

Lao People's Democratic Republic

Peace Independence Democracy Unity Prosperity

Ministry of Natural Resources and Environment (MONRE) Department of Water Resources (DWR)

National Integrated Water Resources Management Support Program (ADB TA 7780)

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S Outcome Study Report &

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Abbreviations

ADB	Asian Development Bank
AFO	Agence Française de Développement (French Development Agency)
CPD	Continuing Professional Development
CSO	Civil Society Organisation
CTA	Chief Technical Advisor
DAFO	District Agriculture and Forestry Offices
DESIA	Department of Environmental and Social Impact Assessment
DERM	Department of Enrest Resources Management
DIPD	Department of Land Planning and Development
DMH	Department of Meteorology and Hydrology
DONRE	District Office of Natural Resources and Environment
DWR	Department of Water Resources
FA	Executing Agency
EIA/SIA	Environmental Impact Assessment/Social Impact Assessment
EMSP	Environmental Management Support Programme
FES	Eaculty of Environmental Sciences (NI IoI.)
FW/R	Faculty of Water Resources (FWR)
GIS	Geographic Information System
НМТА	Technical Assistance for Canacity Building in the Hydropower and Mining Sectors
	Project
IA	Implementing Agency
IMWI	International Water Management Institute
IRBM	Integrated River Basin Management
IWRM	Integrated Water Resources Management
JICA	Japan International Coorporation Agency
KKU	Khon Kaen University
LNMC	Lao National Mekong Committee
LWU	Lao Women's Union
M&E	Monitoring and Evaluation
MAF	Ministry of Agriculture and Forestry
MEM	Ministry of Energy and Mines
MOF	Ministry of Finance
MOH	Ministry of Health
MoNRE	Ministry of Natural Resources and Environment
MPI	Ministry of Planning and Investment
NGD	National Geographic Department
NN	Nam Ngum (River Basin)
NIWRMSP	National Integrated Water Resources Management Support Program
NNRBCS	Nam Ngum River Basin Committee Secretariat
NREI	Natural Resources and Environment Institute
NUoL	National University of Laos
PAFO	Province Agriculture and Forestry Offices
PIU	Program Implementation Unit
PMU	Program Management Unit
PONRE	Provincial Office of Natural Resources and Environment
RBCS	River Basin Committee (Secretariat)
SEDP	Socio-Economic Development Plan
ТА	Technical Assistance
TNA	Training Needs Assessment
VTE	Vientiane
VV	Vang Vieng
WREA	Water Resources and Environment Administration

Executive Summary

1. The NIWRMSP **Outcome Study** has been carried out as an add-on to the project's internal M&E system, which had shown to be limited in capturing the outcomes of the project due to time constraints. The study covers all 4 project components and focuses on summarizing information on the project indicators and further key issues concerning outputs, outcomes, impacts and sustainability. The reported findings will be integrated into the Program's Final Report.

- 2. Before data-collection, 3 **preparatory steps** were carried out:
 - 1) Understand the agreed indicators:

Since there were changes of indicators over the course of the project, firstly the agreed version had to be identified. Furthermore, it is important to clearly define some of the indicators, as the initial contents were revised during actual implementation (for details on each indicator, see Tables 2 for the originally agreed version and Table 3 for a finalized version, including indicator reporting).

2) Design Results Models for all four Components (see Annex 2)

To complement the project's indicators, for each of the 4 components, all the main project activities have been analyzed in terms of the outputs and outcomes which should (in theory) be achieved. This was done in participatory workshops with all key stakeholders and recorded as visualized Results Models. (see **Annex 2**)

3) Define the methods of data-collection, interviewees and questionnaires

These theoretical model as recorded in the Results Models was stringently followed in further processes of the study: decided on the data-collection tools, interviews and concrete guide-questions to ask.

- 3. The following data collection tools and sources of information were used:
 - 89 stakeholder interviews with consultants and staff from national, provincial and district level government organizations, NUoL and the private sector;
 - An additional Tracer Study of 55 C1 Training Participants;
 - A Tracer Study with 6 university students (out of 44 attempted to contact);
 - Document review as identified in the Results Models; and
 - Relevant statistics provided by DWR and NUoL.

Study Limitations

4. These data-collection tools were able to provide most of the envisioned information. However, technical analyses of the quality of produced outputs has not been conducted. Also, the details of implementation processes, management issues and overall design will only be briefly discussed. The report will focus on depicting the quality of outputs and outcomes of those activities, which had been carried out at the time of data-collection and is mainly based on the knowledge, opinions and observations by interviewed stakeholders.

NIWRMSP – OVERALL

5. NIWRMSP has undergone several **fundamental changes** in its lifetime, including the split up of Components 2.1 and 2.2, the relocation of the Nam Ngum River Basin Secretariat to Vientiane Province and several other changes in the Log-frame. Furthermore, in its **design**, water related capacities and (data) systems in Lao PDR had been overestimated, and therefore, some approaches and goals had to be revised. Despite changes were made to the set of **indicators**, the finally agreed set did not emphasize the increased importance of the non-Component 2.2 Components. For example, some indicators were retained but were not implemented, while several other indicators were not formulated appropriately. There appears to be some mismatches between the logframe and implementation and, as a general rule, indicators were not measured properly by the project's output oriented **M&E system**. There were few **gender**-specific activities and no gender mainstreaming, but having drafted the Gender Action Plan, this sets the foundation for the implementation of gender mainstreaming activities in the future. In fact, most Component 1 activities tried to balance the female trainees even though the proportion of female staff is much less than male staff.

6. One of the major problems faced by the project was the **low implementation rates in the first two years** due to the counterparts' struggle with ADB financial procedures, institutional issues and ineffective communication with the consulting teams. Then, fundamental changes in financial processes and changes in consultant teams initiated considerable activity implementation.

7. Two out of seven DWR Divisions reported **major overall improvements** in their work due to NIWRMSP. The Training and Awareness Center is now able to well fulfill their role. It has been approached by local level organizations to provide training and actively attempted to acquire funding. The Administration and Planning Division has significantly increased their conceptual knowledge in IWRM and raised their number of annual proposals from previously 5 to 78 for the fiscal year 2014/15. After this Outcome Study was conducted, five more key trainings were held and an additional of over 90 staff were trained.

8. This report is furthermore structured following the NIWRMSP's 4 Components.

COMPONENT 1: CAPACITY BUILDING

9. Outreach and trainings to a diverse group of stakeholders is a major priority for Component 1 of the project. Trainings were implemented since early 2014. The identification of actually implemented trainings were only partly based on the Training Needs Assessment conducted prior to training implementation, but could improve on more linkages to IWRM and organizational analysis.

10. In total, 20 different trainings relating to water quality management in Lao PDR have been carried out with more than 830 participants (thereof around 24% women) ranging from small-scale (with 14 participants) to large-scale trainings (as many as 77 participants).

11. **Participants** had a variety of backgrounds. They were affiliated with the DWR (103 participants) from 7 different divisions, whereby the majority of participants were technical staff (others being Unit Heads, Directors, Deputies, etc.); with MoNRE (32 participants) from around 9 different departments (amongst these were DESIA, DFRM, NREI, DMH, etc.), whereby about half were with technical background; with PoNRE (197 participants), from

around 17 different Provinces, around 2/3 were represented by technical staff; and with DoNRE (85 participants) from more than 30 districts, whereby around 2/3 were technical staff. Around 54 members of staff (mostly lecturers) came from a number of NUoL departments, mainly from the FWR and FES. There were relatively less participants from other national Ministries (24 participants, mostly from MEM, while MOH, MPI, MAF and LWU were also represented. There were around 10 technical staff), provincial Line Agencies (15 participants, mainly from the Energy and Mining Department as well as from PAFO) and district Line Agencies (14 participants, amongst others from DAFO, MEM and Public Works. The least represented were the development sector (20 participants), Village Authorities (13 participants) and the private sector (9 participants). Around 57 staff from the NIWRMSP also took part in the trainings.

12. The following table summarizes trainings, number of participants, participants' ratings of the training (on a 1-10 scale) and the main contents (**Table 1**). A detailed version of the table can be found in **Annex 6**.

	NO	TOPIC OF THE TRAINING	TRAINEES (F/M)	RATING	MAIN TRAINING CONTENTS
INTEGRA- TED WATER RE-	1, 5, 9	IWRM Framework Training for Central, Southern and Northern Region	47 (8/39) 53 (17/36) 59 (14/45)	8.5 7.5 9	Introduction to IWRM principles, tools and regional best practice, discussion about regional water management issues, connections
SOURCES MANAGE- MENT (IWRM)	10	IWRM EbA: Exchange Visit and MoNRE Demonstration Site Center Proposal Development	14 (3/11)		Understand about participatory planning, about adoptions at community level, application of suitable measures at the MoNRE demonstration site
	3	Integrated River Basin Management and River Basin Planning	41 (12/39)	8	Introduction to concepts and tools of IRBM, information sharing on critical experiences in IRBM planning, adoption of concepts and tools, connections
RIVER BASIN	2	Project Cycle Management	41 (17/24)	8.5	Understand Logical Framework Analysis, planning cycles, monitoring & evaluation, roles/ responsibilities
MANAGE- MENT	7, 8	River Basin Knowledge Training for C and N and S Regions	77 (17/60) 49 (19/30)	6 8	Introduction to key principles of river basin development and establishment of a 'river basin profile'
	20	Leadership building and Communication Training for NNRBCS	22 (3/17)		Leadership skills, team building, communication, support the drafting of a NNRB Communication Plan
	11	Sharing Knowledge; Websites Building and Management	24 (8/16)		Help NNRBCS to create, operate and maintain their webpage
WATER RE- SOURCES KNOWLED GE	6	Orientation for Collaborative Modelling Training - Series 1	68 (15/53)	7	Introduction to participatory development approaches, work on problems in own basins, set up a multi- disciplinary team to collect data and use model
	13, 18	Collab. Modelling Consultation Meeting & Collaborative Flood Modelling Training, Basic	48 (10/38)	9	Background knowledge and hands on exercises in hydrology and modelling
WATER SECURITY	4	Perspectives of Water Quality Management in Lao PDR, S 1	63 (16/47)	7.5	Understand water quality management, water quality regulatory framework, monitoring and challenges
	12	Stakeholder Consultation on Water Quality Management in NN Training	60 (15/45)		Build connections and ownership
	15	Ground Water Management Training – Preparation	32 (3/29)		Discuss and agree on a training schedule for a future ground water management training

Table 1: Summary of C1 supported trainings.

	NO	TOPIC OF THE TRAINING	TRAINEES (F/M)	RATING	MAIN TRAINING CONTENTS
		Meeting			
	16	Flood Risk Management Training	60	7.5	Understand flood risk characteristics, impacts/causes of floods, analysis of historical data, share experiences
	19	Water Quality Management – Consultation	54 (3/51)		Discuss on continuous issues of water quality in the Nam Ngum river

13. Feedbacks on lessons learnt as well as of their usage in actual work were obtained from 87 participants. Majority of them were able to report on the outputs, but only 57% of them reported on usage of the lessons learnt. In around 7% of the trainings, decisions were made and also later followed up on (refer **Figure 1** for further details).

Figure 1: Outputs and Outcomes from C1 Trainings/Workshops



14. A variety of different long-term applications were named by participants. Broadly, **outcomes** can be categorized into lessons learnt used for current and future planning, lessons learnt and straight applications as well as awareness raising/knowledge exchange with third parties. The most relevant ones were, for example, for the formulation of the management plan for the Nam Song River (Deputy Head, DoNRE VV), for the proposals for Provincial Water Quality Management (Technical Staff, PoNRE Khammouane), and for water resources management (Head of DWR, Luangnamtha Prov) or for the development of a Flood Risk Manual (Division Deputy Head). Others mentioned to have applied knowledge obtained from the trainings to set up a water resources conservation area and water quality monitoring area at the demonstration site (Division Deputy Head, DWR Awareness and Training Center), to allocate land and water resources as well as for building of a water weir (Village Head, in VV District), to enhance frequency of water quality monitoring and emergency preparedness (Head of Unit, NN Hydropower Dam).

15. An **IWRM E-learning platform** has been established in 2014 in Lao and English, which contains a variety of articles, and other types of information. The platform, which is an internet website, shall be circulated more frequently among MoNRE employees for

knowledge transfer. Yet, government budget shall be obtained to ensure the continued operation and maintenance of the website, currently still located on the consultant's website.

COMPONENT 2: RIVER BASIN MANAGEMENT

Component 2.1 – National River Basin Management

16. Originally, **Component 2** is a single component. It was only during the project implementation where Component 2 was divided into Component 2.1 (or C 2.1) covering national level **activities**, and Component 2.2 (or C 2.2) supporting the Nam Ngum River Basin.

17. Component 2 consisted of the following activities:

- National River Basin Forum;
- National Water Resource Inventory; and
- National Guidelines for River Basin Planning.

18. The **Lao National River Basin Forum** was carried out in 2014, with more than 200 stakeholders in the water sector to share lessons learnt on IRBM concerning a broad number of subjects. All three persons interviewed for this Outcome Study on the forum have reported learning considerably in the forum, and two out of them opine that they could apply what they have learnt at work.

19. The **National Water Resource Inventory** was introduced to centralize and increase the availability of data on water resources. Guidelines and data-collection forms for PoNREs and DoNREs were established, tested and implemented. These are largely functional but despite the staff have indicated that they know how to use the guidelines and the data-collection forms, their ability to use these documents were limited by their capacity in different computer programs. As a result, only surface water data and limited set of other data were provided for each river basin to form part of the inventory, which includes maps and fact sheets. Pending approval by the Map Department of the National Geographic Department (NGD), the inventory can be shared with the stakeholders.

20. The **National Guidelines for River Basin Planning** were written based on the guidelines prepared for Nam Ngum River Basin Planning (C 2.2). The guidelines basically describe 8 steps in river basin management piloted in the Nam Ngum River Basin. However, in the institutional set-up, the guidelines did not take into account River Basin Organizations (e.g. NNRBCS) as the core implementer and listed all the relevant PoNREs as the core coordinating party. Although the institutional set-up still needs to be discussed and verified among different RBOs before the outcome can be evaluated, the guidelines are perceived as properly written. A national workshop with participants from all the relevant PoNREs and a final workshop with the DWR have been held, and the guidelines have so far been adopted for the Sebang Fai River Basin Profile, but the guidelines are still pending officially approval.

Component 2.2 – Nam Ngum River Basin Management

21. The **Nam-Ngum (NN) River Basin Management Component** is legally based in the Prime Minister's Office Decree No. 293, 2010 and MoNRE's Decision No. 3358, 2012 and acting as pilot basin for the National River Basin Management Guidelines. In **this report**, Component 2.2 is described in 2 parts: (i) description and assessment of all river basin planning processes and outputs, and (ii) findings on institutional setup.

Nam Ngum River Basin Planning

22. The Nam Ngum River Basin Planning process piloted in the framework of the project consisted of a number of inter-related steps and documents, including:

- Top-down/bottom-up stakeholder involvement strategy;
- Current State of the Basin Report;
- Climate Change Adaptation Report;
- Nam Ngum River Basin Management Strategy;
- 5-year River Basin Management Action Plan; and
- Integration into Sectoral five-year SEDP.

23. The **top-down/bottom-up stakeholder involvement strategy** was designed to ensure that all stakeholders were involved. However, this Outcome Study has only in parts been able to assess possible exclusion or non-involvement of important stakeholders. Furthermore interviewees, particularly on the provincial and district level, had difficulties distinguishing the respective NN River Basin Planning meetings and workshop. The results show that there clearly have been conscious efforts for broad participation of different government line agencies and the private sector in the NN River Basin Planning. While no exclusion of any party has been reported, this study found no conclusive evidence on this issue.

24. The **Nam Ngum State of the Basin Report** is the first step of the planning process. While many of the interviewees either did not have fond memories of or did not recall receiving the report, those who do remember the report opine that it was produced in good quality. However, the report could be benefited if required water-related information in Lao PDR (including data concerning the tributary rivers, use of water, pollution erosion, fish population, dam operation, etc.) was obtained. The **Climate Change Adaptation Report** was also produced to ensure the preparedness of the river basin. Yet again, while many of the interviewees either did not have fond memories of or did not recall receiving the report, those who do remember the report opine that it was produced in good quality. Both reports were being applied further in Nam Ngum River Basin Planning.

25. A **Nam Ngum River Basin Management Strategy** was developed in 2014. However, while the strategy has been approved by technical staff, it has not been endorsed by the National River Basin Committee. Interviews / surveys found that the document is, similar to the 2 reports above, not known among some of the key agencies involved in river basin management (with the exception of NNRBCS). As a result, the Outcome Study was not able to retrieve sufficient feedback on the Strategy. At the same time, since many of the interviewees knew rather little about the Nam Ngum River Basin Management Strategy, they could not opine on the strategy's integration into the Sectoral 5-year Socio-Economic Development plan. For those that we knew about the strategy (mainly from the provinces), some reported that the strategy is well integrated, while some reported that it has only been integrated into MoNRE/PoNRE/DoNRE plans, but not into plans by other line agencies. Subsequently, a **5-year River Basin Management Action Plan** was introduced in later stages of the project period to translate the strategy into more concrete and prioritized actions. It is expected to be finalized towards the end of October 2015.

26. The depletion of dissolved oxygen in water bodies is one of the **water quality issues** in the Nam Ngum River Basin, which has caused fish kills. As such, this project, together with RBCS in the leading role, has so far organized 3 water quality forums, looking to solve the problems. While international experts seem to agree, that the problem is caused by rotting biomass in the area inundated by the dams, the majority of interviewees from the provincial and district level see it otherwise.

Nam Ngum River Basin Management – Institutional Setup

The **Technical Working Group** was tasked to prepare the River Basin Committee 27. meetings. On 18th October 2013, the first **Nam Ngum River Basin Committee meeting** was carried out in Vientiane Province. It was prepared by the Technical Working Group with participants from 81 committee members, many of which were high ranking officials. There were also participants from the private sector, NNRBCS and the consulting industry. The Governor of Vientiane Province was appointed as the first Chairperson of the NNRBC on a five-year term. The meeting focused largely on the transfer of the RBCS to Vientiane Province, exchange of opinions on River Basin issues between upstream and downstream provinces. Also agreed during the meeting are the draft Regulations on implementation and responsibilities on management and development of Nam Ngum water basin between central, province and district levels, and main outlines of the Nam Ngum River Basin Plan. So far, there has been limited implementation of activities. In addition, the National Strategy has not included an RBC, which from a legal standpoint might endanger long-term sustainability and continuity of the committee meetings. Funding is expected to be a major issue if there is no further support from the donors. From the technical perspective, the capacity and operationality of the Secretariat is still perceived to be limited.

28. **Nam Ngum River Basin Secretariat** has been the main organization to prepare and facilitate the Committee meetings and manage the overall River Basin Management Planning and implementation process. It was moved from a department on the national level under the PoNRE of Vientiane Province in 2013. While the move can be seen in the context of the Sam Sang policy (PM decree 10), reasons for the transfer are mostly seen in the previous existence of partly overlapping national institutions and resulting difficulties of the RBCS to work with local institutions. While being highly motivated, with a relatively inexperienced team and several leadership changes, the Secretariat would still require further support to fulfil its role to facilitate the River Basin Management, including technical support for the implementation of activities, and donors' support to ensure sustainability continuity of the Committee meetings.

COMPONENT 3: GROUNDWATER RESOURCES ASSESSMENT

29. The relevance of the work done on **Groundwater Management** under NIWRMSP is apparent and it is widely believed that the Program has addressed the most urgent issues. A major problem in the **design** and implementation of the component was that the systems, information and capacity concerning groundwater issues in Lao PDR have been overestimated, which poses major challenges in delivering the outputs that was anticipated

during the design stage. Therefore, basic groundwork had to be done by the Component, and build a foundation for related future works. An additional challenge to the implementation was that the DWR (and its Groundwater Division) has yet been setup at the start of the project. Therefore, the counterpart institution has become the Natural Resources and Environment Institute (NREI) throughout the implementation period. However, NERI is not an implementing agency, but rather, a MoNRE's research agency. It is believed that although such project set up did not cause major problems, it has somewhat limited the involvement of the implementing agencies in the relevant technical work and ownership, in particular the DWR's Groundwater Division.

30. Since the locations, extent, production potentials, and other characteristics of major aquifers in the country are as yet unknown, the **National Ground Water Pilot Study** was supposed to assess the groundwater conditions in a pilot area and thereby contribute to the identification of aquifers, the establishment of a groundwater monitoring and management plan, and the construction of usable wells. The pilot drilling was also supposed to build capacity for water sector technical staff and feed data into the Groundwater Information Management System. However, the pilot study was not implemented as a drilling company could not be recruited with the available budget and the continued attempts to procure the equipment and the contractor took a very long time. Also, while technical support from the International Groundwater Specialist would be required for the Pilot Study, his contract had already been completed beforehand. As a result, a set of draft manuals and presentations describing the methodology in details on how to carry out a ground water study were produced and updated as part of the Pilot Study.

31. **Groundwater Resource Assessment** was carried out to evaluate probable groundwater resources, conditions, usage and demand at the national level for Lao PDR. A Groundwater Resource Assessment Report for the Vientiane Plains in the Nam Ngum Basin and a map roughly estimating the availability of groundwater resources in the country were produced. However, IWMI is the only organization to date that has utilized the outputs in their work on maps to some degree, while NREI and the DWR Groundwater Management Division have yet to adopt them.

32. In the framework of the **Groundwater Information Management System** is considered to be a key tool in obtaining more information on the quantity and quality of groundwater, which could eventually be used for the production of more precise groundwater maps. It consists of a standardized National Groundwater Well Log Standard Form, where a Water Well ID scheme was produced. An MS Access database has also been setup partially for the National Groundwater Well Log Standard Form. To date, the collected (partial) information on 20 wells in Vientiane Province has not yet been entered into the system. Therefore, the system is not yet fully tested and may need external support to finalize it and there are no immediate plans or obligations to use the Form or the database by the government or by the private sector.

