
	Other, please specify:	0	2	12	43
	Other, please specify: [copy text if any]	0	0	0	58
14	What are the conditions for data sharing and management? [a,b,c]	Very important	Important	Not important	blank
	I / my agency must be able to add data and information	8	32	10	8
	I / my agency must be able to change data and information after it is published	6	29	15	8
	I / my agency must be able to revoke any published data and information all the time	8	18	23	9
	There must be one central agency which will be responsible for collecting, compiling, verification, layouting, storing and managing of data and information	29	14	12	3
	Data and information can only be stored in my own agency's data base and information system, but can be made accessible to authorized others.	15	23	12	8
	Other, please specify:	0	5	8	45
15	What are the legal conditions for data sharing and accessibility? [a,b,c]	Yes	Don't know	No	blank
	I / my agency must make all data and information available to the public	20	15	21	2
	I / my agency could make all data and information available to the public without any legal concerns	12	20	21	5
	The director of my agency must agree on all data and information which should be published	55	0	1	2
	The director of another agency must agree on all data and information which should be published	28	16	10	4
	There is a clear statement about legal issues of data and information sharing within my agency	36	10	7	5
	Other, please specify:	1	4	7	46
16	Could the data and information be shared free of charge? [x]	yes	no		
		45	13		
17	If you / your organisation would be able to share information, would you need support to do so? [a,b,c]	Much Needed	Some Needed	Not Needed	blank

	Support to collect / compile missing pieces of information	41	11	5	1
	Support to verification of existing information	25	24	8	1
	Support related to edit / streamline content of existing information	27	19	10	2
	Support to information layout / packaging	24	21	10	3
	Support with Information Technology	39	14	3	2
	Support with Information Technology training	40	13	3	2
	Other, please specify:	1	2	8	47
	Other, please specify: [copy text if any]	0	0	0	58
18	Who is responsible in your agency for the collecting, compiling, verification, editing, laying out, storing and managing of data and information? [a,b,c]	Always	Mostly	Never	blank
	We have a specific division, who is in charge of doing these tasks	24	21	10	3
	Each technical officer of our agency is responsible for doing these tasks	21	31	3	3
	Some individuals, who are known for their skills on these tasks	16	33	7	2
	External consultants	0	10	43	5
	Some foreigner projects under your agency	0	8	45	5
	Other, please specify:	0	1	11	46
	Other, please specify: [copy text if any]	0	0	0	58
19	Did your agency formally agree on some data standards, regarding the format or structure of the data? [x]	x			
	Yes, I use them	23			
	Yes, but I don't use them	7			
	Yes, but I cannot use them, because they are not related to my work	4			
	I don't know	23			
	Other, please specify:	0			
		3			
20	If your agency has some data standards, for what kind of data are they used? [text]	x			
	Geology survey	2			
	Hydrogeology and geology engineering survey	2			
	Geology environmental and urbanisation geology survey	2			
	Procedures about correctness and high accuracy of measurements	1			

	Data must be analysed with statistical methods	4		
	Must be checked by appropriate authorities	1		
	GIS data	5		
	All information of a sectors should be on the filing system (LAN)	3		
	Technical standard for coffee and rubber production	1		
	Guideline on administrative documents system (format + structure)	1		
	Executive result 661programme in the province (format + structure)	2		
	Science and technology data information structure (format + structure)	1		
	Socio-economic standard data	2		
	Socio-economic policy standard data	3		
	Existing irrigation scheme standard data	2		
21	Do you have access to the Internet? [x]	x		
	Yes, at my desk	41		
	Not at my desk, but somewhere in my office	8		
	Not yet, but I expect to have Internet access soon	7		
	No	0		
	Other, please specify:	1		
		1		
22	Which of the following statement is true about your emailing patterns? [x]	*		
	I don't have an email account	5		
	I have an email account, but I don't need it for my work	3		
	I have an email account and I use it occasionally	39		
	I cannot live without emailing anymore	11		
	Other, please specify:	0		
23	What kinds of Software do you use and need for your work? [a,b,c]	Mainly	Occasionally	Never
		blank		
	Web browser, like Internet Explorer or Firefox	27	19	9
	MapInfo Professional	15	26	11
	ESRI ArcGIS	4	12	30
	Mike BASIN	4	5	39
	Microsoft Office Word	49	5	2
	Microsoft Office Excel	48	7	1
	Microsoft Office Access	9	29	14
	Microsoft Office PowerPoint	19	19	16
	OpenOffice	5	15	27