33. Groundwater management knowledge in Lao PDR was found to be considerably lower than initially expected. The **Groundwater Training Needs Assessment** was, therefore, carried out with the objective to clarify the training needs on groundwater issues of staff in DWR, NREI, and NUOL/FWR. Two open book exams for DWR, NREI, and NUOL/FWR technicians and lecturers were carried out to test their capacity and knowledge in groundwater management (which was found to be very limited) and identified those

persons eligible for further trainings. The results of the TNA are included in the Groundwater Action Plan. As of the date of this study, the first training is currently being prepared.

34. A **Stakeholder Assessment** was conducted to understand the role and responsibility of key public and private stakeholders, to get an overview on groundwater users and on the groundwater information needs of all these stakeholders. It included a large range of government agencies, CSOs, donors, commercial users and communities. Yet, it is remarked that the assessment is made only on the level of organizations and not on the level of the respective sub-organizations or positions. The results showed minor overlaps between NREI and the DWR Groundwater Management Division. The Stakeholder Assessment is thought to be of carried out appropriately and could well be used in the preparation of the Ground Water Action Plan.

35. As the key output of Component 3, the **National Groundwater Action Plan** was drafted to replace the initially planned Groundwater management plan for major aquifers. Main objectives of the action plan were to raise awareness on the issue of groundwater and summarize the most important activities and thereby increase the chances of and give orientation to funding. Although based on a limited set of data on groundwater, it was perceived by all interviewees to be well-researched, technically sound and comprehensive and should give good guidance on proposal writing to acquire funding. In spite of the first-time inclusion of groundwater into the Socio-Economic Development Plan (SEDP) 2015-2020, budget is expected from donor agencies rather than from government. The action plan is expected to be approved within 2015.

36. It shall be noted that Component 3 was completed before the Introductory Course of Ground Water Training and the Feasibility Study of Ground Water Training Research Center were conducted.

COMPONENT 4: DEVELOPING INTEGRATED WATER RESOURCES MANAGEMENT EDUCATION AT THE NATIONAL UNIVERSITY OF LAOS

37. The change of status, from the Department of Water Resources Engineering to the Faculty of Water Resources has been longed for by the FWR staff members. Program supported on crucial aspects such as the improvement of the WRM curriculum, institutional strengthening and increase of knowledge of the lecturers has allowed the FWR to bring changes forward. Most of the respondents acknowledged that the project has considerably supported some key issues, including a) the change process of becoming a Faculty and expanding the scope of the institution from irrigation to water resources; b) enhanced knowledge of lecturers; c) increased stakeholder connections; d) the provision of academic equipment; e) the improved quality of curricula. The respondents also expressed appreciation of an increased ownership and attitude by the FWR team's attitude to bring things forward.

38. The **WRM curriculum** has gone through some phases of development, and some support in this has also been provided by the Program. Two surveys have been implemented to assess the labour market and graduate demand in the water sector. Based on these surveys and with the support of the Program, the final curriculum has evolved which focuses on basic engineering skills and professionalization and gives high importance to practical experience. However, while professionals in the sector appreciate that graduates from FWR have better fundamental knowledge on WR than graduates from other

Faculties, FWR staff's lack of skills and lack of available equipment have made the curriculum complicated to be fully implement so far. In the scope of a survey among recent graduates, 3 (out of 6) survey participants said to have used important knowledge gained from studies in their current positions and responsibilities.

39. Project supported in **institutional strengthening** and the development of the Strategy and Action Plan has resulted in improvement. The Plan focused on Human Resources Management, Library / Facility Management, NUoL's "Equipment and Property Management System", Gender, IT support, Cooperation with other universities in the regions and internationally, Research capacity building, and Administration and Leadership skills. Overall, the main noticeable changes are related to the motivation of the implementing staff. Attention has been paid to a better coordination of roles and responsibilities and to an improvement of management skills and of staff's academic education. In the past seven years, an important improvement with regards to gender inclusion has been reported.

40. **Teaching and learning support** by the Program both in capacity building and material support had a positive impact on the Faculty. However, the capacity of the FWR's staff and the general availability of necessary equipment remain low. Nonetheless, both teachers and students have described improvements in the quality of teaching and learning.

41. The **Road Tour Seminars for promotion of the FWR's WRM curriculum** have proven to be useful. The team involved is looking to continue promoting the activities further with the Faculty's budget. The result shows that the number of NUoL applicants interested in joining the FWR has increased by 55% between 2011 and 2015 as compared to a 24% rise for NUoL.

42. **Professionals** in the water sector nonetheless **appreciate that graduates** from FWR have **better fundamental knowledge** on Water Resources than graduates from other Faculties. In the scope of a survey among recent graduates, 3 out of 6 graduates, who could be traced, said they **use important knowledge gained from studies** in their current positions and responsibilities.

43. It shall be noted that this Output Study was completed before many important activities and key documents were conducted and finalised, including:

- The 2016-2025 Development Strategies and Action Plan, Faculty of Water Resource, National University of Laos;
- IWRM Curriculum Teaching Manuals;
- Collaborative Flood Modelling Trainings;
- Trainings on Introductory Course of Ground Water Monitoring and Management;
- Feasibility Study of Ground Water Training and Research Center;
- Exchange visits with regional universities;
- Lao Water Research Seminar;
- FWR's Team Building Training; and
- FWR's Senior Management Training.

BACKGROUND

Project Description

1. The National Integrated Water Resources Management Support Program (hereafter NIWRMSP or "the Program") supported Lao PDR in building the foundations for a national approach to Integrated Water Resources Management (IWRM) including river basin and sub-basin planning and management for sustainable economic, social and environmental objectives.

2. The Ministry of Natural Resources and Environment (MoNRE) led by the Department of Water Resources (DWR) in central and provincial offices is the Project Executing Agency (EA). The Program Management Unit (PMU) under DWR has the responsibility for oversight and management of the Program. The implementation of the Program commenced in October 2011 and will end at the end of the October 2015. The Program lasted approximately four years and was designed with four outputs to complement activities funded by other development partners, which are outside the scope of ADB TA. The TA outputs were designed to directly assist in implementing the water resource strategy and action plan. Each consulting package was recruited to implement the activities under each output which aimed to contribute to the outcome of positioning MoNRE at the center of sustainable IWRM, with resource development and water services provided through appropriate line agencies and the private sector. The four outputs and the corresponding implementing agencies are:

- Output 1: National capacity built in integrated water resources management (DWR),
- **Output 2**: River basin management developed (DWR, NNRBCS),
- Output 3: National groundwater management action plan prepared (NREI),
- **Output 4**: Integrated water resources management education strengthened at the National University of Laos (NUoL).

3. The Program also includes allocation for the hiring of an international IWRM advisor to advise MoNRE on strategic issues and critical decisions.

4. The budget of the implementation of the Program is about US\$4.2 million. The Government of Australia provided AUS\$ 3.2 million and the Spanish Cooperation Fund for Technical Assistance provided US\$ 600,000 administered by ADB. ADB's Technical Assistance Special Fund (TASF-IV) finances US\$ 300,000 as a grant. The Lao government will finance the balance equivalent to US\$ 310,000 in kind by providing counterpart staff, offices and other support required for implementing the TA.

5. As a capacity development technical assistance (CDTA), the design feature of the Program is to provide strategic consulting support to the Government to help the latter in implementing the National Water Resources Policy and Strategy, and Action Plan (NWRPS). Consultant inputs have therefore been contracted under four packages as follows: AECOM (Package 1 consultant to support the delivery of Output 1 and coordinate the CDTA), IDOM (Package 2 consultant, similarly to support delivery of Output 2), GHD (Package 3 consultant to support delivery of Output 3) and RTI (Package 4 consultant to support delivery of Output 4).

6. Overall management of the Program is through the Program Management Unit (PMU) based at the Department of Water Resources (DWR), Ministry of Natural Resources and Environment (MoNRE). Project implementation is through the Project Implementation

Units (PIUs) established within the Implementing Agencies (IA). Each PIU receives support from consultants from the Consulting firms from different packages in the delivery of component outputs.

7. Each of the IAs has assigned component managers to supervise the Project Implementation Unit (PIU). Support staff has also been assigned to the different PIUs.

The Outcome Study – Scope, Objective and Concept

8. Initially, the Consultant was requested to design and implement a Monitoring and Evaluation system from January 2015 until the end of September 2015¹. However, since the Program will end in October 2015, it has been agreed with the program's CTA and validated by ADB that the establishment of a proper system would be rather time-consuming and probably created limited benefits.

9. Therefore, the Consultant would instead carry an Outcome Study, which should be finalized by the third week of September 2015 (Annex 1). The reported findings will be integrated into the Program's Final Report.

10. The study in its core assessed and summarized the main outputs and outcomes attained by the Program and project its potential sustainability. It covers all four Components of the program, as listed below:

- Component 1: Capacity building
- Component 2: River Basin management
- Component 3: Groundwater management
- Component 4: IWRM education at the National University of Laos

11. An **Outcome Study's** main objective is to condense all important information into a single report. Such a study typically proves useful when the project's M&E system was not able to capture important outcomes and impacts by the intervention. The study partly relied on information collected through the project's M&E system as well as on further data-collection to address information needs. Stakeholder Interviews and Surveys with the target beneficiaries were carried out. The information needs were defined by project indicators and further main outputs, outcomes, impacts, sustainability, as identified through Results Models of key activities or working areas. Moreover, the results are visualized as much as possible (e.g. by using charts).

12. Even if Outcome Studies usually systematically follow up all the indicators, further information can be needed, in case some areas of work are not comprehensively covered by the indicators. Besides, outputs, intermediate outcomes or impacts are important to understand to comprehend strength and weaknesses of the project's activities.

13. **Results Models** visualize the relationship between project activities, their Outputs, envisioned Outcomes and indicators in a simple manner and can furthermore show the attribution gap. The project's structure and its components, sub-components and key activities and their respective results logic and other cross-cutting issues are formulated. Results Models are the key tool to define, which information needs to be collected in the Outcome Study. Based on the indicators and further data-items as defined through the

¹ The Outcome Study ended one month earlier than the end of the TA. Therefore, some activities implemented in October 2015, were not included and not reflected in this report.

results-model, data-collection tools have been systematically defined, including the corresponding sampling and guide questions.

14. **Data collection** is usually done through stakeholder interviews, which are based on the identified guide-questions, targeting the people who can best answer them. A matrix was used as a 'questionnaire', which showed all interviewees and all guide-questions and who would be asked what. Surveys also often prove useful with large target groups. Questionnaires including qualitative data, quantitative data and ratings were used. Also data from secondary sources was collected.

15. Functional **data-base tools** and techniques were used to summarize/collate quantitative (by using charts) and qualitative (by categorization). These tools allow the analysis of large amounts of data without any loss.

16. The **Outcome Study Report** summarizes all information on key outputs, outcomes, impacts, sustainability and other cross-cutting issues in a single document. The findings are strongly based on the collected data and presented in the form of charts, tables and graphs in order to visualize the results and raise/sustain the interests by the reader.

DESIGN & METHODOLOGY

17. In the process of designing the NIRWMSP outcome study methodology, 3 main steps were carried out: (i) understand the (valid version of the) indicators, (ii) design Results Models and (iii) define the methods of data-collection.

Preparatory steps

18. In this study, the conceptual preparation has been given considerable attention and has taken a considerable share of the total time used. It was not only important to understand the meaning of the indicators, but also to come up with a visualized and outcome oriented Results Model for each Component. Then, methods of data-collection were decided upon, concrete interviewees identified and questionnaires designed. All these processes took approximately 1 month at the beginning of the assignment.

Validating / Understanding the Indicators

19. In order to **avoid any misinterpretation** of the indicators, all the available versions were retrieved, including those from the original project document, the mid-term review, ADB missions and annual reports. The different versions have been compared for similarities and differences and these were visualized in a matrix. When available, the baseline values, target values, units and sources of information were included.

20. With the help of the CTA, PMU, PIUs and the donors, it was determined **which of the indicator versions to accept as valid**. This was in parts not easy, as different versions of the indicators did not include parts of the other indicators, did not mirror (useful) changes to indicators made in earlier stages, or included indicators not further pursued in the actual work of the program. Also, the timelines for target values and organizational aspects (e.g. WREA, MONRE, DWR), were not streamlined throughout the different versions. As a general rule, those versions of the indicators were defined as value, which were most recent and/or made sense in the institutional and time-wise context of the program.

21. Furthermore, all key words / concepts / abbreviations in the indicators were defined so that all stakeholders agreed on their meaning. The result of this discussion is shown in the *Table 2* below.

Code of indicator	Indicator	Definitions / additional information
Outcome	By the end of 2015: Effective	River Basins = River Basins within or outside the project
indicator 1	river basin committees	area
	operating in at least two basins	Effective =
		 role and mission of the RBC in the Basin is clear, not overlapping and acknowledged by stakeholders coordination with different agencies on the local, provincial and national level, and the private sector (implementation of IWRM) have and implement strategy and action plans, based on
		an identification of problems
		 decisions taken on water management

Table 2: List of valid indicators along with their definitions

Code of indicator	Indicator	Definitions / additional information	
		> compare to past situation without RBC	
Outcome indicator 2	At least two major river basins have IWRM plans fully integrated with province and national plans	 fully integrated = integration of all key principles/pillars and activities with = into IWRM plans = River Basin Management Strategy and 5-year River Basin Management Action Plan 	
Outcome indicator 4	75% of MONRE staff successfully complete phase 1 continuing professional development programs	 WREA/MoNRE = technical staff in DWR and Water Resource sections in PoNRE, NERI, NUoL Faculty of Water Resources, Num Ngum RBCS CPD program = Continuing Professional Development (= process of recording and reflecting on learning and development) = IWRM training measures > also ask about the use/effectiveness of these trainings 	
Outcome indicator 5	Water allocation and regulation mechanisms established and in use.	 Indicator was not supported by the project 	
Output 1 indicator 1	80% of water resources management sector professional staff in MONRE are actively participating in tailored personal CPD programs by end of 2015.	 Water resources management sector professional staff in MONRE = technical staff in DWR and Water Resource sections in PoNRE, NERI, NUoL Faculty of Water Resources, Num Ngum RBCS CPD program = IWRM training measures 	
Output 2 indicator 1	Two basin plans are published by MONRE in collaboration with basin management organizations.	 River Basins = River Basins within or outside the project area Basin Plan = River Basin Management Strategy and 5-year River Basin Management Action Plan 	
Output 2 indicator 2	NNRBC is established andoperational.	 NNRBC = Nam Ngum River Basin Committee operational = role and mission of the RBC in the Basin is clear, not overlapping and acknowledged by stakeholders coordination with different agencies on the local, provincial and national level, and the private sector (implementation of IWRM) have and implement strategy and action plans, based on an identification of problems decisions taken on water management 	
Output 2 indicator 3	NNRBC communication plans are implemented by 2013.	 NNRBC = Nam Ngum River Basin Committee 	
Output 3 indicator 1	Groundwater management plan is published for major aquifers by end 2014	 Major aquifers = major aquifers are not identified (groundwater study was cancelled) Groundwater management plan = Groundwater Action Plan 	
Output 4 indicator 1	NUOL graduates a minimum of 10 IWRM bachelors of science per year by 2015	 IWRM Bachelor = NUOL Bachelor of Water Resources includes IWRM in all 3 Major selective courses 	
Output 4 indicator 2	DWR employs of at least 5 NUOL IWRM graduates	 At least 5 = at least 5 from 2011 to 2015 DWR = DWR and Water Section in PoNREs IWRM graduate = graduates in Bachelor of Water Resources 	

Result Models Design

22. As mentioned above, indicators only cover a limited scope of those achievements aimed for by a project. Therefore, for each of the 4 components, all the **main activities** by the project have been analyzed in terms of the outputs and outcomes which should (in theory) be achieved by building Results Models (see *Annex 2*). Also, the program **indicators** have been situated in this visual representation of the result models. All these elements in the result models are linked in a logical way ending with the overall, most global expected impact.

23. Results Models were created in workshops with the main stakeholders of each component in order to ensure that the structure and objectives of the project are verified and equally understood in the same way by everyone.

Data-collection & Analysis

24. All the elements presented and agreed on in the Results Models have been integrated into a **matrix**, listing them per component and in a logically coherent way.

25. In collaboration with the corresponding PMUs and PIUs, each item to evaluate was reviewed and the data collection tools, sources of information, persons to interview and guide questions were determined.

26. The following data collection tools and sources of information were used:

- Stakeholder Interviews
- A Tracer Study for C1 Training Participants
- A Tracer Study with university students
- Documents as identified in the Results Models
- Statistics by DWR and NUoL

27. The **main data collection method** used for the study was stakeholder interviews, done either individually or as group discussions, depending on the interviewees. As a consequence, most of the data collected is qualitative, describing institutional and personal changes and perceptions. In many cases, detailed descriptions on **"before" and "after"** were retrieved from respondents and later compared. The quality of the different activities implemented, their relevance and usefulness, as well as the quality of the documents produced were assessed.

28. A detailed list of type of data collection tools, project documents and guide questions to be used is available in *Annex 3*.

Sampling

29. As explained above, this study will mostly rely on **stakeholder interviews** and **key document** reviews. Respondents have been chosen among the different relevant organizations as described in the Annex 4. The interviewees have been selected constituting those persons who can best answer the guiding questions for each specific item. When relevant and possible, the stakeholder interviews were realized in groups.

30. In total, 89 persons were **interviewed**, including consultants and staff from national level government organizations (all DWR Divisions, NREI, including PMU and Component

managers) Provincial level in Vientiane Province and Xiengkhuang (PoNRE, PAFO, PEM), District level (DoNRE, DEM, Planning Office), the University (lecturers, staff and students) and the private sector.² Almost all interviews could be held as planned and are believed to well cover the main stakeholders of the project. For a detailed list of interviewees, please see *Annex 4*.

31. In addition to this, it was realized, that the interviewed persons would not yet provide a sufficient sampling size to cover training participants. Therefore, it was decided to carry out a **Tracer Study for C1 Training Participants**. The interviewees were partly selected from a shortlist prepared by C1 (33 respondents), partly from a complete list of participants (22) and, in most cases, interviews were carried out by phone. Only For 3 trainings, the planned minimum of 4 trainees could not be reached.

32. Furthermore, a **Tracer Study of 2013 and 2014 batch Water Resource Management graduates of the Faculty of Water Resources** aimed to assess the nature of their current occupation / professional activity and the usefulness of their studies to fill these positions. Contacting the former students was quite challenging. Out of the total of 44 graduates, 34 telephone numbers were available, however, in the end, only 6 could be reached.

33. In addition to these interviews, the consultant also reviewed all key **documents** as shown in the Results Models of all 4 Components. For a list of documents, see *Annex 5*.

Analysis and Reporting

34. Due to the large number of topics/issues to cover in this Outcome Study and the high number of interviewees, a total of around 200 pages of stakeholder interview notes were recorded in addition to two small data-bases for the Tracer Studies. Nevertheless, analysis and reporting could be comprehensively done thanks to the developed MS Excel **data-base and tools** for quantitative and qualitative analysis and an MS Word based tree-structure-based analysis of stakeholder interview data.

Scope and Limitations of the Survey

35. This Outcome Study tries to comprehensively review the NIWRMSP, mainly in terms of the quality of implementation and outputs and outcomes achieved by the key project activities. However, the Outcome Study covers only the activities that were already carried before data-collection (i.e. beginning/mid September 2015). As such, the Study neglects the activities that have yet to be implemented.

36. Management issues and review of overall design are briefly discussed in the Report but are not analysed in detail.

37. It should also be mentioned that this Outcome Study is mainly based on the knowledge, opinions and observations by interviewed stakeholders. A technical analysis of the quality of produced outputs is not done under this Study. The details of implementation processes are not also provided, but only briefly described. The interested reader may

² Unfortunately it was only possible to talk to one person from the private sector (from Nam Ngum 1 Hydrower). All other 3 persons (Nam Papa, Phu Bia, Fisher's Group) were unsuccessfully attempted to contact / to get an interview appointment.

review such issues in the various consultant final reports produced in the framework of the project.

NIWRMSP - OVERALL

38. This report is structured to report the findings for each of the NIWRMSP's 4 Components separately, despite that there are some linkages between the components exist, especially for Component 1 trainings, which related to all other areas of work. The Report addresses some design issues and other issues concerning monitoring & evaluation, gender, accounting and financing, consultant work, organizational setup and coordination. The Report also provides a brief account on those outcomes not covered in the component.

39. The project has undergone several **fundamental changes** in its lifetime. These changes include: Components 2 were split up into C2.1 and C2.2; the Nam Ngum River Basin Secretariat was moved from the central level to Vientiane Province; several outcome/output indicators were changed; and the Terms of References (TOR) of some consultants were considerably revised.

40. While a comprehensive assessment was not conducted to evaluate this, the team has observed there are several cases in which water related capacities and data systems in Lao PDR had been overestimated during the **design** of the program and activities. As such, some of these activities (C1, C2.1 and C3 and in view of the indicator on water allocation³) have to be revised in later stage of the program implementation. Also, it was noted that two indicators were deleted from the original set of indicators.⁴ These design issues were contributing to the delays in the implementation of the Program.

41. In addition, it was apparent, that NIWRMSP was originally built with an emphasis on the Nam Ngum River Basin, and it was not until later that more focus was put on other components. This becomes evident in the number of **indicators** per component: 2 indicators for C1; none for C2.1 (established after commencement of the project); 5 indicators for C2.2; 1 indicator for C3, and; 2 indicators for C4. Unfortunately, this skewed selection of indicators was not addressed during the program revision stage. Another important issue with the indicators were that the details of several indicators were not revised, even when they no longer reflect the latest situation (see *Table 3* for more details on the single indicators). This might provide an explanation to why indicators were not well used during the annual planning and review, why some of them have been neglected during the implementation, and why key stakeholders were not aware of them. As the result, several indicators have not been fulfilled in the way they were originally conceptualized.

42. Further, the program's **M&E system** was designed primarily to track progress of the outputs and not to generate respective data on indicators fulfillment. As a result, quarterly and annual reporting tended to be activity- and output-oriented, rather than outcome-oriented.

43. *Table* **3** summarizes the fulfilment of the indicators of the Program.

Indicator Code	Indicator	Remarks / Explanations	Fulfillment of Indicator
Outcome	By the end of 2015:	Sedone, which had originally been	So far in the Nam Ngum Basin,

Table 3: NIWRMSP Indicator Fulfillment

³ It has however been reported, that the government plans to continue working on water allocation and it is included in programme 6 of the National Water Resource Management Strategy and included in the World Bank MIWRM project.

⁴ These indicators are the Outcome Indicator 3: "RBC has minimum 30% female members" and "Water allocation and regulation mechanisms established and in use" for which the deletion could never be officially confirmed.

Indicator Code	Indicator	Remarks / Explanations	Fulfillment of Indicator
indicator 1	Effective river basin committees operating in at least two basins	envisioned as 2nd River Basin to be covered, was not implemented as the implementation of two Basins in parallel was after the first two years of slow implementation of the project by the donor agencies not seen any more as doable.	the committee has met once. The meeting was focusing largely on its own institutional and organizational issues and general exchange of ideas and experiences.
Outcome indicator 2	At least two major river basins have IWRM plans fully integrated with province and national plans	See comment on Outcome indicator 1 The integration of the (more concrete) 5- year River Basin Management Action Plan into Sectoral 5-year Socio-Economic Development plan could not be measured, as it is yet to be finalized. Even though the 5 year planning period has been missed, it can potentially be integrated into yearly plans.	Integration of the Ngum River Basin Management Strategy into the Sectoral 5-year Socio- Economic Development plan is reported for Vientiane Capital, Vientiane Province and Xiengkhuang but no information is available for Luang Pabang, Xayxomboune and Bolikhamxay.
Outcome Indicator 4 & Output 1 indicator 1	75% of MONRE staff successfully complete phase 1 continuing professional development programs & 80% of water resources management sector professional staff in MONRE are actively participating in tailored personal CPD programs by end of 2015.	The meaning of these two indicators (refer Also to Output 1 indicator 1) was found to be in need of reinterpretations, as the concept of Continued Professional Development (CPD) was not known to stakeholders and had not been implemented by the project. The indicator was reformulated as % of technical staff in DWR and Water Resource sections in PoNRE, NERI, NUOL Faculty of Water Resources, Num Ngum RBCS receiving IWRM related trainings. However, data obtained concerning this reformulation is relatively imprecise and incomplete.	Up to date, 18 IWRM related trainings have been implemented by NIWRMSP C1 with a total number of 825 trainees. It can be confirmed that thereby a high percentage of persons in the key organizations of the water-sector have been reached. A concrete percentage or a range cannot be given.
Outcome Indicator 5	Water allocation and regulation mechanisms established and in use.	Water allocation requires many preconditions, e.g. related to a water inventory, knowledge on the quantity of water and high capacity of staff. These preconditions are currently and will in the near future not be met in Lao PDR. Therefore, water allocation was not promoted by the project. The issue was discussed, during the ADB review mission in May 2014, but the topic was not reflected in the mission report.	Indicator was not supported by the project
Output 2 indicator 1	Two basin plans are published by MONRE in collaboration with basin management organizations.	See comment on Outcome indicator 1	The Ngum River Basin Management Strategy has been written, but not yet officially approved and therefore not distributed yet. An Action Plan is expected to be finalized within 2015.
Output 2 indicator 2	NNRBC is established and operational	No specific comments	The Nam Ngum River Basin Committee is established and the general institutional setup, including responsibilities is clarified and well accepted by members. So far, there has been limited concrete

Indicator Code	Indicator	Remarks / Explanations	Fulfillment of Indicator
			implementation of activities and the sustainability is not yet ensured both from the financial and the technical side
Output 2 indicator 3	NNRBC communication plans are implemented by 2013	No specific comments	A Participatory Planning and Communication Plan for RBCS was written in 2014 Out of the 7 tasks specified in the plan, 5 tasks could be followed up. Three tasks were partly implemented and two were not.
Output 3 indicator 1	Groundwater management plan is published for major aquifers by end 2014	A Groundwater Management Plan for major aquifers could not be written, because the location of aquifers in Laos is not yet known due to the unavailability of first-hand data. Pilot well drilling, which might have initiated their step-wise clarification on groundwater could not be implemented.	As substitute output to the Groundwater Management Plan, a high quality Groundwater Action Plan has been drafted and is expected to be officially approved soon.
Output 4 indicator 1	NUOL graduates a minimum of 10 IWRM bachelors of science per year by 2015	No specific comments	So far, 3 batches of WRM graduates have graduated at the FWR. 2013: 34 graduates (44% female). 2014: 10 graduates (10% female) 2015: 37 graduates (27% female) Average: 27 graduates (32% females)
Output 4 indicator 2	DWR employs of at least 5 NUOL IWRM graduates	No specific comments	DWR has so far employed 6 WRM graduates.

44. A **gender consultant** was recruited and a draft Gender Action Plan (GAP) was prepared. However, as the GAP can only be implemented together with the final NWRSP, the GAP has not been finalized and developed further. Initial comments on the draft GAP was that the proposed actions are found to be theoretical and not adaptable to the latest situation in Lao PDR. Without further revision and the finalization of the water resources strategy, the report was found to be not useful. As a result, neither gender-specific nor gender mainstreaming activities could be identified in NIWRMSP. None of the interviewees had a conceptual understanding of how to consider gender mainstreaming in Water Resource Management.

Developments in the Project

45. One of the major problems faced during the implementation of the program was the **difficulties to carry out activities in the first two years**. A comprehensive analysis of the reasons of initial slow implementation was not conducted. However, stakeholder interviews have generally revealed that the slow progress was due to the combination of complicated and detailed ADB **financial procedures** and requirements in order to receive approval of proposals; the requirement to comprehensively liquidate the budget for previous activities

before receiving further funding; lack of experience (and possibly ownership) by DWR as a young organization, institutional issues and non-transparent budgeting. In 2013, funds for project activities were channeled through the consulting companies for some time. In October 2014, financing system was reverted back to it original structure, which was to channel through DWR as the PMU who at the time have increased capacity to operate the system.

46. Based on the findings of the interview of the beneficiaries, a second reason identified to have contributed to the delay was that several initial **consultant teams** did not give enough guidance to the project or in some cases did not well follow their TOR or did not have the required qualification. Only after new (teams of) consultants were hired, the satisfaction by government counterparts could be improved. As a result of these **changes** (and the institutional and design-wise adaptations as described above), activity implementation has been relatively fast and smooth since 2013. Communication problems with some consultants remained a problem, which made decision making process difficult in some cases. Nevertheless, overall communication has been good and coordination processes and roles functional, both within the components of NIWRMSP and with other Development Partners (e.g. MRC, IFC, EMSP, IWMI, etc.).

47. It is important to note that, due to the delays during the initial phase of the program, many outputs were not finalized until later in the project period. As such, in many cases, **outcomes have not materialized** by the end of the project and were therefore not captured in the Outcome Study.

Overall Outcomes

48. As a general rule, the outcomes of the project are described in the chapters of the particular components. This is done in order to ensure, that the changes can actually be attributed to the project and to avoid unspecified and unverified general statements of improvements, which might not withstand scrutiny, e.g. the numerous, but not further specified claims on a more integrated way in water resource management. Nevertheless, a few outcomes relating to NIWRMSP as a whole shall be listed here, as they seem of particular importance.

49. Out of the 7 interviewed **DWR Divisions**, 5 could not mention overall significant improvements of their work due to the project, the two exceptions being the Training and Awareness Center and the Administration & Planning division.

50. The **Training and Awareness Center** reported a lack of understanding how to interpret and fulfill their role previous to the commencement of the project. The Training of Trainers (ToT) on the IWRM Manual, IWRM training aids (as brochures, games, posters), received equipment and transport in collaboration in the participation in /facilitation of several trainings have enabled them to now actively carry out their responsibilities. This has resulted in requests from NuoL, PoNREs and DoNREs for trainings.⁵ Training and Awareness Center are currently trying to sustain this dynamism by applying their raised conceptual Water

⁵ E.g. PoNRE Bolikhamxay, Champasack, Sekong, Salavanh, Vientiane Capital have asked for a training on IWRM. Funds are obtained from the Environmental Protection Fund (EPF) from the Nam Thuen 2 fund (World Bank), together with GoL funds for DSA.

Resource Management knowledge and their increased capacity in proposal writing. Several proposals have already been handed in.⁶

51. Also **the Administration & Planning division** has reported considerable upgrading of their functionality. While in previous years, they were only able to submit approximately 5 project proposals to the government and donors per year, a total of 78 proposals were handed in for the fiscal year 2014/15. This increase is said to be in part due to improved conceptual skills in proposal writing by the division. Previously, the division usually only received calls from local level agencies and solely supported them with ideas how to write proposals. Now they provide other agencies with a template, which proves some general information on the project. This template is then further elaborated by these local agencies and then finally checked by the Administration & Planning division. Such an approach is only possible since the division itself and also other agencies have gained more conceptual knowledge on IWRM through the project.

⁶ Training plans have so far been sent to a potential Chinese donor, JWP and CAPNET

COMPONENT 1: CAPACITY BUILDING

52. This Section of the Report presents the outcome and the outputs of capacity building activities implemented as part of C1 activities. The capacity building measures are described in terms of their identification of topics and outreach to key organizations. The section also provides an explanation on the difficulties in measuring the C1 indicators. The overall outcomes of all the trainings implemented are provided in the section. The specific outputs and outcome of each training implemented are also presented.

Training Needs Assessment & Identification of Training Topics

53. In the early stages of the project, a Training Needs Assessment was carried out to define the most important needs in capacity building. The approach was rather based on the self-reported needs and less on the IWRM approach or on respective roles and responsibilities. This is partly due to the fact that much knowledge on water resource management in Lao PDR was not available yet at that time and because the allocated time was limited.

54. Due to diverse management problems, as previously reported, first actual trainings were only implemented in early 2014. The TNA was only partly used to decide on actual trainings, which were also designed based on IWRM theory and a second small scale survey on responsibilities, the organizational setup and current priorities. The number of training topics was eventually reduced/merged from 60 to 20

Outreach of Trainings to Different Organizations

55. It can be shown that C1 trainings were able to reach out to a large number of participants from different sectors. While focusing on DWR, PoNREs, and also DoNREs, other MoNRE Departments, other ministries on all levels, NUoL and some Village Authorities, Development Partners and private sector staff were trained. *Table 4* illustrates outreach to organizations.

NIWRMSP

56. NIWRMSP staff (57) were represented at most of the trainings (in 14), with most attending the IWRM Framework (17), the Project Cycle Management Training (14) as well as the Integrated River Basin Management and River Basin Planning Trainings (7). Attendants related either directly to one of the three project components (C1:~22, C2:~5, C3:~8) or to the PMU (4).⁷

DWR

57. In total, around 90 DWR staff participated in trainings, specifically in those evolving around IWRM Framework and River Basin Knowledge. Unfortunately, it was not possible to extract specific information on division affiliations by all attendants since the relevant information was not provided by participants. The available data reveals that personnel from

⁷ In the same regard, it should be noted that there might be duplications in counting of staff working e.g. both at NREI and NuOL as well as with the NIWRMSP.

the following divisions participated in the C1 trainings: Training and Awareness Center (6), the Data and Information Center (2), the Water Quality Management (2), the Law (2), the River Basin Management (2) and the Admin (1) Divisions.

MoNRE (Others)

58. In total, around 314 governmental staff from MoNRE and its sub-divisions on the provincial (PoNRE) and district (DoNRE) level participated in IWRM trainings, whereby most workshops held were attended by at least some representatives of these institutions. MoNRE staff attended 11 different trainings (most of all the Orientation for Collaborative Modelling and the Perspective of Water Quality Management in Lao PDR Trainings), coming from different MoNRE departments, ranging amongst other from NREI (9) (though it is uncertain whether or not these participants directly related to Water Resources Management activities), DMH (3), DFRM (3), DESIA (3) to DLPD (1) and LNMC (1).

PoNRE

59. PoNRE representatives from around 17 Provinces around Lao attended trainings. Most of these came from Luang Prabang (15), Vientiane Province (15), Khammouane (14) and Luangnamtha (13); around 31 participants from the NNRBCS-PoNRE attended trainings. Most PoNRE staff attended the IWRM Framework (61) and the River Basin Knowledge Trainings (50). It should be noted that some limitations occurred when eliciting data for PoNRE, i.e. it could not be made clear who of the participants directly works on water resources management related issues.

DoNRE

60. Only 4 staff from the district level (DoNRE) participated in one training (the IWRM Framework Training for the Southern Region).

Other Ministries (National)/ Other Line Agencies (Provincial and District)

61. National level ministry representatives participated in a variety of trainings, amongst these members from the Ministry of Energy and Mines (MEM) (10), the Ministry of Health (MOH) (5), the Ministry of Agriculture and Forestry (MAF) (5) and one participant from each the Ministry of Science and Technology, Lao Women's Union, Ministry of Planning and Investment (MPI) and the Water Supply Office.

Line agencies at the provincial and district levels included the Energy and Mining Department (Prov: 7, Dist: 3), the AFO (Prov: 6, Dist: 3), the LWU (Prov: 1, Dist: 1), the MOH (Prov: 1), and two participants each from district level agencies relating to Health, Information, Culture and Tourism as well as to Public Works.

National University of Lao PDR (NUoL)

62. In total, 54 staff affiliated to NUoL attended trainings/meetings, i.e. most of all, the Ground Water Management Preparation, Kick-off Meeting (17) and the Collaborative Modeling, Basic Training (17). Participants came from a range of departments, including the FWR (32), Faculty of Environmental Science (FES) (6), Khon Kaen University (KKU) (2), the Faculty of Forestry Science (1), and the Faculty of Science (FSC) (1).

The numbers of participants from the NUoL are likely underestimated since evaluated numbers only include trainings held in the scope of Component 1.

Village Authorities

63. 13 different authorities from villages participated in either the Flood Risk Management Training (9) or the IWRM Ecosystem based Approach Training (4), ranging from (Deputy) Village Heads (9), to representatives of the village Women's Union (2), Village Party Secretary (1) or Lao Front Construction Committee member (1).

Private Sector

64. 9 private sector representatives participated in three trainings, namely in the Perspectives of Water Quality Management in Lao PDR, Series 1 (5 members from Hydropower Dams in Nam Ngum 1, Namlik, Nummung 3 and from consultancy companies), in the Stakeholder Consultation on Water Quality Management in Nam Ngum Basin (2 members of the Hydropower Dams in Nam Ngum 1 and Namlik) as well as in the Leadership building and Communication Training for NNRBCS (2 members of consultancy companies).

Development Partners

65. 20 different attendants from a variety of development partners were represented at the trainings, including the Asia Foundation (10), EMSP (4), IWMI (3), HMTA (1) and the Australian Embassy (1).

Table 4: Outreach of C1 Trainings														
Training / Workshop	NIWRMSP	DWR	MoNRE (not DWR)	PoNRE (including RBCS)	DoNRE	Other Ministries (national)	Other Line Agencies (provincial)	Other Line Agencies (district)	NUOL	Village Authorities	Development Partners	Private Sector	unknown	Grand Total
1: IWRM Framework Training for Central Region	9	9	1	3		3		1					20	46
2: Project Cycle Management	14	3	2	16					2				4	41
Management and River Basin Planning	7	3	1	5	33				1		1		0	51
4: Perspectives of Water Quality Management in Lao PDR, Series 1	2	7	6	9	3	2	4				2	5	23	63
5: IWRM Framework Training for Southern Region	4	3	1	14	4	4	1		3		1		18	53
6: Orientation for Collaborative Modelling Training - Series 1	1	13	14	14		6			3	1	5		11	68
7: River Basin Knowledge Training for Central and Northern Regions	1	11	2	31	4	4	2		2		2		18	77
8: River Basin Knowledge Training for Southern Region	2	9	2	19	2	2	1	1			4		8	50
9: IWRM Framework training for Northern Region	4	10		44					2				0	60
10: IWRM Ecosystem based Approach: Exchange Visit and MoNRE Demonstration Site Center Proposal Development		6		1	3					4			0	14

Table 4: Outreach of C1 Trainings														
Training / Workshop	NIWRMSP	DWR	MoNRE (not DWR)	PoNRE (including RBCS)	DoNRE	Other Ministries (national)	Other Line Agencies (provincial)	Other Line Agencies (district)	NUoL	Village Authorities	Development Partners	Private Sector	unknown	Grand Total
11: Sharing Knowledge; Websites Building and Management													24	24
12: Training Workshop: Stakeholder Consultation on Water Quality Management in Nam Ngum Basin	5	6	1	13	13	3			5	1	1	2	10	60
13: Training Workshop: Collaborative Modelling Training	3												45	48
15: Ground Water Management Training – Preparation, Kick-off Meeting	2	3	1						17		2		7	32
16: Flood Risk Management Training	2	6	1	4	19		7	11	1	9			0	60
17: Training Workshop: Water Quality/Monitoring Management		3		15	4						2		1	25
18: Collaborative Modelling, Basic	1	5		4					17				4	31
19: Leadership building and Communication Training for NNRBCS		6		5				1	1			2	7	22
Grand Total	57	103	32	197	85	24	15	14	54	15	20	9	200	825

Specifications on C1 Indicators

66. There are two indicators relating to Component 1, both specifying outreach of Capacity Building measures:

Outcome Indicator 4:

75% of MONRE staff successfully complete phase 1 continuing professional development programs

Component 1 Output Indicator 1:

80% of water resources management sector professional staff in MONRE are actively participating in tailored personal CPD programs by end of 2015.

67. The meaning of these two indicators was found to be in need of reinterpretations, as the concept of Continued Professional Development (CPD) was not known to stakeholders and had not been implemented by the project. The indicator was reformulated to convey the outreach (defined as % of technical staff in DWR and Water Resource sections in PoNRE, NERI, NUoL Faculty of Water Resources, Num Ngum RBCS) receiving IWRM related trainings. Therefore, the Outcome Study team attempted to collect the data on persons participating in C1 trainings and (in order to compare them) the number of staff working in the identified water resource organizations (DWR, PoNREs, NN RBCS, NREI, NuOL FWR).

68. The thereby obtained data is relatively imprecise and incomplete for the following reasons:

Concerning the list of participants in trainings:

- The organizations of participants were not reported or could not be clearly identified from the participant lists for 24% of the trainees;
- For PoNRE and NREI, it is not clear which of the participants work directly related to Water Resource Management;
- Names on the lists were written in different ways, which made it difficult to search for persons participating in several trainings (and then only counting persons), and;
- The lists of participants only include C1 trainings and therefore underestimate the outreach to NuOL.

Concerning the lists of staff:

- The list of PoNRE staff for many provinces seems to cover all PoNRE staff and not only those working in the Water Sector, and;
- Staff fluctuation is high which might lead to different staff filling the same position at different times participate in trainings.

69. Therefore as a result, only very approximate numbers can be and some of the data is not accurate (e.g. are the staff from NNRBCS and DWR participating in training, or they are working as facilitators of the training).

70. For these reasons, the indicators. also in their reformulated form. can hardly be reported. What can be said is that a high number (and probably also high percentage) of persons in the water-sector can believed to reached have been bv NIWRMSP C1 trainings. A

Organizations	Participants in trainings (estimated)	Total number of staff (estimated)				
PoNRE	173	126				
NNRBCS	22	13				
DWR& NIWRMSP	90	78				
NUOL	13	55				
NREI	2	n/a				
Total	280	272				

concrete percentage or a range is however very difficult to define.

Summary of Outputs and Outcomes

71. The scope of this Outcome Study does not only include mapping out the level of outreach of the capacity building activities, but also to assess whether the organized training and workshops have **created outputs and achieved the outcomes** of the Program. To gather the information needed, the team conducted series of interviews (either in person or via phone) of at least 5 participants for each of the 15 substantial trainings carried out in 2014/15. In total, 87 participants could be interviewed and were asked the following series of questions:

- What did you NOT know before the training but you did know it in the end? (output 1)
- How did you apply these lessons learnt later in your real work? (outcome 1)
- Which people did you get to know (better), which you did not know (well) before? (output 2)
- Did you later collaborate with these people in any way? If yes, how? (outcome 2)
- Were there any decisions taken in the workshop/meeting/training? If yes, which? (output 3)
- What happened as a result after these decisions? (outcome 3)
- What do you think were the weaknesses of the training/meeting/workshop?

72. The **interviewees** were partly **selected** from a shortlist prepared by C1 (33 respondents), partly from a complete list of participants (22) and partly due to the selection of stakeholder interviewees as discussed in the Outcome Study Step 2 (32).

73. The **summary of results** shows, that almost all respondents could report some lessons learnt from the trainings (output 1), however only 57% could make use of this new knowledge in their actual work and 43% reported otherwise (outcome 1).

74. Also making new connections to other stakeholders or enhancing them was, particularly in the context of IWRM, an important function (output 2) by the trainings. 58% of the respondents reported that they have achieved such in making new connection during the trainings. However, 25% of respondents could later make use of these new or enhanced relationships. Only few of the trainings had the character of a workshop and therefore only few decisions were taken (output 3 / 8%) and later implemented or followed-up (outcome 3 / 7%).





Figure 3: Respondents reporting any outcomes from trainings.



75. It has also been analyzed for which trainings, how many respondents could report any (type 1, 2 or 3) outcomes. However the findings need to be treated with great caution, since many of the trainings have too few respondents to allow conclusions on the success or failure. Also, some of the trainings (especially number
20) have only recently been conducted and therefore outcomes could not yet materialize.