	Email client, like Outlook, Outlook Express, Eudora, Thunderbird	6	26	20	6
	Instant Collaboration tools, like Skype, Google Talk, MSN Messenger	14	27	13	4
	Microstation (Intergraph)	10	17	24	7
	Autocad	11	21	21	5
	Photoshop, paint, proshow	3	28	22	5
	Other, please specify:	0	2	5	51
	Epanet (Hydraulic on urban water supply system software)	1	0	3	54
	SAP	1	0	2	55
	Science management	2	1	0	55
	SPSS	0	2	0	56
	Adobe Reader (7.0)	0	1	0	57
	ACD see (6.0)	0	1	0	57
	Nero Startsmart	0	0	1	57
	Hydrology calculating software	1	0	0	57
24	Do you think that you could benefit from such a shared data base? [yes/no]	yes	no		
		57	1		0
25	How would you prefer to access such a proposed Sre Pok River Basin data base and information system? [a,b,c]	Most preferred	Would be okay	Least preferred	blank
	By Internet	41	12	2	3
	By local file system or intranet of my own agency	23	24	5	6
	By local file system or intranet of another agency	8	24	18	8
	On a CD-Rom	21	21	10	6
	Printed hardcopies	20	24	9	5
	Other, please specify:	2	0	7	49
	Other, please specify: [copy text if any]	1	0	0	57
26	What are your expectations about such a proposed Sre Pok River Basin data base and information system? [text]	*			
	Information exchange	12			
	Biophysical Environmental procedures	10			
	Sre Pok Website with relevant data and information	19			
	Publish evaluation, reports and scientific information on the website	4			
	Information on agencies and new documents	4			
	Monitor river basin status	5			

	Sustainable and management resources development planning	7	
	Relevant legislation documents	4	
	Access free	1	
	Usable for agricultural planning	4	
	Development of changes for agricultural mechanisms/products	3	
	Information on rural regulations	2	
	Information about forestry land allocation	3	
	Forestry and basin management data over time	3	
	Impact monitoring for the river basin	2	
	International agreement and commitment to river basin protection	3	
	Monthly update of data	3	
	Related conference and workshop	1	
	Database system should be operative as soon as possible	3	
27	What do you think are the possible risks of such a Sre Pok River Basin data base and information system? [text]	*	
	Not enough funding for the persons who are responsible for managing the data base and information system	6	
	Unauthorized access and usage of confidential information	7	
	Information not updated and low accuracy	10	
	The information is undependable	7	
	Sector development roadmap [It's not clear what this answer should mean, Ha,FL]	2	
	No agreement from leading agencies	2	
	Little known and nobody is interested in the data base system	2	
	To limited ability to supply to the public	2	
	Virus, hacker	4	
28	What are the must-have requirements for the Sre Pok River Basin data base and information system? (Otherwise your agency cannot/will not support any further planning and development) [text]	*	
	There must be a stable organization and up-to-date information	9	
	There must be enough funding	2	

River and stream parameter data details by season and potentiality must be published	2
Roadmap and master plan for river basin management	4
New statistic data	1
GIS data	3
Relevant legislations	2
Continuous, timely, exactly and no data overlapping	15
The implementing agency must have permission from the authority	8
Enough equipment	2
Free Access	1
Multipurpose information	2
Publish news about nation and international action programme in river basin	1
Donor support needed	1
Good communication and education on river basin protection	1
The publication of data must be permitted	1
Clear planning and data demand for the data base system	1
River basin information sharing	2
Basin level scope and updating about changes within the basin	1
Good data base structure	1

29	What kind of content /information /resources /data bases should be included in the Sre Pok River Basin data base and information system? [a,b,c]	Very important	Important	Not important	blank
	National contacts	20	25	8	5
	Competent national authorities	25	24	4	5
	International contacts	14	29	10	5
	Relevant websites	16	31	8	3
	National laws	33	19	2	4
	Regulations	32	18	4	4
	Guidelines	23	23	7	5
	Bilateral regional & multilateral agreements	16	27	8	7
	Publications, reports	15	33	6	4
	Reference documents	13	36	6	3
	Case studies	18	30	5	5
	Information, resources about capacity building	22	21	10	5
	Geographical GIS data sets	26	20	7	5
	(Geographical) statistic data	35	14	5	4
	Information about upcoming events	27	21	5	5

General news	9	32	9	8
Discussions	7	34	10	7
Other, please specify	0	1	3	54
	0	0	0	58
	0	0	0	58

30	Do you have any additional comments, which have not been covered above? [text]	*		
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Identify all data collecting agencies. Avoid overlapping.	4		
Risk management	1		
Benefit must correspond with the mandate of the information system	3		
Introducing some/other Mekong resources	1		
Methodology to develop/calculate forest price	1		
Database handover after project	1		
The finished information system will act as an exchange forum	1		
Add surface and groundwater quantity and quality data	2		
Capacity building to use new technology	1		
	0		
	0		

31	Would you like to recommend any other people who you think should be interviewed [text]	*		
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Nguyen Luu - 704 Agency Hydrogeology	2		
Executive persons	5		
Local government within river basin	1		
Farmer depend on river basin	1		
Some agricultural officer in the district level and province level	1		
Dr Bao Huy - Agroforestry department Tay Nguyen University	0		
Phạm Hữu Hào - Director of Sub department fro water resource - DARD Dak Nong	2		
Nguyen Van Xuan - Vice director DARD - Dak Lak	0		
Le Viet Thuan - Head technical section of Sub department fro water resource - DARD Dak Nong	1		
Trinh Van Tuong Head disaster management section of Sub department fro water resource - DARD Dak Nong	1		