76. As a general trend, it can be observed that IWRM trainings have been particularly successful and trainings concerning modeling, river basin management and water quality management to a lesser degree (for more details see *Figure 2* and *Figure 3*).

Details on Training Contents, Outputs & Outcomes

77. The details of trainings will be presented structured according to the main training areas:

- Integrated Water Resource Management (IWRM)
- River Basin Management
- Water Resource Knowledge
- Water Security
- Others

78. Up to date no trainings have been implemented in the area "Policies, strategies, legal framework".

Integrated Water Resource Management (IWRM)

Integrated Water Resources Management (IWRM) Framework Trainings

79. Framework trainings on IWRM were held for the Central (Feb 2014, 47 participants, 8 female and 39 male), the Southern (Jul 2014, 53 participants, 17F/36M) and the Northern Region (Dec 2014, 59 participants, 14F/45M). The objective of the trainings was to introduce participants to IWRM principles, tools and regional best practice, to encourage discussion about regional water management issues while also establishing connections amongst stakeholders, including Head of Units, Technical Staff or Deputy Heads, from mainly MoNRE, PoNRE, DoNRE, DWR, other partner agencies and lecturers. Generally, feedback provided on the trainings was positive (8.5 for the Central, 7.5 for the Southern, and 9 out of 10 for the Northern Region). A number of participants provided comments (Central Region 23%, Northern Region 8%) on recommendations and lessons learnt.

80. Those participants who commented on the training from the Central Region mostly positively recognized the need for participatory solutions (n=4), to get to know about river basin management (3) and about difficulties in current water management (2).

81. 9 out of 11 participants who provided lessons learnt also reported on its usage, referring, for example, to being more regularly in contact with relevant people outside the own department (Deputy Head, Unit with DoNRE), to learning about regular collection of water samples (Technical Officer, Irrigation Department of MAF), and to awareness raising (2 Technical Staff, Training and Awareness Center of DWR).

82. According to the Project's Assessment Summary, participants from DoNRE in the Southern Region were more familiar with IWRM concepts and practices than

trainees from Central Laos. Detailed data on training outcomes for the Southern Region is not available.

83. Main lessons learnt mentioned by participants from the Northern Region referred to the division of land and water resources as a way to more sustainably manage water resources (5) as well as the need for river-basin planning to improve water quality and water reservation (3). 4/5 trainees said they also applied the lessons learnt in practice in the course of implementation of regular water measuring (Head of Unit, DWR Section), doing planning work to develop a sustainable tool (2 Technical Officers, PoNRE) and for village forest planning (Technical Officer, Provincial Forestry office).

84. 3/5 participants particularly thought the established contacts to be useful; these were used for planning for a new tourism project, to plan for water resources management in Luangnamtha Province and to plan for a village forest project. All those who provided comments in the Northern Region also mentioned a weakness, referring e.g. to the short time of the training (3) and the need for regular trainings (2).

IWRM Ecosystem based Approach: Exchange Visit and MoNRE Demonstration Site Center Proposal Development

85. A training on an IWRM ecosystem-based approach as well as an exchange visit to a Demonstration Site was organized in Thailand and Vangvieng (Dec 2014,14 trainees participated in total, 3F/11M), ranging from village authorities from the MoNRE demonstration site in Vangvieng to Directors, Deputy Directors and Technical Officers from the DRW, PoNRE and MoNRE. Main purpose of the training was to better understand about participatory planning, about adoptions at community level and to apply suitable measures at the MoNRE demonstration site in Vangvieng.

86. 71% of the participants provided lessons learnt, including the implementation of land and water resources division (n=6), implementation and management of organic farming (3), river basin planning to sustainably use water resources (3), and homestay developments (3). Participants used these lessons for writing a management plan for the Nam Song River (Deputy Head of Unit, DoNRE Vang Vieng), to pass on organic farming ideas to villagers (Deputy Head of Unit, DoNRE Vang Vieng; Village Head), for implementing regular water measurements in Luangnamtha Province rivers (Head of DWR Section Luangnamtha Province; 2 Technical Officers PoNRE), for village forest planning (Technical Officer, Prov Forestry), and for homestay development (Village Head). The Division Deputy Head of the DWR Training and Awareness Center mentioned that a water resources conservation area and a water quality monitoring area were set up at the demonstration site after the training. Two village heads also reported the division of land and water resources as well as the building of a water weir which facilitates fresh water supply for organic farming. Trainees pointed out the short training time (3) and the need to hold more such trainings (2) as the main weaknesses.

River Basin Management

Integrated River Basin Management and River Basin Planning

87. An Integrated River Basin Management and River Basin Planning (IRBM) Training was held with 41 participants (12F/39M), ranging from mainly DoNRE staff to

trainees from NIW RMSP, PoNRE and DWR, in May 2014. Main objectives of the training were to introduce and help participants to better understand concepts and tools of integrated river basin management (IRBM) and planning, to share information on critical experiences in IRBM planning at local and international levels, to encourage trainees to adopt concepts and tools for own and future IRBM projects and to build connections amongst managers and staff. The average assessment score was 8 out of 10.

88. Many participants were not familiar with the training's topic. Feedback was collected from two people only. For one participant, the training subject was entirely new (NUoL Lecturer, FWR) while the other mentioned that dealing with floods and flood preparedness/prevention was newly learnt (Technical Staff, DWR Data & Information Center). The latter also proposed to have more colleagues joining in a training next time in order to better discuss contents and exchange knowledge at work.

89. Trainees proposed to facilitate a stakeholder platform between NT2 Operators, MoNRE and communities from Xaybangfai in order to discuss on EIA/SIA, benefit sharing and impact mitigation measurement.

Project Cycle Management

90. A training on Project Cycle Management was conducted (Jul 2014, 41 participants, 17F/24M) with staff mainly from NIWRMSP, PoNRE, DWR and MoNRE, to better understand the Logical Framework Analysis, project planning cycles, project monitoring and evaluation as well as roles and responsibilities of technical and admin/finance officers.

91. The training scored 8.5 out of 10 points. Four participants provided comments on lessons learnt, including how to develop goals, objectives and indicators (Technical Staff PoNRE and DWR Training and Awareness Center; Finance Assistant PMU) and how to accordingly formulate proposals (Division Deputy Head, DWR Training and Assessment Center). One person mentioned that the training has helped to better understand own tasks, while the other three trainees have integrated the learnt into the formulation of proposals for Provincial Water Quality Management, for government funding at the IWRM demonstration site and for a capacity building plan. The Technical Staff from PoNRE in Khammouane mentioned that it was difficult for provincial staff to travel to the training venue.

River Basic Knowledge Trainings

92. Co-funded River Basin Knowledge Trainings were held for the Central and Northern (Sep 2014, 77 participants, 17F/60M) as well as for the Southern Region (Oct 2014, 49 participants, 19F/30M) for employees from PoNRE, DWR, DoNRE, MoNRE, other line agencies, NUoL and development partners working in key river basins. Main objectives of the trainings were to introduce participants to key principles of river basin development and to the establishment of a 'river basin profile'.

93. Feedback on the first training was only fairly positive with 6 out of 10. Based on the recommendations and lessons learnt, the approach was slightly adjusted for the second training (which scored 8 out of 10).

94. At the initial training, interviews were held with two Technical Staff and the Division Deputy Head of the DWR Training and Awareness Center. They mentioned to now understand what is meant by river basin planning (1), that different sites have different issues with water and its allocation (1) and to now know what should be done in case of a draught or a flood (1). The Division Deputy Head added that he is currently compiling three river basin profiles. According to the Summary Report of the Project, representatives from Nam Ngum mentioned to use the discussed methodology and proposed improvement of their 2013 State of the Basin Report if given the opportunity. Participants from Nam Tha stated to seek for funding from the DWR to initiate a river basin profile.

95. At the second training, feedback was collected from 22% of the participants. Main lessons learnt included data collection methods of water (4), the need for high quality water and principles of monitoring water quality (4), division of water resources for more sustainable use (4), prevention of waste water (3), water retention and savings (2) as well as proposal planning (1). A number of cases mentioned how the training has influenced their work, including teaching students on the subject matter (NUoL Lecturer), consultancy on a project in Parksong District (Technical Staff, Industry and Commercial Department), consultancy on IWRM of a Hydropower Dam (Head of Section, Provincial Energy and Mine Planning Department), improvement of water quality monitoring (Chief, Groundwater Management Division, DWR) and improvement in terms of summarizing data and information (Technical Staff, DWR). Main weaknesses about the second training were its shortness and limited time available for practicing (4), limited amount of case studies (2) and understanding difficulties of the presentations (2). One person also criticized that there was no conclusion or consensus of the use of data.

Leadership Building and Communication Training for NNRBCS

96. In September 2015, a Leadership Building and Communication Training for NNRBCS was held for 22 participants (3F/17M), who are either affiliated to the NNRBCS or to the DWR, PoNRE, other line agencies, NUoL and the private sector. The training was to strengthen leadership skills, team building and communication planning skills amongst the NNRCBS team as well as to support the drafting of a NNRB Communication Plan.

97. Four participants from Vangvieng Province were interviewed for lessons learnt and their adoption. Two trainees uttered that it was a good exercise and helped to better understand leadership and ways of communication while the other two participants mentioned that they now know about how to manage conflicts and the importance of team work. The Deputy Head of DoNRE VV stressed that the training continuously benefitted his communication and information exchange in his daily work.

98. Participants critically remarked that the time of the training was too short because of budget issues (3) and that the schedule and the content were not arranged well accordingly (2).

99. NNRBC communication plans were developed and implemented by 2013

Water Resource Knowledge

Sharing Knowledge; Websites Building and Management

100. A Sharing Knowledge, Websites Building and Management Training was held in December 2014 with 24 participants (8F/16M), including staff from the NNRBCS as well as technical and admin staff from DWR, NREI, NUoL and the PMU. Main objective of the course was to help attendants from the NNRBCS to create, operate and maintain their webpage.

101. Feedback was received from 20% of the participants. These positively commented to have learnt about designing a webpage with Goola (5), about website administration (4) and about framing webpage content attractively (1). One participant could not yet apply the learnt yet, because the NNRBCS website has not been launched yet, though two other participants explained that the training benefitted them in improving the websites of their own institutions (DWR and NUoL respectively).

102. On the other hand, participants explained that there was a great lack of knowledge of many participants on software programs (3).

Orientation for Collaborative Modeling Training - Series 1

103. 68 participants (15F/53M), mainly staff from MoNRE, PoNRE, DWR, NUoL and development partners from seven key river basins amongst them, attended an Orientation for Collaborative Modeling Training in August 2014. The main purpose was to introduce participatory development approaches, to identify and work on problems in own basins, to select an appropriate modeling software and to set up a multi-disciplinary team to collect data and run/use the model in order to inform decisions and water planning. Attendants rated the training as good (7 out of 10).

104. 4% of the trainees provided feedback. While trainees mentioned to have learnt about different types of models (Head of Center, NREI/MoNRE) and about how to use the model and evaluate basin situations (Technical Staff, NTKDs/PoNRE Khammouane), there was no feedback provided on how these lessons were actual made use of after the training. According to the Project Summary, trainees from the Nam Ngum, Nam Ou and Xaybangfai Basin requested DWR to provide further technical trainings on the use of the HEC-RAS-Sim model for cascade dam management, and of IWRM Modeling for river health protection. Further trainings in community participation in verifying the modeling results and in collecting important data was also overwhelmingly requested for.

105. According to the three respondents who provided feedback that the training could not be followed well due to a language barrier (1) and that it did not provide input on how to actually use modeling software (2).

Collaborative Modeling Consultation Meeting and Collaborative Flood Modelling Training, Basic

106. A stakeholder consultation meeting was held with 48 attendants (10F/38M) in December 2014, mainly from the NUoL in order to discuss and plan for the development of a Collaborative Flood Modeling Training.⁸

107. An intensive 12-days course on Collaborative Flood Modelling with the HEC-RAS-Sim model followed in June 2015, with 31 participants (7F/24M) from mainly NUoL, NREI, NNRBCS members, DWR staff and development partners. The training provided important background knowledge and hands on exercises in hydrology and modelling. Overall, the course was highly appreciated by the participants and scored 9 out of 10.

108. Feedback was acquired from 3 Lecturers and 2 Technical Staff (NNRBCS and River Basin Management Division, DWR). Participants largely expressed to have learnt a variety of (rain) water calculations (4) and to be now able to create (outlook) graphs with a modelling programme (4). Two lecturers expressed to have passed on information and knowledge on calculations to students. Trainees however evaluated the training as too basic (2) (because of greater knowledge gaps among participants) and criticized little practical experience (1) and little insight on how data is collected (1). Furthermore, no manual was provided (1).

Water Security

Perspectives of Water Quality Management in Lao PDR, Series 1

109. A training on Perspectives of Water Quality Management was held for 63 participants (16F/47M) (in Jun 2014), mainly represented by key stakeholders of the Nam Ngum river basin, including PoNRE, DWR, MoNRE, DoNRE, other line agencies and private sector operators. The training was to provide better understanding on water quality management, to strengthen skills on the water quality regulatory framework, institutional setting and law enforcement mechanisms as well as on monitoring in developing an understanding for potential challenges in setting up a water quality management system. The training scored 7.5 out of 10.

110. 22% of the participants were asked for further feedback on lessons learnt and on the usefulness of the course for later work. Largely, participants said to better understand about water quality and the need for protecting water (6), about management issues and monitoring of water quality (3), as well as of the need to measure water quality (2). 7 respondents provided examples on how the training has helped them during work, i.e. during report writing (Phanek MPI, Division Deputy Head, DWR), all the time when planning for water irrigation and animal raising techniques (PAFO Vientiane Province), for water management planning and awareness raising among the lay public (Deputy Head Hong Va Kan Pok Khong Administration Vientiane Province) and among own staff (Chief of Groundwater Management Division, DWR),

⁸ During this consultation meeting, it was also agreed on further next steps: the Asia Foundation committed to prepare a field team for training at the villages located in the upstream and downstream basins in Xaybangfai and Nam Ngum, for at least 6 months and up to 1 year, and to collect flood, biodiversity and water quality data.

for increased water quality monitoring as well as for emergency preparedness (Head of Unit, Nummung 3 Hydropower Dam). Participants also proposed to form the NNRBCS coordination group for ensuring the water quality of the Nam Ngum basin. When asked for weaknesses of the training, a number of issues were named by 8 participants, concerning e.g. the shortness of the training (6), slight difficulties in understanding the English (2), too little solutions presented to problems and too little discussion and explanations (3).

Stakeholder Consultation on Water Quality Management in Nam Ngum Training

111. Stakeholder Consultation meeting on Water Quality Management in the Nam Ngum Basin Training was held in December 2014 with 60 participants (15F/45M), largely from PoNRE, DoNRE, DWR, NIWRMSP, NUoL and the private sector. The meeting was held in view of getting to know each other and to build up ownership for the 8-months work plan of the Water Quality Management facilitated by the NNRBCS and the project team. At the end of the meeting, it was agreed on a training methodology, a tentative training schedule and a work plan (including the setting up of a platform for dialogue, research on water quality, impact mitigation and grievance processes, the development of a flood warning system, and community training in biodiversity and water pollution monitoring).

112. The NNRBCS and the EMSP presented recent survey results on stakeholder engagement and on the water quality of the Nam Ngum basin. Only one participant was surveyed by the team (PoNRE Vientiane Province) who mentioned that new knowledge on water quality at different locations was acquired as well as that groups had been formed to discuss about critical issues. Although the information was much appreciated, the participant also wondered why data on water quality had not been passed on to attendants at an earlier stage.

Ground Water Management Training – Preparation, Kick-off Meeting

113. A preparatory/kick-off meeting for groundwater management training was held with 32 participants (3F/29M) in May 2015. Most attendants came from the NUoL, the Khon Khan University, IWMI, NREI and DWR. The workshop concluded with an agreement on a training programme. Expected outputs of the future training programme mainly tailored for professors, lecturers and prospected students from the Water Resources and Environmental Engineering Faculty as well as for members of relevant government agencies, are, amongst other, the development of a feasibility study on ground water, strengthening capacity and a ground water database formulation.

Flood Risk Management Training

114. A course on Flood Risk Management was held in June 2015. 60 participants came from different institutions, ranging from DoNRE, PoNRE, DWR, NIW RMSP, MoNRE, other provincial and district line agencies, to private and development sector representatives and village authorities from the Nam Thuan and Xaybangfai basins. Attendants learnt about flood risk characteristics, impacts and causes of floods, about

analyzing historical scientific data and also shared experiences. The training scored 7.5 out of 10.

115. 13% of the participants provided more detailed information on lessons learnt and their follow up after the training. Newly acquired knowledge referred, amongst other, on how to shelter when a flooding occurs (6), on how to follow up after flood events and water levels (6) and on how to prepare for floods (3). Half of the respondents also used the learnt in later work, including advice to villagers (Village Party Secretary, Deputy Head of Public Health Office) as well as for planning for data collection (Deputy of Labour and Social Welfare at village level, Deputy Head of Public Health Office) and for the development of a Flood Risk Management Manual (Division Deputy Head). According to the Project Summary Report, trainees also brainstormed and developed a constructive list for a key action plan for local flood mitigation and management in the Xaybangfai basin. Three respondents however also mentioned weaknesses, concerning the short time of the training (2), the little practical application (1), that no training manual was provided (1) and that seemingly less attention was paid to the training content by villagers coming from rural areas.

Water Quality Management – Consultation Meeting

116. Following previously held trainings and a consultation meeting, the NNRBCS met trainees' request to organize for a consultation meeting with representatives from six provinces in the Nam Ngum river basin and key stakeholders (54 participants, 3F/51M) in order to further discuss on continuous issues of water quality in the Nam Ngum river in August 2015.

117. The meeting resulted in the agreement of immediate and short-term actions (e.g. organize a high level meeting to discuss and technically accept the existence of the problem and the result of a scientific study, set up an urgent action plan, set up a sub-committee, conduct a feasibility study on mitigation approaches, or identification of financial mechanisms) as well as a long-term plan to mitigate issues with water quality in the basin. Feedback was only provided by one respondent from PoNRE Vientiane Province who noted water quality and critical locations as lessons learnt as well as the discussion of problems in a group. The respondent however wondered why presented data on water quality was not handed out earlier, so that affected people could have been made aware of the existing problems.

Others

Administration and Finance Training

118. An Administration and Finance Training took place in December 2014 with 19 (14/5) participants mainly working in administrative or financial sections of the NNRBCS, DWR, NERI, NUoL, and the PIU. Attendants were provided with an overview of disbursement of TA, with the arrangement of fund flows to the project components as well as they were introduced to disbursement and liquidation of ADB forms 6-15, to the checklist of required supporting documents and to disbursement procedures and types of expenses as per ADB and MOF 0008 guidelines.

119. Feedback on the training was received by 21% of the respondents. Most (3) mentioned to now know about regulations of TA and ADB budgeting and expenditures

(3) as well as about how to prepare a budget (1). Three attendants applied the learnt during their daily work, i.e. they applied the rules when e.g. preparing budgets, banking and supporting documents and also pointed out that it was very useful to clarify issues with the trainer (2). Overall, trainees found the course to be too short (3) or its terminology too difficult to understand for attendees with a non-financial background (1).

E-learning Platform

120. In order to keep produced training materials and other documents available beyond the project lifetime, an E-learning platform on IWRM has been created. It is bilingual, in Lao and English, and contains 64 articles published, 20 key references, one interactive web map of the river basins in Lao PDR and one reference to the riversnetwork.org library (containing more than 4000 pages of items related to IWRM). There are 8 registered institutions and 8 projects in a stakeholders' data base.

121. The website link has been circulated by e-mail with participants of trainings, staff of international organizations and government staff. Knowledge on the site seems however yet limited, confirmed by some key DWR staff now knowing it and the e-learning platform being reported as "not yet established" during a meeting concerning this Outcome Study (resulting in the activity not being systematically followed up by the consultant). Also, since its establishment in 2014 only 120 documents have been downloaded (approx. 7 downloads per month).

122. Also, the sustainability of the platform is endangered. Currently it is still located on the consultant's website (<u>http://www.riversweb.org/monreCBP/</u>) which is a situation which cannot be sustained for long. However, it is also doubted by DWR⁹, that there will be government budget to pay for the website in the future.

⁹ This opinion was given by Mr. Bounsanong Fongnaly, Position: C1 Manager

COMPONENT 2.1: NATIONAL RIVER BASIN MANAGEMENT

123. Originally, Component 2 used to be a single component. Only during the project implementation, it was divided into Components 2.1, covering national level activities, and 2.2, support for the Nam Ngum River Basin.

124. Component 2.1 consists of the following activities:

- National River Basin Forum
- National Water Resource Inventory
- National Guidelines for River Basin Planning

National River Basin Forum

125. The Lao National River Basin Forum was carried out in Vientiane Capital on 30-31 July 2014, with the main objectives to:

- Update participants on the current level of implementation of the IRBM approach in different parts of the country;
- Share experiences, summarizing lessons learnt, finding ways how River Basin plans can be implemented more effectively, and;
- Agree on common planning methodologies for the future

126. Covered **topics** were: Improving Urban Water Supply Quality, Groundwater Management, Capacity Building, Water Resource Data, River Basin Planning Guidelines, River Basin Management and Water Fees, Funding, and Implementation.

127. It has been the largest national meeting on water issues up to date and included more than 200 **participants** from national and provincial government agencies across Lao PDR, river basin committees, the National University of Laos, research institutes, non-profit and development organizations, state-owned enterprises and the private sector.

128. Unfortunately, it was not possible for the Outcome Study team to obtain the list of participants and therefore data from only three respondents from the stakeholder interviews is available, one from DWR and two from NUoL/DWR. All three have reported considerable **learning** in the forum, e.g. on water quality (2), preparation to droughts and floods (3), groundwater regulation (1) sustainable financial mechanism (1), legal issues (1), conflicts on water usage (1), needs from the local level, roles and responsibilities in the sector (2). The only mentioned weakness was that implementation of water-related activities by different actors did not become sufficiently clear (2).

129. Two out of three interviewees mentioned **usage of these lessons learnt** in their work, e.g. for the Socio-Economic Development Planning 2015-2020 and proposal writing (1), knowledge which stakeholders consult before implementing activities (1) and teaching (1).

National Water Resource Inventory

130. The National Water Resource Inventory is built on the realization that data on water resources is currently very limited. The data is also located at different Ministries and/or Departments and at different levels. The data sets have not been consolidated and retained on a single platform.¹⁰

131. PoNREs and DoNREs were identified as the entities that could best compile all the data, which could be recorded in a central database. Draft guidelines were written to identify which data to collect and to outline the technical steps that the data collectors need to carry out. A training and **pilot test** was carried out in Savannakhet province, which showed that the guidelines and the draft forms for data-collection were functional and effective in collecting water resources data. The pilot test also showed that PoNRE and DoNRE staffs were interested.¹¹ Unfortunately, the pilot also showed, that implementation would not be easy, given that the staff (around 30% of the staff) has very limited computer knowledge, which would hinders the agencies' abilities to create and maintain the database ...

132. After the pilot test, the guidelines were revised. Approval has not been given for the full implementation because of the lack of budget to carry out the required consultation meeting with all provinces and other stakeholders. Nevertheless, even without final approval, it is believed that the guidelines can be used.¹²

It was originally planned to include 4 areas of data in the inventory: (1) Surface 133. Water Baseline Development, (2) Water Quality Inventory, (3) Water Use Inventory and (4) Ground Water Inventory. Finally, only surface water (including river characteristics) data was collected and included in the inventory, as the preconditions for a broader inventory are not yet met, mainly in terms of availability and/or budget to retrieve the respective information. The database is formed for each of the River Basin. For each river basin, the data includes the following information: area of river basin (provinces, districts, villages), number of meteorological stations, location, elevation, slopes, water classification, quantity of water flow and rain (measured in hydrological station), rivers and sub-rivers. Currently, such information is largely available for 62 river basins.

134. Based on the collected information, 62 maps and 62 fact sheets were produced. A printed Atlas is available but seems to be in scarce supply. Also, although the Atlas is prepared and printed in 2014, the official approval from the Map Department of the National Geographic Department (NGD) has not yet been received. Therefore, no hard copies have yet been handed out and only some PoNREs and MoNRE Departments have received the soft copies on request. So far, only DWR, some PoNREs and DoNREs have used the data/Atlas for modeling and/or for their planning (mainly in order to define the location of River Basins). In the pilot area, irrigation and agricultural companies have asked for the data, confirming its potential usefulness, as soon as the Atlas and the data sets are produced in a larger scope and handed over to the relevant stakeholders.

¹⁰ Unfortunately, the key responsible person for the Inventory, Mrs. Phaylin Bouakeo, was not available for an interview. Therefore some of the information below is not verified.

Unfortunately in some cases, PoNRE and DoNRE leaders took part in the training and not those staff, who would later carry out the actual work. ¹² This opinion was given by Mr. Phingsaliao Sithiangkha, C2.1 Manager

National Guidelines for River Basin Planning

135. In the original concept of NIWRMSP, guidelines for River Basin Planning were only thought to be in preparation of the Nam Ngum River Basin Planning (see C2.2). After realizing that national guidelines are not yet available, the draft guidelines for Nam Ngum were re-designed as National Guidelines for River Basin Planning. A national workshop with participants from all PoNREs and a final workshop in DWR have been held, but the guidelines are not yet officially approved.

136. The document describes 8 **steps** in river basin management as piloted in the Nam Ngum River Basin under C2.2. A difference to the Nam Ngum pilot however is the **institutional set-up**: the guideline does not foresee a River Basin Organization (e.g. NNRBCS) as the core implementer, but lists PoNREs of all related provinces to be the core actor to coordinate the process.

137. As different opinions were given on the issue of institutional set-up, it is not possible to assess which institutional approach would be more beneficial in the framework of this Outcome Study. The guidelines are thought to be of **good quality** and give good guidance in River Basin Planning. Based on the inter-sectoral spirit of IWRM an assessment of their functionality still needs to be verified in other River Basins.¹³ The guidelines have so far been **used** for the Sebang Fai River Basin Profile¹⁴.

¹³ The reliance on local level institutions is by some respondents thought to be beneficial due to their high ownership and their local knowledge. High level of ownership by the provinces can for example be seen in the fact that the Province governor of Vientiane Province has met several times with Mr. David Baringo, one of the international consultants of 2.2. Others believe that high central level power is needed to resolve major river management issues.

¹⁴ This has been confirmed by Mr. Bounheuang Phanthasith, National Consultant

COMPONENT 2.2: Nam-Ngum River Basin Management

138. The Nam Ngum River Basin Management Component is legally based in a Prime Minister's Office Decree No. 293, 2010 and MoNRE's Decision No. 3358, 2012 to establish 2 River Basin Committee Secretariats (RBCS) in the Nam Ngum (NN) and the Nam Kating basins. The Project's objective was to support the implementation of this decree and to put into practice the main river basin management principles. Through the introduction of the National River Basin Management Guidelines, Nam Ngum has de facto acted as pilot area for the national strategy.

139. Nam Ngum River Basin was chosen for its complexity concerning agriculture, irrigation, fishing, hydropower and mining and built on previous ADB and French projects. Sedone River Basin, which had originally been envisioned as 2nd River Basin to be covered, was not implemented as the implementation of two Basins in parallel was after the first two years of slow implementation of the project by the donor agencies not seen any more as doable.¹⁵

140. In **this report**, Component 2.2 are described in 2 parts: (1) description and assessment of all river basin planning processes and outputs, and (2) findings on institutional aspects.

Nam Ngum River Basin Planning

141. The Nam Ngum river basin planning process was piloted in the framework of the project, and have completed the following inter-related **steps and documents**:

- Top-down/bottom-up stakeholder involvement strategy
- Current State of the Basin Report
- Climate Change Adaptation Report
- Nam Ngum River Basin Management Strategy
- 5-year River Basin Management Action Plan
- Integration into Sectoral five-year Socio-Economic Development Plan (SEDP)

142. The overall logic of these processes and documents seems sound and has not been questioned by any of the interviewees. In the following sub-chapters, they shall be assessed more in detail one by one.

Inclusion of stakeholders

143. The **top-down/bottom-up stakeholder involvement strategy** was designed to make sure, that all stakeholders, who should be involved in the river basin planning process, actually do get involved. This Outcome Study, however, has only in parts been able to assess possible exclusion or non-involvement of important stakeholders. As mentioned in the chapter on the methodology, only a single private sector representative could be interviewed. Furthermore, interviewees, particularly on the provincial and district level, had difficulties distinguishing the respective NN river basin planning meetings and workshop from others.

144. What can be said is that there have been **conscious efforts** for broad participation of different government line agencies and the private sector. Furthermore none of the interviewed stakeholders from the private sector and non-MoNRE line

¹⁵ This focus on a single basin was from the beginning covered in the Consulting firms contracts.

agencies has raised concerns that they felt excluded from the process¹⁶. Such evidence indicates that overall the integrated spirit of IWRM has been well considered. Those interviewees, who had participated in related meetings by and large felt that they could raise their concerns without any issues. Only a few issues were reported, e.g. workshop documents not being received before or after the meeting¹⁷. Other concerns were raised¹⁸ on the follow-up action and implementation of the decisions made during the river basin planning meetings.

Current State of the Basin Report & Climate Change Adaptation Report

Assessing the State of the Basin Report is the first step and starting point in 145. River Basin Planning. The Nam Ngum State of the Basin Report was produced by the project. Unfortunately, most interviewees on the provincial and district level had not received or could not remember the report (Nam Ngum Hydropower 1, PAFO Vientiane Province, DEM and Planning Office Vang Vieng, Planning Department and PAFO Xiengkhuang) or do not remember sufficient details to give an assessment (PoNRE, PEM Xiengkhuang, MPI Vientiane Province).

146. Those who remember generally think the report is prepared in good quality but suffers from the lack of required water-related information in Laos PDR (also see more background information given on this issue in the section on the National Water Resource Inventory). Some of the key information could be retrieved from an ADBfunded report in the context of the Nam Ngum 3 dam on water quality problems. The main information that was lacking, as mentioned by the respective experts, was the data concerning the tributary rivers, use of water, pollution, erosion, fish population, and dam operation.

147. A Climate Change Adaptation Report was also prepared in order to ensure the preparedness of the basin in adapting to climate change e.g. increased storms, draughts or floods. It was rather targeted towards higher level officials and academics (who were however not inquired/interviewed under in this study). Except for RBCS, none of the respondents from the provincial or district level could remember the report.

It has been reported by the respective experts that both reports were **applied** in 148. further steps of the Nam Ngum river basin planning.

Nam Ngum River Basin Management Strategy & Action Plan

Based on the analytical reports presented above, a Nam Ngum River Basin 149. Management Strategy has been prepared in 2014. The strategy describes the main conceptual, legal and institutional framework on how to manage and develop the river basin, including its surface and ground water resources. It also gives a vision and general direction on RB development until 2030 while the strategy is valid until 2025.

¹⁶ Interviewed were: from the private sector: Nam Ngum 1 Hydropower; from non-MoNRE line agencies (MPI departments and offices from Vientiane Province, Xiengkhuang Province and Vang Vieng District; MAF department from Xiengkhuang Province, MEM departments and offices from Xiengkhuang Province and Vang Vieng District.¹⁷ Comments were given from Planning Department, Xiengkhuang concerning the River Basin Profile

meetina.

¹⁸ Concerns were raised by the Planning Department and PAFO, both from Xiengkhuang

150. Similarly to the two reports above, the Nam Ngum River Basin Management Strategy was **not received or (not well) known** among all the interviewees on the provincial and district levels, including the most important agencies, PoNRE, MPI, Governor's Office and PAFO from Vientiane Province, PoNRE, MPI, DEM, PAFO Xiengkhuang, DoNRE, Planning Office and DEM Vang Vieng, Nam Ngum Hydropower 1.

151. Only the Nam Ngum RBCS was able to

comment on its quality and thought it delineated clear objectives for the basin, but was not very detailed, mainly due to the lack of available time for its preparation. The strategy has so far been approved by technical staff, but **not yet officially endorsed** by the National River Basin Committee and not distributed yet. The draft version has been presented to key agencies from 6 provinces.

As neither the interviewed PoNRE nor 152. MPI staff knew details about the Nam Ngum River Basin Management Strategy, they also did not give an opinion about its integration into the Sectoral 5-year Socio-Economic **Development plan**. However, the MPI Vientiane Province¹⁹ and the RBCS both believed that it integrated. According was well to Mr. Phousavanh Fongkhamdeng, DWR Admin and Planning Division Vice Head, the strategy is only integrated into MoNRE / PoNRE / DoNRE plans, but not into plans by other line agencies. This opinion was confirmed for Vientiane Capital,

Output 2 Indicator 1

Two basin plans are published by MONRE in collaboration with basin management organizations

The Ngum River Basin Management Strategy has been written, but not yet officially approved and therefore not distributed yet. An Action Plan is expected to be finalized within 2015.

Outcome Indicator 2

At least two major river basins have IWRM plans fully integrated with province and national plans

Integration of the Ngum River Basin Management Strategy into the Sectoral 5-year Socio-Economic Development plan is reported for Vientiane Capital, Vientiane Province and Xiengkhuang but no information is available for Luang Pabang, Xayxomboune and Bolikhamxay.

Vientiane Province, Xiengkhuang, but no information is available for Luang Pabang, Xayxomboune and Bolikhamxay. The late submission of the Action Plan (after the 5-year planning period) is not believed to cause major problems, since it can potentially be included into consecutive annual plans.

153. While a strategy was originally believed to be sufficient as basis for the Nam Ngum river basin development, in later stages an additional action plan was thought to be necessary to translate the strategy into more concrete and prioritized actions. Therefore, a **5-year River Basin Management Action Plan** was added in 2015 in relatively late stages of the project²⁰ and is expected to be finalized in October 2015. None of the interviewees from the provincial or district level had enough knowledge to comment on the process up to date.

The Nam Ngum Water Quality Issue

154. One particular issue in the Nam Ngum River Basin, addressed by NIWRMSP, is the lack of oxygen in the water, which lead to the **death of its fish population**. The

¹⁹ This was said by Mr. Khamsone Sounsavath, Deputy Head

²⁰ This is the opinion of Supalerk Jansart, NIWRMSP CTA and also by Jorge Ocon de Diego, Project Manager of IDOM. However Mr. David Baringo, River Basin Consultant, thought that the action plan had actually been part of his contract but could not be done due to time constraints.

project, with RBCS in the leading role, has so far organized 3 water quality events to debate and discuss potential solutions for the problem, including a discussion of the results from an ESMP sponsored study on the water quality problem.

155. While international experts seem to agree, that the **problem is caused** by rotting biomass in the area inundated by the dams, the opinions by interviewees from the provincial and district level were not so clear. The dams were seen as (i) main cause of the problem by 3 interviewees, as (ii) one amongst several causes by 1 person, and (iii) not as the cause by 7 interviewees. One person did not know and the respondent from the Nam Ngum Hydropower plant denied that there was a problem.

156. Other **causes** for the water quality problem that were listed by the interviewees include:

- Mining along the rivers (7 respondents);
- Industrial crops which are planted (6);
- Sand collection (3);
- Erosion of soil (2);
- Pollution from the general population and small businesses (2);
- Construction activities (2);
- Monsoon weather (stirred/blurry water, strong stream);
- Animal husbandry along rivers;
- Deforestation; and
- Climate change.

Nam Ngum River Basin Management – Institutional setup

157. The task of the **Technical Working** Group was to prepare the River Basin Committee meeting. Several meetings²¹ have taken place, including 8 province agencies and village representatives from upstream and downstream provinces. The objectives of the meetings were mainly to identify the main issues for discussion in the Committee, to identify the different interest and positions of the different participants and to brainstorm for possible solutions. According David to Baringo, International Consultant for Package 2, the technical level of the participants was not high,

Output 2 Indicator 2

NNRBC is established and operational

The Nam Ngum River Basin Committee is established and the general institutional setup, including responsibilities is clarified and well ac cepted by members. So far, there has been limited concrete implementation of activities and the sustainability is not yet ensured both from the financial and the technical side.

but they showed interested. The only respondent of this study, who knew about the Technical Working Group found all above mentioned functions well covered and the meeting useful, but it would require a better wrap-up / summary of the results.

158. On the 18th October 2013, the first (and so far the only) **River Basin Committee meeting** was carried out in Vientiane Province. 81 committee members of 9 Line Agencies from 6 Provinces and the central level (including high ranking officials) plus 5 people of the private sector (hydropower and mining companies), 7 people of the NNRBCS staff and 6 consultants participated. Not invited were representatives from

²¹ According to Mr. Bounthai Xaysannavongphet, Head of NNRBCS, there were 4 meetings. According to Bounheuang Phanthasith, Deputy Team Leader of IDOM, 2 meetings

NGOs and NPAs. The Governor of Vientiane Province as the first Chairperson of the NNRBC was officially appointed for a five-year period.

159. Main **topics** in the meeting were the transfer of the RBCS to Vientiane Province. The meeting also allowed exchange of opinions on River Basin issues between upstream and downstream provinces. Also, the draft regulation (on implementation and responsibilities on management and development of Nam Ngum water basin between central, province and district levels) and main outline of the Nam Ngum River Basin Plan were agreed upon at the meeting.

160. Interviewees usually mentioned both

Outcome Indicator 1

By the end of 2015: Effective river basin committees operating in at least two basins

So far in the Nam Ngum Basin, the committee has met once. The meeting was focusing largely on its own institutional and organizational issues and general exchange of ideas and experiences.

strengths and weaknesses of the meeting, but around 1/3 of respondents could not give any opinion. Main **strengths** mentioned were the cross-sectoral integrated nature of the event (6 respondents), including high level representatives (4) and including the private sector (1). As outputs from the meeting were mentioned the clarification of roles (1) and common planning (1), including funding issues (2), more knowledge on water quantity and quality issues (1). All mentioning of **weak points** concerned the very low level of implementation (5), which is attributed to lack of budget (2) clarity of responsibilities (3) and the difficulties to demand actions from other provinces (1) or the private sector (1).

161. A second meeting had originally been envisioned, but the Nam Ngum River Basin Strategy had not been translated to Lao and further technical preconditions for the meeting were not met yet (because of the recent relocation of the RBC Secretariat). As previously mentioned, the National Strategy has not included an RBC, which from a legal standpoint might endanger **long-term sustainability and continuity** of the committee meetings. Funding is expected to be a major issue if there is no further support from the donors, especially in term of

Output 2 Indicator 3

NNRBC communication plans are implemented by 2013

A Participatory Planning and Communication Plan for RBCS was written in 2014 Out of the 7 tasks specified in the plan, 5 tasks could be followed up. Three tasks were partly implemented and two were not..

operational budget. From the technical perspective, the capacity and operationality of the Secretariat is still perceived to be limited. According the their self-assessment, the Secretariat understands its responsibilities well and currently has good capacity to coordinate and facilitate, define water quality, design a website and do some modelling. Capacity is still limited concerning impact assessments, data-maintenance and indepth RBM knowledge²² and external consultant support would be needed to organize the 2nd national forum. Furthermore, only a single tool for water quality measurement is available there is a general lack of information on water issues.

162. The **Nam Ngum River Basin Secretariat** has been the main organization to prepare and facilitate the committee meetings and manage the overall river basin management planning and implementation process. Originally set up as a Department

²² According to consultant opinion, this also includes the capability to identify the main topics for the basin

on the national level, RBCS was **moved under the PoNRE of Vientiane Province** in 2013. While the move can be seen in the context of the Sam Sang policy (PM decree 10), reasons for the transfer are mostly seen in the previous existence of partly overlapping national institutions and resulting difficulties of the RBCS to work with local institutions. While no discussion on the benefits and costs of this move shall be engaged here, it can be observed, that opinions on the restructuring are divided (both amongst Lao and international experts). The positive response on the restructuring reported by respondents include: (i) better inclusion of RBCS in the regular structure of MoNRE and (ii) the increased functionality of the RBCS under PoNRE. On the other hand, some respondents also indicated some doubts on whether RBCS, with its lowered ranking, can exercise enough authority to steer river basin management. Other negative opinions include overlaps and coordination with PoNRE itself on its tasks and responsibilities.

163. About one quarter of respondents from the provincial and district level could not give an **assessment** on the work of the RBCS. From those who responded, the gathering of information on problems (1) and information sharing (1) function were mentioned and there has been observed high motivation by their staff. However the secretariat has also been suffering from several changes in their leadership and, with staff coming from various backgrounds, a general lack of experience with river basin management. Therefore, the technical capacity is still limited and the lack of concrete implementation of activities (4) is the main concern mentioned by respondents. Also for the secretariat, sustainability is critical and will probably need further donor support to ensure operations in the future.

COMPONENT 3: GROUNDWATER MANAGEMENT

Ground Water Management

164. The relevance of the work done on Groundwater Management under NIWRMSP is apparent and is widely believed that the Program has addressed the most urgent issues. Despite its importance, the groundwater issue has largely been neglected so far²³ and was not mentioned in the previous Socio-Economic Development Plans.

165. A major problem in the **design** (and later implementation) of the component was that the systems, information and capacity concerning groundwater issues in Lao PDR have been overestimated. It only became clear after the work had commenced that the capacity on groundwater management was very low and that the data and information were basically non-existent. The overestimation of the capacity and data therefore poses major challenges in delivering the outputs that was anticipated during the design stage, especially because limited time input is provided to the International Consultant²⁴. Overall, the work of C3 constitutes basic groundwork on groundwater issues in Lao PDR, which can in the future be built on.

166. An additional challenge the to implementation was that the DWR (and its Groundwater Division), which in terms of their mandate probably would have been closest to the activities implemented, had yet been set up at the start of the project. Therefore, the counterpart institution has become (and remained throughout the implementation period) the Natural Resources and Environment Institute (NREI), which is not an implementing agency, but rather, a MoNRE research agency. It is believed by the C3 consultant that, although such project set up did not cause major problems, it has somewhat limited the involvement of the implementing agencies in the relevant technical work and ownership, in particular

Output 3 Indicator:

Groundwater Management Plan is published for major aquifers by end 2014.

A Groundwater Management Plan for major aquifers could not be written, because the location of aquifers in Laos is not yet known due to the unavailability of first-hand data. Pilot well drilling, which might have initiated their step-wise clarification on groundwater could not be implemented. As substitute output to the Groundwater Management Plan, a high quality Groundwater Action Plan has been drafted and expected to be officially approved soon.

the DWR Groundwater Division. As most of the produced outputs under C3 is research-oriented it is not said that NREI was an inappropriate choice as counterpart institution. Furthermore it is confirmed by DWR²⁵, that they thought to be sufficiently involved in the implementation under the component.²⁶

²³ An exception to this is IWMI, which is working on groundwater.

²⁴ In terms of the workload actually lifted and the expertise needed, it seems that the allocation of months to the International Consultant (4 months) was rather low in comparison to the national Consultant (22 months).

²⁵ This opinion was given by Mr. Phousavanh Fongkhamdeng, Vice Head of the DWR Administration and Planning Division, and PMU Vice Head

²⁶ This was also ensured through the Inter-sectoral Working Group on groundwater

167. In the following sections, the main outputs of the C3 work are discussed in more detail. The C3 outputs included:

- National Ground Water Pilot Study
- Groundwater Resource Assessment and Map
- Groundwater Information Management System
- Training Needs Assessment and Groundwater Trainings
- Stakeholder Assessment
- National Groundwater Action Plan

168. The Feasibility Study for a National Ground Water Research Center in NUoL's Faculty of Water Resources (FWR), which is explored as one possibility to ensure sustainability on groundwater knowledge in Lao PDR is not reported below, as it had not been implemented at the time of the data-collection for this Outcome Study.

National Ground Water Pilot Study

169. The National Ground Water Pilot Study is related to the C3 indicator, demanding that a *"Groundwater management plan is published for major aquifers by end 2014"*. Since the locations, extent, production potentials, and other characteristics of major aquifers in the country are as yet unknown, the Study was **supposed to** assess the groundwater conditions in a pilot area and thereby contribute to the identification of these aquifers and the establishment of a groundwater monitoring and management plan.²⁷ At the same time usable wells would be constructed and the condition of existing ones checked upon. The (management of the) pilot drilling was also supposed to act as capacity building for (yet inexperienced) water sector technical staff and feed data into the Groundwater Information Management System.

170. The activity was however **not implemented**, as quotations by bidding drilling companies were higher than the planned budget ceiling²⁸. As the contract of the International Groundwater Specialist had already ended and his technical support would be required to support the activity, continued attempts to procure the equipment and the contractor took too long²⁹ and therefore had to be cancelled.

171. Therefore, the **outputs** produced as part of the Pilot Study are a set of draft manuals and Powerpoint presentations describing the methodology in details on how to carry out a ground water study, which has not been used up to date.

Groundwater Resource Assessment and Map

172. The **objectives** of the Groundwater Resource Assessment were to assess probable groundwater resources, conditions, usage and demand at the national level for Lao PDR. Due to the lack of a Groundwater Information Management System and the insufficient number of well records, the originally envisioned approach was not followed.

 ²⁷ Since for each 20-30 km², 1 well would be required, a complete mapping of the country would be very costly and is in mid-term hardly possible to finance.
 ²⁸ A contributing factor to the high price was, that there is limited competition with only a few drilling

²⁸ A contributing factor to the high price was, that there is limited competition with only a few drilling contractors available in the country having the necessary equipment.
²⁹ The earlier mentioned complex ADB procurement roles certainly played a role in the failure to quickly

²⁹ The earlier mentioned complex ADB procurement roles certainly played a role in the failure to quickly carry out the procurement. Also the slow reaction to the issue by the CTA and the fact that this activity had not been included in the initial contract of the Ground Water Specialist contributed.

173. Therefore it was decided to produce two **outputs** as substitutes: (1) a Groundwater Resource Assessment Report for the Vientiane Plains in the Nam Ngum Basin, based on the data produced by a previous study by JICA, which can act as guidelines for further assessments and (2) a rough estimation on the availability of groundwater resources in the country based on indirect methods in the framework of GIS models covering the whole country, displayed in the International Specialists' Consultant Report in addition to the information being available in a GIS database. Two interviewed international specialists and NREI confirm the high quality of these products (especially given the contractual circumstances), their informational value for the groundwater situation in Lao PDR and their potential guidance in how to carry out further assessments.

174. Unfortunately, up to date these outputs have so far only been absorbed to some degree by IWMI's work on maps. NREI has not yet **used** the maps, as they do not engage in drilling well regulation and do not carry out groundwater-related research. They have also not been promoting the national map to other stakeholders because of doubts about their accuracy. The GIS database theoretically could be used by DWR for planning for drilling (an activity which also has not been carried out by DWR yet). Potential usage by DWR is also limited by the fact that the maps were not known to the DWR Groundwater Management Division.

Groundwater Information Management System

175. The Groundwater Information Management System is, in the long term, supposed to form part of the National Water Resources Inventory, promoted under NIWRMSP C2.1. The system is considered to be a key tool in obtaining more information on the quantity and quality of groundwater, which could eventually be used for the production of more precise groundwater maps.

176. The **system consists** of a standardized National Groundwater Well Log Standard Form, which should be filled out whenever wells are drilled. A Water Well ID scheme ensures clear identification of all wells. A MS Access database to enter the respective information is designed, however only for its data-entry features, but not for the modules for summary or analysis.

177. These produced **outputs** are considered to be technically solid, but the collected (partial) information on 20 wells in Vientiane Province has not yet been entered into the system, and therefore, the system is not yet fully tested and might yet need adjustments / simplifications. Its finalization (especially of the remaining MS Access modules) cannot be done by NREI and would need external support. For these reasons the database is not yet used, neither by IWMI nor by the DWR Groundwater Management Division, both of which use separate (but mutually exchanged) MS Excel files to record information and do not immediately plan the usage of the Access version.

178. Also, the standardized National Groundwater Well Log Standard Form is not yet in use. As above mentioned, drilling by NREI and DWR is not yet carried out and other stakeholders are not yet obliged to use the form, also due to the absence of a law or regulation, which would demand this. Therefore, the Form has not yet been distributed.

Training Needs Assessment and Groundwater Trainings

As previously mentioned, groundwater management knowledge in Lao PDR 179. was found to be considerably lower than initially expected. The Training Needs Assessment was carried out with the objective to clarify the training needs on groundwater issues of staff in DWR, NREI, and NUoL/FWR. As capacity building had not initially been much considered in the C3 concept and not included in the International Groundwater Specialist's ToR³⁰, little time was available to carry out the assignment.

Two open book exams for DWR, NREI, and NUOL/FWR technicians and 180. lecturers were carried out to objectively test their capacity and knowledge on groundwater management. The results were well accepted by the related agencies and showed the urgent need for training. It also identified those persons most eligible for further short- and long-term training.

181. Unfortunately, trainings have up to date not yet been implemented. This was because there was, amongst other reasons, a change of the responsibility for the training from C3 to C1 and because of the difficulties to find an appropriate trainer. However, the first training is soon to be carried out and the training needs are recorded in the Groundwater Action Plan, which might, in the mid-term, lead to further training opportunities. The training was however conducted in October 2015 and therefore the outcome/outputs are not covered in this Study.

Stakeholder Assessment

As vital input to the creation of the National Ground Water Action Plan and other 182. work, it was necessary to understand the role and responsibility of key public and private stakeholders, to get an overview on groundwater users and on the groundwater information needs of all these stakeholders.

183. With these objectives, the Stakeholder Assessment was conducted by the International Groundwater Specialist³¹ with the involvement of a working group and including the DWR Groundwater Management Division. The first draft was not accepted (also because of difficulties to meet with stakeholders), but the second version broadly included a large range of government agencies, CSOs, donors, commercial users and communities. It is however also remarked, that the assessment is made only on the level of organizations and not on the level of the respective suborganizations or positions. It reportedly also showed minor overlaps between NREI and the DWR Groundwater Management Division, which in reality do not exist.³² Due to the timing of the assessment, it could also not yet take into account any more changes made in the government structure in 2013³³. Nevertheless, the Stakeholder Assessment is thought to be conducted appropriately by stakeholders from DWR

³⁰ It only included on the job training as mode of capacity building

³¹ An open question remains, why the national Groundwater Consultant (with a contract of 22 working months) did not take over this assignment, as most other assignments had already been carried out largely by the International Consultant.

This was remarked by Mr. Ounakone Xayviliya, Head of the DWR Groundwater Management Division

³³ By the time, the assessment was made, the new responsibilities were only in Lao language and not yet approved

Groundwater Management Division, NREI and other international experts and could well be used in the preparation of the Ground Water Action Plan.

National Groundwater Action Plan

184. The National Groundwater Action Plan is the key Output produced by Component 3 and is replacing the initially planned Groundwater management plan for major aquifers, which had to be abolished for the lack of data on these aquifers and the acknowledgement that groundwater work in Lao PDR is less advanced than originally expected. Main objectives of the plan were to raise awareness on the issue of groundwater and summarize the most important activities and thereby increase the chances of and give orientation to funding.

185. The first **draft** was thought to be high quality in substance, but rather brief³⁴ and overly technical in nature. Therefore another consultant was hired to improve the plan. The adapted version largely retained the activities from the 1st draft, but included more capacity building measures, consultations and linkages to government policies with references to ground water. Management and planning related issues as (revised) costing, timelines and a log-frame with concrete deliverables and outputs were also included.

186. The result of the final draft is thought to be good quality by all interviewees. The only **weaknesses** mentioned were: (i) a limited availability of information on groundwater (for the background, see previous chapters), (ii) that some comments to the first draft were not taken into account³⁵ and (iii) that the proposed plan requires a very high budget. Particularly **strong features** of the plan were a thorough underlying analysis of the situation and the comprehensiveness and appropriateness of the suggested actions. Therefore, the action plan is thought to be a good starting point for the Groundwater work in Lao PDR, with its major achievement, bringing clarity on the main priorities concerning a previously hardly understood issue.

187. The **approval** of the plan is not believed to be problematic as many stakeholders have already been involved and agreed to the plan. Approval is expected latest by the end of 2015.

188. The DWR Groundwater Management Division has confirmed, that they will promote the distribution of the plan to stakeholders and that it will help to propose activities from donors and government, which was previously was difficult. In order to acquire **funding**, it will however be essential to write and submit proposals. More potential for funding and continued support by international experts can be expected from donor agencies, while the funding from the government are expected to be relatively minor.

189. A major achievement, also facilitated by NIWRMSP, is that, for the first time, groundwater is mentioned alongside surface water in the **Socio-Economic Development Plan** (SEDP) 2015-2020. As the Groundwater Action Plan would only have been an Annex to the SEDP, the (late) approval of the plan at the end of 2015 is

³⁴ Also here it needs to be acknowledged, that the Consultant had little time to carry out the whole scope of tasks in the given time.

³⁵ This was mentioned by Mr. Ounakone Xayviliya, DWR Groundwater Management Division

not believed to have major implications for the possibility to receive funding in the next 5 years. $^{\rm 36}$

³⁶ The SEDP is also based on the National Water Resources Management Strategy, which mentions groundwater

COMPONENT 4: IWRM EDUCATION AT NUoL

190. It shall be noted that this Output Study was completed before many important activities and key documents were conducted and finalised, including:

- The 2016-2025 Development Strategies and Action Plan, Faculty of Water Resource, National University of Laos;
- IWRM Curriculum Teaching Manuals;
- Collaborative Flood Modelling Trainings;
- Trainings on Introductory Course of Ground Water Monitoring and Management;
- Feasibility Study of Ground Water Training and Research Center;
- Exchange visits with regional universities;
- Lao Water Research Seminar;
- FWR's Team Building Training; and
- FWR's Senior Management Training.

Change from Department to Faculty of Water Resources

Historical Background

191. The Faculty of Water Resources (FWR) of Tad Thong evolved from the independent 'College of Irrigation'. In 1995, it was integrated into the NUoL as the Department of Irrigation, within the Faculty of Engineering. In 2008, it was renamed Department of Water Resources Engineering and in September 2015, the campus starts its first academic year as a Faculty. According to key interviewees within the (now) FWR, the change to the status of Faculty has been wished for several years, at least since 2008 when the WRM curriculum first started. Support from ADB's "Nam Ngum River Basin Project" had been provided to develop the first WRM curriculum.

Implications of Becoming a Faculty

192. The change from Department of Water Resources Engineering to Faculty of Water Resources has fundamental **implications in terms of responsibilities, regulations, opportunities as well as awareness** about the curricula that are taught. Decisions do not have to be clarified with the Faculty of Engineering anymore, key staff conveniently works on one campus (Tad Thong) for better communication, more direct ways of communication with partners and the NUoL are now possible as well as funding opportunities from the NUoL or other stakeholders such as NGO's³⁷ have improved. For instance, budget for the construction of a new building was recently allocated by the Ministry of Education. Most of all, the Faculty status demonstrates the growing importance that water resources and water management issues are given in the scope of national developments. Alongside, interest of students as well as of opportunities for capacity building for the faculty staff are expected to increase.

³⁷ Some former students also provide help to the campus, for example, video projectors or a small toilet unit.

Difficulties of the Transition

193. Increased roles and responsibilities however also bring along **challenges and difficulties**. Many interviewees mentioned current lack of experience and capacity in management, the lack of staff (in terms of qualifications and number) and the lack of sufficient and proper equipment as the main weaknesses. Given additional roles and responsibilities³⁸ on top of present working descriptions (lecturers sometimes cover up to 2-3 positions), challenges arise in terms of workload and experience to cope with new tasks as well as new teaching subjects. In addition to this, 50% of the staff are employed on a temporary or part-time basis or even as volunteers. **Academic qualifications / degrees** of the staff are also limited. Interviewees have reported that these have not yet matched with the standards (that serve more like targets) of the NUOL. Moreover, specialist positions for some topics taught are vacant (e.g. modeling, which requires ability to use water management related software). Comments made about the **lack of sufficient equipment**. This includes the absence of a proper laboratory and practice facilities (e.g. for tests, modeling, hydraulics).

194. The current lack of capacity (in term of quality and quantity), equipment and facilities of FWR could result in having students graduating without much practical experience. The library was, for instance, said to be small, not up-to-date and lacking of books and manuals on IWRM subjects (particularly on modeling and general water management). The general poor conditions of the facilities³⁹ and lack of vehicles to transport students were also mentioned.

Role of NIWRMSP in the Change Process

195. The change of status was **significantly supported by NIWRMSP**. Most of the respondents (including high level stakeholders) acknowledged that the project has considerably supported some key issues, which include the following:

- Support during the change process of becoming a Faculty and expanding the scope of the institution from irrigation to water resources,
- Enhanced knowledge of lecturers,
- Increased stakeholder connections,
- Some provision of academic equipment (this has been described as very helpful though as not yet sufficiently in regards of actual needs),
- The improved quality of curricula (through exchange with international consultants).

196. Related to these issues, respondents described an increased ownership and, generally, attitude by the FWR team to bring things forward, considering now e.g. a wider intellectual framework and set of objectives.

³⁸ Examples are student life and rules management, management of other activities (such as sports, etc.) and management and distribution of grants to specific students or additional assignments to care for international cooperation and post graduate research.

³⁹ However, new buildings are under construction.

WRM Curriculum

Background and Relevance

197. The Water Resources Management Program curriculum was first introduced as a five years Bachelor program in Tad Thong Campus in the academic year 2008-2009. In the academic year 2011-2012, the new, four years version of this curriculum was introduced. This change in number of years goes along with the change of the secondary and upper secondary school programs from a total of 6 years to 7 years, which was decided by NUoL. NIWRMSP has provided academic support on the development and improvement of the four years curriculum through international consultants and reviews of the water sector's needs and feedbacks. Generally, it has been acknowledged by the respondents that water resources management is of high relevance in Lao PDR and that having a Faculty able to produce professionals that are qualified on this specific issue is necessary.

198. Unlike irrigation, IWRM is more cross-sectoral and related to several different interest groups. The FWR now has three curricula which are "Irrigation", "Water Resources Management" and "Meteorology and Hydrology". The latter has been developed very recently and being offered to students who start the program in the 2015-2016 academic year.

Comparison of the Two Versions of Curriculum

199. The first WRM curriculum (a five year programme) included a wider range of more general topics (such as Math, Physics, etc.). Reducing the programme to 4 years meant also to reduce the total number of credits from 180 to 150. "General Basic Subjects" got reduced from 40 to 20 credits (50% reduction), the "Basic Engineering" subjects were increased from 38 to 42 credits (10% increase), "Main Subjects" and "Research" (named "Professional Subjects (including Thesis)" in the new curriculum) were only reduced from 99 to 84 credits (15% reduction).

200. The new curriculum focuses on engineering as well as it now offers professional and specialized topics (such as Hydrology, Planning and Management, Water and Environment), as it was also described by interviewees. The Faculty's team was also thought to try much harder in allowing students to learn the professional topic of their choice. The Tad Thong Campus now offers three different curricula which correspond to 7 Bachelor majors (specializations). The Irrigation curriculum offers "Irrigation Engineering" and "Irrigation management". The Water Resources Management curriculum offers "Hydrology", "Planning and Management" and "Water and Environment" and the Meteorology and Hydrology curriculum offers "Hydrology" and "Meteorology". It was advised by some respondents that the latter curriculum should remain as an available specialization option under the umbrella of the WRM curriculum and that the FWR should develop masters degrees.

Labour Market Survey

201. The objective of the Survey was to get to know about needs and recommendations of various stakeholders (private, public, etc.) on the education of

WRM graduates. Comments will also be merged from a study with the same objective from 2012. 40

202. The Labour Market Survey was carried out during the academic workshop, "The Challenges of IWMR Education" on May 7th - 8th 2015, which had 70 participants from the water sector (GoL Departments from Provinces and Capital, NGOs, private sector). The objectives of the workshop were to discuss, raise awareness and get feedback from a wide range of stakeholders on the needs of development of education in WRM, on a presentation of the strategy and action plan to strengthen WRM education at FWR / NUoL as well as on challenges and opportunities of a Faculty status. Some respondents also outlined the limited level of detail of the survey results. The respondents of the Labour Market Survey were mainly affiliated with the Irrigation Department and the sample may thus not be sufficiently diverse as well as respondents' activities were only little related to IWRM.

203. Respondents from the Graduate Demand Survey were largely represented by management staff from companies based in Vientiane and responses may thus not well reflect technical staff's expectations on the future workforce.⁴¹ Interviewees of both surveys confirmed the great need of skilled WRM specialists / workers. When asked to **compare** the request from the Labor Market Survey with the contents of the actual **curriculum**, respondents confirmed that requested topics and capacities were part of the curriculum.

Relevance of the Curriculum to the Lao Market – an Assessment by Practitioners

204. Three batches of WRM graduates have now potentially entered professional life and most FWR stakeholders explained that no assessment study on the knowledge of WRM graduates fitting actual demands in the water sector. Some respondents expressed that the new curriculum is more specialized and professionalized, however that the knowledge of graduates only gradually adapts to the needs of the water sector. Knowledge of graduates is expected to further increase along with the capacity of FWR staff to fully implement the curriculum. Stakeholders from relevant departments of GoL (DWR, NREI) met during this outcome study and underlined the high relevance of a WRM curriculum in the Lao context (dams, floods, draughts, increased use of water, etc.). They expressed confidence that there will be demand for graduates in this field and gave a positive feedback on the few graduates who already work in their organizations. They consider that the WRM graduates have a much higher starting point of knowledge when joining the water sector professional world and stressed the cross-sectoral aspect of the curriculum along with its high relevance to the Lao context as a positive fact.

⁴⁰ When asking about the Labour Market Survey, it was found out that a previous survey "Graduate Demand Survey" had been realized by Component 4 in 2012. This caused the respondents to be confused when asked about this study and therefore the answers they provided sometimes applied also to the "Graduate Demand Survey". The Graduate Demand Survey interviewed 11 people from the water supply, the mining and the hydropower sector. A report was written in Lao language to summarize the findings of this survey.

this survey. ⁴¹ Consequently, the expectations of some respondents in terms of education were higher than the current capacity of the graduates and the FWR (e.g. higher degree (masters) for managing positions, good command of English language, etc.).

Quality of New Curriculum

205. Given the educational level of entering students, respondents expressed understanding in the difficulty to create a curriculum that meets professional standards. Yet, they thought the design to be greatly facilitated by the input of the program's international consultants.

206. FWR respondents reported not having the ability to neither judge a better fit of students to the water sector nor the quality of the curriculum so far. General positive comments and specific weaknesses have been collected. These include:

Positive Comments:

- + Given time to practice in the curriculum
- + topics are less numerous but more specialized than the previous curriculum

Specific Weaknesses:

- Topics around groundwater and modelling are not detailed enough yet
- FWR limited teaching capacities
- Curriculum does not yet offer a complete set regarding river basin management issues
- Important aspects of the curriculum are still missing or incomplete⁴²

Putting the Curriculum into Practice

207. The current **implementation of the curriculum is limited**. The knowledge and command of some IWRM topics by the FWR team is not complete, as most of the lecturers come from an irrigation background. As a consequence, about 20% of the curriculum cannot be properly taught yet (including e.g. stochastics, dynamic programming, generic algorithms, climate change). Besides, some topics are still taught by DWR staff (mainly on modeling, stochastics, computations and ground water). Available books and manuals are also not sufficient or appropriate for some topics. Moreover, the equipment necessary to actually realize the different practical activities that are included in the curriculum is not sufficient or almost non-existent (Laboratory).

208. The implementation of the curriculum, theoretically and practically, is not yet up to a satisfactory standard.

Institutional Strengthening

Background

209. Three strategy and action plans have been written concerning institutional strengthening (2005-2012 by NUoL, 2012-2015 by the RTI consultant and supported by NIWRMSP, and 2015-2025 which is currently being developed by FWR team with support by the NIWRMSP).

⁴² Such as the details on the specific targets to be reached, knowledge to be acquired by the students, as well as the specific handbooks to use and the necessary knowledge to be owned or learned by the lecturers. Methods and guidelines as well as a whole set of reference teaching documents and material to use have been developed and are being provided to the FWR team by the Program's consultant.

210. It should be taken into account that interviewees that have not been completely aware of the succession of plans often got confused between the current and the previous plan designed by the RTI consultant.

Review of the New Plan (2015-2025):

211. The general appreciation of the current, latest plan is rather positive. High level FWR respondents consider that it covers (or will cover) all necessary aspects and consider to approve it. Roles and responsibilities of each unit are strengthened and clarified, referring also to clear indicators. The Program's consultants described the Plan as **a starting process**, along with positive comments on the approach of the FWR team. There is an increasingly pro-active approach on the formulation and structure of a plan.

212. However, Program's **consultants currently describe the plan's level as still weak**. It was advised to design it for a much shorter period, in order to keep it alive and more connected to the present and to also include a proper monitoring system.

213. The new Plan approaches the following main issues, with the associated focus / objectives:

- Human Resources Management (Positions and responsibilities better defined, target ratio of PHDs, Masters and Bachelors in the education team based on NUoL target (1 PHD, 6 Masters and 3 Bachelors), increase knowledge and total number of staff.
- Library / Facility Management (Evolution from a hand-written system, towards a computer-based one (library)
- NUoL's "Equipment and Property Management System" is in the plan.
- Gender (Increase the education (academic) level of women, access to higher positions also depends on academic level)
- IT support (increase the speed of the internet network from ADSL to Fiber, have proper IT staff for actual support)
- Cooperation with other universities in the regions and internationally (Further develop and increase existing cooperation relations, knowledge exchange of teachers, funding opportunities).
- Research capacity building (research workshops) (develop Groundwater Research Institute on the campus (very long term), become reference in the national sector)
- Administration and Leadership skills (increase ownership and active management, improvement of relations with students (administration and education bodies)

Implementation of the 2012-2015 Plan by Main Issues:

Human Resources Management:

214. HR management concerned the development and improvement of the education level of the lecturers. The target ration of PhDs, Masters, and Bachelors was almost reached (more than 90%). Unfortunately some FWR team members changed to other faculties and most people still need to develop a better command of English language (about 70% people).

Library/Facility Management:

215. No major change has happened since the last years. The librarians have started registration of all the books and documents digitally. The overall recording of use of facilities and equipment has already improved and is now clearer (arranged according to codes).

Gender:

216. Qualified women are much more represented nowadays. 2 women have a Master's degree and 7 have a Bachelor degree. One Woman is completing a PHD and one is completing a Master's degree. The NUoL provides important help to increase the academic level of staff through e.g. covering some of the fees for both men and women⁴³. Today, there is a female "Deputy Head of Department" and two female "Head of Units"

IT Support:

217. The current IT support is very limited, largely because teachers hold IT responsibilities. The installation of the current WiFi internet network, supported by NIWRMSP, was part of the previous plan and has been implemented. Unfortunately, its quality is very limited and it can't be properly used⁴⁴. Although now students are granted access to internet, many use an air-card or their smart-phone to access the internet due to its low quality (the interviewed students estimated that about 80% of all students have a laptop).

Cooperation with Other Universities Regionally and Internationally:

218. The Faculty of Water Resources has cooperation activities with six universities in Thailand (Chulalangkorn, Mahasalakham, Khonkaen, Kasetsat, Asian Institute of Technology and Rajamangala University), two universities in Vietnam (Hanoi Water Resources and Hanoi University of Natural Resources), and with three national universities (Souphanouvong in LouangPrabang, Champassack and Savannakhet). The cooperation relations with AIT, HUNRE and Rajamangala Universities have been initiated through the Program's activities.

Administration and Leadership Skills:

219. Currently, progress is still ongoing to reach the objectives of this 2012-2015 plan. Only the relation to students has been reported as improved. This can be a consequence of an increased confidence by the lecturers and staff, provided by trainings and international consultant's support on teaching and planning.

⁴³ For Master's 70% is covered, for PHDs, 30% is covered and Bachelors have to be fully paid by the teachers themselves.

⁴⁴ ADSL is not adapted to needs of a Faculty, too slow. WIFI signal set up poorly since many rooms have low signal. Usable about 1 day per week.

Teaching and Learning Support

Capacity Building for Teachers and Staff

220. **Component 4 has organized several capacity building events,** including seminars on general IWRM, trainings on GIS and remote sensing, basic hydrological measurements, and study tours to universities in Thailand. It must be taken in account that some of these trainings were implemented three years ago. Therefore, respondents sometimes had trouble remembering details.

Seminars on IWRM:

221. The seminars have been organized in two sessions of five days in February and November 2012. They covered various IWRM topics such as: River basin management; Water resources planning; Integrated flood risk management; Water law, policy and administration and Water and Environment. A total of 21 FWR team members participated, of which 15 joined as trainees. Five interviewees reported on this training. The choice of the topics was appropriate since they were chosen by the staff itself (meeting with all the lecturers). The quality of the contents was satisfying for many interviewees, learning about new topics or refreshing knowledge. However, the many subjects taught in a limited amount of time, combined with the exclusively theoretical approach, made it hard to learn properly. The frequent use of English language along with a too short or incomplete translation also limited the benefits of this seminar. As far as the material and documents are concerned, the language was also often a problem and some respondents were never provided Lao language versions. Since many topics were covered, every staff member only uses selected specific parts of what they have learned, when teaching.

GIS and Remote Sensing Training

222. This training took place in October 2012 for four days with a total of 13 participants. Three interviewees reported on this training. The training was generally well appreciated and interviewees thought it to fit their needs. The participants could increase their knowledge on modelling, GIS 10.1 software use, as well as generally on IWRM. The only weak point mentioned about this training was that some documents were only provided in English language.

Basic Hydrological Measurements training:

223. This training was implemented in the end of 2012 with 14 participants, including 12 teachers. Two interviewees reported on this training. The training was conducted in Lao language. Participants thought to have increased their knowledge on water / stream measurement and on computer based calculations. Lecturers that have a position related to this topic use all the knowledge from this training when teaching their students. Weaknesses reported were that documents were in English language and the absence of documents (for one respondent).

Study tour to AIT, Kasetsart and Chulalongkorn Universities:

224. The study tour took place in June 2012 with 9 participants. Its main objectives were to familiarize the staff with related or similar institutions and courses and to initiate cooperation and exchange or twinning arrangements. Three interviewees reported on this training. Generally, the staff could increase or refresh knowledge on various topics. The important lessons learned are also related to the review of the curricula and teaching methods of the visited institutions. This proves useful in the development / improvement of the FWR's own WRM curriculum and teaching techniques. Participants could also assess the quality of the equipment (e.g. for hydraulic modelling) and handbooks used in those places.

Improvements in Teaching and Learning Related to Capacity Building and Material Support

General increased knowledge by lecturers:

225. Trainings were generally well received by participants. Teachers' main barriers to acquiring knowledge were thought to be language (little material offered in Lao), limited internet access and limited access of material in the library. A small group of teachers with a good command of English did not think information access to be an issue (e.g. through CAP-NET, Global Water Partnership, Oregon State University, etc.).

226. As far as the students are concerned, they reported that relations have generally improved with their teachers. The interviewed students also mentioned that the teaching and understanding of some specific topics had gotten clearer (GIS and related software use, environment, tests and measurements theory). This may be attributed to a higher confidence of some teachers, from increased knowledge gathered in the trainings and the specialized books provided, as well as teaching tools and methods provided by the Program's consultants.

227. However, some students wished that teachers would make sure that subjects are correctly understood during classes (with more exercises and checks of their knowledge) and that there would be more practical exercises and on the job / on-site learning.

Material support and use in teaching and learning:

Books for the Library:

228. The teachers who joined the study tour in Thailand used part of the leftover budget to buy books that they needed, most of them in Thai language. A total of 33 **books on topics specific to WRM** were selected by the teachers. However, librarians were often not aware of these books. The quality of these books / manuals is appreciated by all the respondents that are aware about them, using them for teaching.

Documents Translated into Lao language:

229. The initial objective was to have 1000 pages professionally translated in Lao language and supported by the program. Unfortunately the selection of the material to

be translated was too long and some teachers also mentioned that they wanted to do the translation on their own. **Therefore, no translation has been done so far.**

Computers for the library:

230. The program provided nine desktop computers, initially intended to be used in the library. However, the library only has a small area to set them up and **does not yet have a computerized book referencing system.** For these reasons, only four of the computers are used in the library (2 by the librarians, and 2 by students). Five other computers are currently being used by some of the FWR staff for various office tasks.⁴⁵ The limited usage of the computers is in stark contrast to the urgent need of hardware in the FWR computer room, which limits its usage⁴⁶.

Video Projectors:

231. The four video projectors provided by the project appear to be the material support that has the most benefits so far. All respondents find them very useful but regret that only four were provided and estimate that about 8 to 9 would be necessary so that all staff could access them when needed.

232. Thanks to the use of these projectors (about 70-80% of the classes, as reported by students) the students can easily see lessons, illustrations, and videos. **This increases the quality of the communication of the knowledge to the students**. Teachers report that it also makes teaching more convenient.⁴⁷

Laboratory Equipment, Test / Practice Equipment and Teaching Materials:

233. Some water quality measurement and current meter equipment (5 items) as well as visual aids (TV, video camera: 2 items) are reported to have been provided by NIWRMSP. However, interviewees from the staff team were unaware of it. The students reported that the equipment for practice had slightly improved.

Other Material Support:

234. Other items such as 3 shelves (2 in library, 1 in C4 manager office), 4 computer desks (for the library) and one printer for the library have been supplied and are being used.

⁴⁵ Most respondents do not really know where they are or by whom they are being used and just assume that they were set up in the computer room to replace the old ones. ⁴⁶ The FWP's computer room currently and the set of a line set of the set of the

⁴⁶ The FWR's computer room currently only has 16 old computers, provided in 2004-2005 by a former project, out of which only 2 can still be used. As a consequence the basic MS Office classes only benefit one fourth of the students (mainly the ones who bring their own laptop). Therefore, the computer room is very rarely used.
⁴⁷ A weakness mentioned was that the four projectors are needed by most of the teachers, they are

⁴⁷ A weakness mentioned was that the four projectors are needed by most of the teachers, they are moved around a lot and may not get a good maintenance. Some students reported that the quality of the projection is not always good.

Development of Awareness on FWR

IWRM Road Seminars

235. Between the 8th and 26th of December 2014, **IWRM curriculum promotion road seminars** were organized in both northern (Louangprabang and Xiengkhouang) and southern (Champassak, Savannakhet and Khammouan) provinces of the country by a team of five FWR staff members. As described in the activity report, 15 high schools were visited, over 1164 final year students participated and communication material was distributed (2200 brochures, 100 posters and 100 orientation guideline books). Stakeholders from Provincial Education and Sports, PAFO and PONRE joined the presentations. A similar promotion / awareness tour had already been organized in 2008, when the first WRM curriculum started. In total, the two sessions of promotion (2008 and 2014) have reached 10 provinces. Feedback from the interviewees about this activity and its potential benefits is unanimously positive. Respondents explain that promotion needs to be continued, also through other media (TV, radio, website, etc.).

Impact on Number of Students

236. The admission system of NUoL is divided into 20% of students being admitted on quotas (students who get very high scores, ethnic minorities, etc.) and 80% being admitted when passing the entrance examination.

Developments in total Applicants for FWR and NUoL:

237. The Department of Academic Affairs of NUoL provided statistics on the wishes of students applying to NUoL and especially to join the FWR (and formerly Department of Water Resources Engineering) (*Table 5*). Between 2011 and 2015, the number of applicants to FWR has increased from 112 to 174 (an increase of 55%). At the same time, the total number of applicants to NUoL increased by only 24%, suggesting an increased interest of students in DWR. Moreover, the increase in number of applicants between 2014 and 2015

Output 4 Indicator 1

NUoL graduates a minimum of 10 IWRM bachelors of science per year by 2015

So far, 3 batches of WRM graduates have graduated at the FWR. 2013: 34 graduates (44% female). 2014: 10 graduates (10% female) 2015: 37 graduates (27% female) Average: 27 graduates (32% females)

(16% for FWR against 2% for the whole NUoL) shows an even more important increase of interest for FWR since 2014 (when the Road Seminars took place.)

Table 5: Evolution of Number of Applicants to NUoL and FWR since 2011

Academic Year	Total No. of Applicants to NUoL	No. of Applicants to FWR	
2011-2012	13,580	112	
2012-2013	14,218	148	
2013-2014	15,602	152	

Academic Year	Total No. of Applicants to NUoL	No. of Applicants to FWR
2014-2015	16,559	149
2015-2016	16,921	174

Number of Students Joining FWR's WRM Curriculum:

238. It is important to mention that the number of new students per year and per curriculum in FWR is theoretically limited to 40 by NUoL rules, according to the FWR's capacity.

239. The Department of Student Affairs of the FWR provided statistics on the number of students joining the WRM curriculum from 2012 to 2015 (*Table* **6**).

Table 6: Evolution of number of students to join WRM curriculum from 2012 to 2015

Academic Year	2012-2013	2013-2014	2014-2015	2015-2016
No of students joining WRM Curriculum	26	44	30	41

Number of WRM graduates:

240. Until now, only 3 batches of WRM graduates came out of the FWR, in 2013, 2014 and 2015. In 2013, 34 people graduated in WRM, including 44% women. In 2014, 10 students graduated, including one woman. The low number of graduates in 2014 comes from a very low number of students joining in 2009, according to the Department of Student Affairs. In 2015, 37 students graduated in WRM, of which 27% were women.

Professional Developments of IWRM Graduates

241. The WRM graduates from 2013 and 2014 have been followed up to assess their professional development. The Department of Student Affairs was able to provide a contact (i.e. phone number) for 34 (out of 44) of them. Unfortunately, only 6 out of these 34 numbers are still valid. Therefore the results of this

Output 4 Indicator 2 DWR employs of at least 5 NUOL IWRM graduates

DWR has so far employed 6 WRM graduates.

tracer study are not very significant (*Table 7*). All of these 6 graduates now work in an organization / activity that is related to WRM. Three of them have responsibilities related to their field of study. Their positions are "Assistant of water quality management and awareness raising", owner of a noodles factory and "Forestry Technical Officer". Three of these graduates find their degree useful, one finds it very useful and two do not use it. The specific topics learned and mentioned as useful were: water quality, water purification, hydrology, meteorology, modeling, water flow management and zoning.
Table 7: Results of	Graduates	Tracer	Study
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No.	Year of Graduation	Organization	Position	Responsibilities	Usefulness of degree	Useful topics
1.	2014	PoNRE, Department of Water Resources and Environment, Bolikhamxay Province	Technical sector forest management	Copy documents, send documents and seedlings to peoples	Not useful in job. But very useful in a training at the Water Department	Water quality
2.	2014	State power (Electricity), LaoNgarm district, Sekong Province	Volunteer	Collect electricity bills	Not useful	None
3.	2014	Khaopoon (rice noodles) factory, Oudomxay	Owner of the factory khaopoon	Inspect manufacturing, Cost management, accounting	Very helpful	Water purification
4.	2013	DoNRE, Forestry and Water Division, Khoukham District, Khammouane Province	Assistant of Water quality management and Raise Awareness	Provide / manage data when project asks. Organization of meetings.	Average useful	Hydrology and Meteorolog y
5.	2013	Freelancer to work on irrigation occasionally. Work on own business: house design, inside design and decorate. Vientiane Capital	-	Designer, decorator	A little useful	Modelling
6.	2013	DoNRE, Forest section. Khop District, Sayabouly Province	Technical Officer on Forestry	Coordinator for forest restoration and related to planning process	A little useful	Site Survey (Zoning) and general WRM

242. Additional information was provided by the DWR interviewees, who reported that, so far, the institution has hired 6 WRM graduates from FWR. The quality of their work was evaluated satisfying and their general knowledge on water resources is higher than of people who usually start working in this Department.

ANNEXES

Annex 1: Planning of the Study Process

		May 2015		J 2(un 015			J 20	ul 15			At 20	ug 15			Se 20	沪 15	
		W 23	W 24	W 25	W 26	W 27	W 28	W 29	W 30	W 31	W 32	W 33	W 34	W 35	W 36	W 37	W 38	W 39
Study process	Activities																	
Preparatory work	Validating Indicators																	
	Result Models design																	
	Develop Data collection methods																	
Data gathering	Stakeholder Interviews (+ documents)																	
Data	Data Analysis																	
analysis	Reporting																	
Deliverables	Inception report (IR)										IR							
	Draft report (DR)															DR		
	Final report (FR)																FR	

Annex 2: Project Results Models



Results Model for NIWRMSP – Component 2: River Basin Management

Output 2: River basin management developed. (IWRM-SP C8)



Results Model fo

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Results Model for NIWRMSP – Component 4: IWRM Education at NUOL

Output 4: Integrated water resources management education strengthened at the National University of Laos (IWRM-SP C9)





Annex 3: Detailed list of data collection tools, project documents and guide questions

Loca Resul	ation in ts Model	Item	Data-collection			
Compo -nent	Type of issue	Item to evaluate	Source of information (according to project document)	Data- collection Tool (others)	Inter views	Guide-questions
C1	indicator	75% of MONRE staff successfully complete phase 1 continuing professional development programs	CPD assessment reports	List of participants of all NIWRMSP trainings & List of all staff in relevant organizations	no	key CPD criteria: (source: Melanie Allen) - be a documented process - be self-directed: driven by you, not your employer - focus on learning from experience, reflective learning and review - help you set development goals and objectives - include both formal and informal learning.
none	indicator	Water allocation and regulation mechanisms established and in use.	WREA water allocation decisions widely disseminated	none	yes	explain, why this was put in and later cut out? (Lan, Sup, Peter)
C1	indicator	80% of water resources management sector professional staff in MONRE are actively participating in tailored personal CPD programs by end of 2015.	WREA executive and management action plans and individual training plans	see ID4	no	- get list of DWR staff - check IWRM trainings for each staff since 2011
C1	main activity	Training Needs Assessment list trainings conducted		check TNA report	yes	- quality of TNA - coverage of needs by NIWRMSP
C1	main activity	Training conducted		see training reports& summary lists	no	list trainings on: - IWRM Basic Training list trainings - Policies, strategies, legal framework - River Basin Management - Water Resource knowledge - Water Security
C1	main activity	Toolboxes list toolboxes		get training report from CTA	no	

Location in Results Model		Item	Da	ta-collection		
Compo -nent	Type of issue	Item to evaluate	Source of information (according to project document)	Data- collection Tool (others)	Inter views	Guide-questions
C1	main activity	Use of Tools and Knowledge from Training		none	yes	 quality of trainings quality of tools use of trainings improvements of the water sector (specifically for the respective division/organization through NIWRMSP
C1	other outcomes	improved work through capacity building measures		none	yes	 improved work concerning: Integrated and coordinated way of managing water resources Nam Ngum: Planning and water quality (see C2) Sebang-Fai: improved flood and draught mitigation and participation Improved technical skills of water sector staff Water quantity management is improved (in cases of floods and draughts)
C1	main activity	IWRM e-learning platform Contents - training materials - data of National water resources inventory (?) - GIS maps - water surface flows - GIS based stakeholder maps		none	yes	which materials are promoted to which stakeholders how
C1	other outcomes	Trainers use published training materials				
C1	main activity	Output 3 Coordination of Capacity Building in the NIWRM-SP (including communication plan)		none	yes	 coordination of Capacity Building other NIWRMSP management issues (strenghts and weaknesses)
C1	other outcomes	Clear and integrated administration and communication structures, roles and responsibilities within NIWRMSP		none	yes	 coordination of Capacity Building other NIWRMSP management issues (strenghts and weaknesses)
C1	other outcomes	Roles and responsibilities in DWR DWR, water sections in PoNREs, NERI, NUoL and NN RBCS are clarified and teams are strengthened		none	yes	 constributions of NIWRMSP towards development of the sector clarification of Roles and responsibilities

Location in Results Model		ltem	Da	ta-collection		
Compo -nent	Type of issue	Item to evaluate	Source of information (according to project document)	Data- collection Tool (others)	Inter views	Guide-questions
C1	other outcomes	Clear and integrated administration and communication structures, roles and responsibilities within within DWR		none	yes	 constributions of NIWRMSP towards development of the sector clarification of Roles and responsibilities
C1	main activity	Output 5 Advise and Assist MONRE Management in IWRM Matters		none	yes	- which activities implemented?
C1	main activity	Output 4 Monitoring and Evaluation (on the job training, project cycle management training)		none	yes	
C1	other outcomes	Results-oriented and good quality reporting by NIWRMSP		none	yes	
C1	other outcomes	NIWRMSP runs smoothly		none	yes	
C1	other outcomes	improved monitoring within DWR, water sections in PoNREs, NERI, NUoL and NN RBCS		none	yes	- any improvements in your M&E system because of support by NIWRMSP
C1	other outcomes	DWR, water sections in PoNREs, NERI, NUoL and NN RBCS well fulfils their functions according to their mandate		none	yes	any further improvements due to NIWMRSP
C1	other outcomes	Gender concerns are included in the project activity concepts		none	yes	how was gender mainstreamed into activities?
C1	other outcomes	IWRM gender mainstreaming is included in MoNRE Natural Resource and Environment Strategy		none	yes	
C1	other outcomes	IWRM gender principles is mainstreaming in administration, policy and activities by DWR		none	yes	
C2	indicator	By the end of 2015: Effective river basin committees operating in at least two basins	WREA executive and management action plans and meeting minutes	none	yes	- what are the responsibilities/roles of the committes? In as far are they fulfilling these roles?

Location in Results Model		Item	Da	ta-collection		
Compo -nent	Type of issue	Item to evaluate	Source of information (according to project document)	Data- collection Tool (others)	Inter views	Guide-questions
C2	indicator	At least two major river basins have IWRM plans fully integrated with province and national plans	Provincial records of adoption of basin plans.	- River Basin Management Strategy - provincial and national NSEDP	yes	 check/ask on River Basin Management Strategy and province and national NSEDP and compare their contents understand process how was the River Basin strategy included in the Sectoral five-year SEDP how will the and 5-year River Basin Management Action Plan included in the Sectoral five-year SEDP
C2	indicator	Two basin plans are published by MONRE in collaboration with basin management organizations.	River basin committee minutes and publications	none	yes	is it planned to publish the River Basin Management Strategy and/or the 5-year River Basin Management Action Plan?
C2	indicator	NNRBC is established and operational.	Provincial council record of adoption of plans	none	yes	- what are the responsibilities/roles of the committes? In as far are they fulfilling these roles?
C2	indicator	NNRBC communication plans are implemented by 2013.	State-of-the- rivers publications	see plan and monitoring	yes	 check activities in NNRBC communication plan follow-up in as far activities were implemented
C2	main activity	Concept Note for Water Resource Inventory, including explanations on the framework (e.g. importance and organizational structure) of: - Surface Water Baseline Development - Water Quality inventory - Water Use Inventory - Ground Water Inventory		none	yes	 how was the concept note used for the National water resources inventory? were all parts used? what are the strengths and weaknesses of the concept note was the concept note send to other donors to try to retrieve funds?
C2	main activity	Guidelines for National Surface Water Inventory - guidelines on how to collect data, establish the data-base on surface		Stakeholder Interview		 strenghts and weaknesses of the guidelines how do you use the guidelines and how often? can the guidelines be well used?

Location in Results Model		Item	Da	ta-collection		
Compo -nent	Type of issue	Item to evaluate	Source of information (according to project document)	Data- collection Tool (others)	Inter views	Guide-questions
C2	main activity	Capacity Building Measures concerning data-collection, data-entry, data analysis		Stakeholder Interview		 Who and how many people trained? how was the capacity building done? strenghts and weaknesses of the capacity building do the trainees have all knowledge they need know? what are factors, making the use of the knowledge difficult? (e.g. GIS knowledge, computers etc.)
C2	main activity	National water resources inventory: - data base including information on: already included: surface water (including river characteristics), not yet included: water quantity, quality of water, water usage, meteorological data in a Pilot Area (Nam Ngum, Nam Tha, Sebang-Hieng)		- Stakeholder Interview - Check guidelines		 which information is in the system (type of information, scope of places/areas) and which not how is the information recorded, managed? where is the information from? how was/is it collected (sources) how is the info analysed how is the info used? by whom? for what? with whom is the info shared? discussed? in which setting? (meetings, formal/informal etc.), how is the info sent? (internet, by paper, etc.) weaknesses / problems & strenghts (remark: ask for all steps above)
C2	main activity	National GIS River Basin Atlas - maps, showing the information from the water resource inventory and other information		- Stakeholder Interview - check Atlas		 which information is in the Atlas (type of information, scope of places/areas) and which not how is the info displayed (book, internet) where is the information from? how was/is it collected (sources) who and how many people/organizations have received the Atlas? how is the info analysed how is the info used? by whom? for what? weaknesses / problems & strenghts (remark: ask for all steps above)

Location in Results Model		Item	Da	ta-collection		
Compo -nent	Type of issue	Item to evaluate	Source of information (according to project document)	Data- collection Tool (others)	Inter views	Guide-questions
C2	main activity	National River Basin Forum: - update the current level of implementation of the IRBM approach in different parts of the country - sharing experiences, summarizing lessons learnt, finding the ways how River Basin plans can be implemented more effectively - agreeing common planning methodologies for the future		- Forum Report	yes	 what did you learn in the forum? what was the usefulness for your work? strenghts and weaknesses of the forum remark: follow the objectives of the forum
C2	other outcomes	Planning/Advice on Water allocation (DWR)		interview		 & 2) - how was the inventory data used for water allocation - strenthts and weaknesses of the inventory for water allocation 3) which information did you share with the DWR Law Division and DRW River Basin Management and Development to be used for water allocation
C2	other outcomes	River Basin Planning (RBC - decisions on large infrastructure (dams, mining etc.)		none	yes	 how/in which steps was the inventory used in the River Basin Planning strenghts and weaknesses of the inventory?
C2	other outcomes	Private sector planning & other stakeholders planning (infrastructure project developers)		interviews		Water Resource DAta - from which sources to you receive information on water related issues? - water are the strenghts and weaknesses of information (sharing) - how do you make use of the info - how does it help you to sustain water quality and quanity River Basin Forum: - what did you learn in the forum? - what was the usefulness for your work? - strenghts and weaknesses of the forum remark: follow the objectives of the forum
C2	main activity	Nam Ngum Guidelines for River Basin Management		see guidelines	yes	 strenghts and weaknesses use how?

Location in Results Model		ltem	Da	ta-collection		
Compo -nent	Type of issue	Item to evaluate	Source of information (according to project document)	Data- collection Tool (others)	Inter views	Guide-questions
C2	main activity	Technical Working Group for NN RBMP		none	yes	 activities done strenghts and weaknesses
C2	main activity	Top-down/bottom-up stakeholder involvement strategy		none	yes	 how were you involved in the process? are you satisfied with your involvement?
C2	main activity	Current State of the Basin Report		see Report	yes	 strenghts and weaknesses of the report who received the report? use how?
C2	main activity	Climate Change Adaptation Report		see Report	yes	 strenghts and weaknesses of the report who received the report? use how?
C2	main activity	Nam Ngum River Basin Management Strategy		see Strategy	yes	 strenghts and weaknesses of the strategy who received the report? use how?
C2	main activity	National guidelines for River Basin Management Planning		interviews see guidelines		 how were the lessons learnt from NN integrated strenghts and weaknesses of the strategy who will receive the report? will be used how? process/steps in development of guidelines
C2	other outcomes	Sectoral five-year SEDP of 6 provinces		none	no	
C2	main activity	Support the establishment and capacity of River Basin Committees		none	yes	which support was given by the project?
C2	main activity	Transfer of NNRBCS from MONRE to Vientiane Province Package 2 team works closely with DWR and the Vientiane Provincial Authorities		none	yes	-what were the reasons for moving?- what are the implications of moving?- support given by the project for the transfer
C2	main activity	Communication Plan		see communication plan	yes	
C2	other outcomes	Communication related issues of the RBC and Secretariat (e.g. reporting of implemented work to stakeholders, trainings on River Basin Strategy)		none	no	

Location in Results Model		Item	Da	ta-collection		
Compo -nent	Type of issue	Item to evaluate	Source of information (according to project document)	Data- collection Tool (others)	Inter views	Guide-questions
СЗ	indicator	Groundwater management plan is published for major aquifers by end 2014	WREA national groundwater management plan	none	yes	- check availability and coverage of Groundwater Action Plan
C3	main activity	Groundwater Manual Course Package, Including Teaching Aids and Test Questions	not to be evaluated	see Groundwater Manual Course Packag	no	
C3	main activity	National Ground Water Study / Ground Water Assessment Pilot Study (not implemented because no drilling company could be found) - information on available ground water - on-the-job training on drilling	not to be evaluated	see Ground Water Assessment Pilot Study	no	
C3	main activity	Groundwater Resource Assessment Probable groundwater resources, conditions, usage and demand are assessed based on water-balance	interview	see Groundwater Resource Assessment	yes	strenghts and weaknesses of the study (to write the Action Plan)
C3	main activity	Groundwater resource map shows probably groundwater resources		see Groundwater resource map	yes	strengths and weaknesses of the study (to write the Action Plan)
СЗ	main activity	TNA for groundwater specialists: Training needs of staff in DWR, NREI (Natural Resource Environment Institute) and NUOL on groundwater are assessed		see TNA for groundwater specialists:		strengths and weaknesses of the TNA
СЗ	main activity	Assessment on Groundwater Information and Monitoring System - lists all available information and monitoring systems on groundwater in Laos in all related agencies - describes monitoring systems on groundwater	interview	see Assessment on Groundwater Information and Monitoring System	yes	strengths and weaknesses of the study

Location in Results Model		Item	Da	ta-collection		
Compo -nent	Type of issue	Item to evaluate	Source of information (according to project document)	Data- collection Tool (others)	Inter views	Guide-questions
C3	main activity	Groundwater Information Management System - Water Well ID scheme - Standardized National Well Log Standard Forms - Database Application - well standard > will be part of National water resources inventory	interview	none	yes	strengths and weaknesses in the drafted system
C3	main activity	Stakeholder Assessment Key public and private stakeholders and their groundwater information needs and uses are assessed.		see Stakeholder Assessment	yes	strengths and weaknesses of the study
C3	main activity	National Ground Water Action Plan (2014/15)	interview			strengths and weaknesses of the draft plan
C3	other outcomes	General Statement / Strategy included in 5-year SEDP	interview			
C3	other outcomes	Proposals to Donors	not to be evaluated	none	no	
C3	other outcomes	Proposals to Private Sector	not to be evaluated	none	no	
C3	main activity	Feasibility Study of National Ground Water Research Center and Ground Water Management Training is developed {soon implemented} - Recommendations on the possibility of establishing the Research Center - action plan for the establishment	not to be evaluated	none	no	
C3	other outcomes	decision on establishment on National Ground Water Research Center is taken	not to be evaluated	none	no	
C4	indicator	NUOL graduates a minimum of 10 IWRM bachelors of science per year (25% female) by 2015	University graduation records	Students records	no	
C4	indicator	DWR employs of at least 5 NUOL IWRM graduates	WREA employment	Tracer Study of Graduates	yes	- what are the graduates working now? is it related to water resources

Loca Result	tion in ts Model	Item	Data-collection			
Compo -nent	Type of issue	Item to evaluate	Source of information (according to project document)	Data- collection Tool (others)	Inter views	Guide-questions
			records			
C4	main activity	Capacity Building for Teachers / Staff Training - seminars on IWRM - teaching methodologies - GIS and Remote sensing - Basic Hydrological Measurements - introduction to climate change - study tour to AIT, Kasetsat and Chulalongkorn Universities		1) Training Reports 2) Questionnaires to Teachers	no	- topic appropriate? - quality of trainings?
C4	other outcomes	Increased knowledge by lecturers		2) Questionnaires to Teachers	no	 increased knowledge? problems in getting this knowledge? application of knowledge in teaching
C4	main activity	Labour market survey - labour market survey (including Recommendations from employers side) > academic workshops (with PoNRE, Irrigation and Education Divisions) to get feedback from participants		Check Labour Market Survey Report	yes	- quality of the survey - does it answer the question of which skills are required by graduates?
C4	main activity	Curriculum development: - recommendations for improvements in the curriculum (to be fitting to the Bachelor's degree) - a Water Education Strategy was developed - the curriculum has been updated based on the recommendations (cut and added subjects, change contents) - a 5-year course was changed to 4 years (to be in line with national regulations) - the focus from irrigation management was changed to IWRM		compare curriculum vs. Labour Market Survey	yes	1) quality of new curriculum 2) compare requests from labour market survey with actual curriculum
C4	other outcomes	Changed scope of topics (including IWRM)		none	yes	- compare curriculum before & after
C4	other	The knowledge by graduates			yes	

Loca Resul	ation in ts Model	Item	Data-collection			
Compo -nent	Type of issue	Item to evaluate	Source of information (according to project document)	Data- collection Tool (others)	Inter views	Guide-questions
	outcomes	better fits with the realities of Laos for professionals in the Water Sector		compare curriculum vs. Labour Market Survey		
C4	main activity	Material Support - Books for the library - computers for the library - internet network - projectors - lab equipment (not yet) - teaching materials (visual aids, e.g. TV, recorders) (not yet) - documents translated into Lao etc. (not yet)		none	yes	- did we buy the right materials? - quality
C4	other outcomes	Use of materials		none	yes	are materials in use?
C4	main activity	institutional strengthening / Support staff - Strategy and Action plan, including topics like: - human resource management - library/facility management - gender awareness - IT support - cooperation with other universities in the regions and internationally -research capacity building (research workshops) - administration / leadership skills		none	yes	quality of the plan
C4	other outcomes	Implementation of the Strategy and Action plan		Monitoring of implementation of Strategy and Action Plan	yes	
C4	main activity	Promotion - IWRM Road Tour Seminars to introduce the Faculty of Water Resources for last year high school students		Activity Report	yes	
C4	other outcomes	Higher number of students interested in enrolling in the faculty		NUOL entrance examinations	yes	compare numbers from 2012-2015 compare changes in total applicants to applicants for water resources

Loca Resul	ation in ts Model	Item	Data-collection			
Compo -nent	Type of issue	Item to evaluate	Source of information (according to project document)	Data- collection Tool (others)	Inter views	Guide-questions
C4	other outcomes	IWRM is tought (well)		check curriculum for IWRM topics & compare with DWR IWRM training manual	yes	- coverage of IWRM topics as compared to DWR IWRM training manual
C4	other outcomes	Improved (ways of) teaching and learning		none	yes	 how do new materials help? preference of teaching methodology (e.g. powerpoint) interaction with teachers? use of books from library? use of computers field visits etc. Ask year 3 or 4 students on changes in teaching
C4	other outcomes	Improved institutional setup/ capacity		none	yes	 how well could the change from department to faculty be done? (and what actually changed?) what changes have happened in the way things are done? (and how does it relate to the project?) what are the main problems and how are they resolved? How was it before?
C4	other outcomes	Higher number of students		Students records	no	

Annex 4: List of Interviewees

Organization	Position	Name and Surname	Date of Interview
ADB	Consultant	Mr. Peter Logan	4/9/2015
Admin and Planning Division	Head	Mr. Phonexay Simmalavong	11/9/2015
Admin and Planning Division	Technical staff	Mr. Khampasert Vangvichit	11/9/2015
Devision MPI Vte Province	Division Deputy	Mr. Khamsone Sounsavath	15/9/2015
Division MPI, VTE Province	Division Deputy	Mr. Khamsone Sounsavath	15/9/2015
DONRE, Vangvieng	Deputy of institution of Water Resources	Mr. Kongpheng Kounpanya	15/9/2015
DONRE, Vangvieng	Deputy of institution of Water Resources	Mr. Kongpheng Kounpanya	16/9/2015
DRW Data & Information Center	Technical Staff	Mr. Sisamouth Milattanapheng	14/9/2015
DWR Law Division	Head	Mr. Kingkham Manivong	11/9/2015
DWR Law Division	Technical staff	Mr. Khamphone Chanthalangsee	11/9/2015
DWR, Admin and Planning Division	PMU Deputy	Mr. Phousavanh Fongkhamdeng	4/9/2015
DWR, River Basin Management Development	Technical Staff	Mr. Souksakhone Songkham	14/9/2015
DWR, River Basin Management Development	Technical staff	Ms. Souniphar Xaiyakeo	14/9/2015
DWR, River Basin Management Development	Technical staff	Mrs. Sengphachan Sinbandith	10/9/2015
DWR, Training and Awareness Center	Division Deputy Head	Mrs. Sengphasouk Xayyavong	10/9/2015
DWR, Training and Awareness Center	Division Deputy Head	Mr. Bounsanong Fongnaly	10/9/2015
DWR, Training and Awareness Center	Technical staff	Mr. Souksakhone Songkham	10/9/2015
DWR, Training and Awareness Center	Technical staff	Ms. Bounpheng Souvahnalath	10/9/2015
FOE	Dean, when still department, Project reported to him	Mr. Boualin Soysouvanh	9/9/2015
FWR	Lecturer	Mr. Saykham Sithavong	27/8/2015
FWR	3 rd Year student	Chidtaphone	10/9/2015
FWR	3 rd Year student	Chanthavone	10/9/2015
FWR	3 rd Year student	Sengpachan	10/9/2015
FWR	3 rd Year student	Tong	10/9/2015
FWR	3 rd Year student	Keopanya	10/9/2015
FWR	3 rd Year student	Khampai	10/9/2015
FWR	4 th Year student	Toumeyang	10/9/2015

Organization	Position	Name and Surname	Date of Interview
FWR	4 th Year student	Sackda	10/9/2015
FWR	4 th Year student	Dali	10/9/2015
FWR	4 th Year student	Chantha	10/9/2015
FWR	4 th Year student	Sackwan	10/9/2015
FWR	C4 Manager, Lecturer	Mr. Bounyom Thoummavong	25/8/2015
FWR	Dean	Mr. Ounma Thammavong	17/8/2015
FWR	Deputy Dean	Mr. Ounla Sivanpheng	17/8/2015
FWR	Deputy Head	Mr. Bounhom Silimnotham	17/8/2015
FWR	Lecturer	Mr. Keophet Poumphone	2/9/2015
FWR	Lecturer	Mr. Khammoun Ackkaxay	27/8/2015
FWR	Lecturer and "help" of Mr. Sounthone in I.T.	Mr. PhetviengKham Onxayvieng	31/8/2015
FWR	Lecturer, head infrastructure, facility, equipment	Mr. Khamchan Chandalasouk	27/8/2015
FWR	Lecturer, Responsible of student affairs	Mr. Somkhit Dalasang	24/8/2015
FWR	Librarian	Mrs.Houngsone Vannasan	27/8/2015
FWR	n2 Librarian, admin	Mrs. Maysouk Sorpubmixay	27/8/2015
FWR	Student teaching and learning, Deputy Division. Irrigation is her degree but she teaches MS. Office (Word, Excel).	Mrs. Khen Phimmathat	3/9/2015
FWR	Vice Dean	Mr. Khamkeng Chanthavongsa	31/8/2015
IDOM	C.2.2 Consultant	Mr. David Baringo	27/8/2015
IDOM	C.2.2 Consultant	Mr. Alfredo Collado Andino	30/8/2015
IDOM	Deputy Team Leader of IDOM	Mr. Bounheuang Phanthasith	31/8/2015
IDOM	Project Manager	Mr. Jorge Ocon de Diego	2/9/2015
IWMI	Groundwater Specialist	Mr. Paul Pavlic	28/8/2015
M.E.M. Xiengkhuang Province	Division Deputy	Mr. Bounkeun Lonorkhue	18/9/2015
M.E.M. Xiengkhuang Province	Technician	Mrs. Khanthali Phimmasone	18/9/2015
MEM Vangvieng	Director MEM, Vangvieng District	Mr Sikhaly Vongtian	16/9/2015
MEM Vangvieng	Director MEM, Vangvieng District	Mr. Sikhaly Vongtian	15/9/2015
MEM Vangvieng	Technician	Mrs. Songvone Sisayan	16/9/2015
MEM Vangvieng	Technician	Mrs. Songvone Sisayan	15/9/2015

Organization	Position	Name and Surname	Date of Interview
MPI Xiengkhuang Province	Technician	Mr. Khadsavath Thoummavong	18/9/2015
MPI, Xiengkhuang Province	Deputy of Planning Division	Mr. Bounmy Vannayoud	18/9/2015
Nam Ngum 1 Hydropower	Technical staff in the Management Division	Mr. Phetsomsack Saypanya	24/9/2015
NIWRMSP	C1 Manager	Mr. Bounsanong Fongnaly	3/9/2015
NIWRMSP	C2.1 Manager	Mr. Phingsaliao Sithiangkham	10/9/2015
NIWRMSP	C3 Consultant	Mr. Nicolas Lambodi	18/9/2015
NIWRMSP	C3 Manager	Mr. Oulaphone Ormkeo	3/9/2015
NIWRMSP	СТА	Mr. Supalerk Chanpasart	25/8/2015
NREI	C3 Coordinator	Mr. Ounakone Xayviliya	31/8/2015
NREI	C3 Coordinator	Mr. Ounakone Xayviliya	31/8/2015
NUOL	Consultant	Mr. Khamkeng Chanthavongsa	18/9/2015
PAFO VTE	Division Deputy	Mr. Sinphavanh Saymounkham	15/9/2015
PAFO VTE	Technician (irrigation)	Mr. Oudong Phanakhone	15/9/2015
PAFO Xiengkhuang Province	Planning Division Authority	Mr. Soulinya Dalavong	18/9/2015
PAFO, VTE Province	Division Deputy	Mr. Sinphavanh Saymounkham	15/9/2015
PAFO, VTE Province	Technician (irrigation)	Mr. Oudong Phanakhone	15/9/2015
Planning Office Vang Vieng District	Chief of Planning Office	Mr. Bouathay Souvong	16/9/2015
Planning Office Vang Vieng District	Deputy	Mr. Sengtjan Manitjai	16/9/2015
PONRE (W.R.) VTE province	Deputy of institution	Mr. Khamphone Sisouthan	15/9/2015
PONRE (W.R.) VTE province	Deputy of Water Resources Division	Mrs. Bounthavy Champha	15/9/2015
PONRE (W.R.) VTE province	Head of institution	Mr.Thongphet Vongkhamsouk	15/9/2015
PONRE (WR) VTE Province	Deputy of institution	Mr. Khamphone Sisouthan	15/9/2015
PONRE (WR) VTE Province	Deputy of Water Resources Division	Mrs. Bounthavy Champha	15/9/2015
PONRE (WR) VTE Province	Head of institution	Mr. Thongphet Vongkhamsouk	15/9/2015
PONRE W.R. Xiengkhuang Province	Deputy	Mr. Sivone Boutdatjan	18/9/2015
PONRE W.R. Xiengkhuang Province	Head of Water Resources Division	Mr. Saykham Nanthasing	18/9/2015
Riversnetwork.org	Consultant	Mr. Eric Trueman	3/9/2015
Vientiane Province	Vice Administrator of	Mr. Samli Phommachack	9/9/2015
Vientiane Province	Vientiane Province	Mr. Samli Phommachack	15/9/2015
Admininstration Hall	Vientiane Province		
Water Quality Management	Division Deputy Head	Mr. Pinthong Salermxay	4/9/2015

Organization	Position	Name and Surname	Date of Interview
Division			
Water Quality Management Division	Division Head	Mrs. Keodokmai Phouipasert	4/9/2015
Waterland Experts	C3 and C4 Consultant	Mr. Rien Dam	27/8/2015
Women Development Division	Technician	Mrs. Vilayphone Meuangpak	15/9/2015
Women Development Division	Technician	Mrs. Vilayphone Meuangpak	15/9/2015

Annex 5: Key documents reviewed

List of documents for Component 1:

- List of participants of all NIWRMSP trainings AND List of all staff in relevant organizations
- **ADB document** that mentions that this indicator was dropped: (Output 1 indicator 2: DWR GAP prepared as a financial application by end 2014)
- TNA report
- **Training reports** (list trainings on:- IWRM Basic Training, List trainings -Policies, strategies, legal framework - River Basin Management - Water Resource knowledge - Water Security)
- Any lists **summarizing trainings**
- List of **tool boxes**

List of documents for Component 2:

- Guidelines Nam Ngum for River Basin Management
- Nam Ngum River Basin Management **Strategy** (is finished but not officially approved yet)
- Provincial and National **NSEDP** (including reference to the sections relating the to River Basin Management Strategy)
- NNRBC communication plans
- Activity/output **monitoring** (which activities implemented) of RBCS
- Guidelines for National water resources inventory
- National GIS River Basin **Atlas** (Atlas is not yet printed. so far only used as draft within MoNRE, PoNRE, DoNRE)
- Forum Report
- Current State of the Basin Report
- Climate Change Adaptation Report
- **National guidelines** for River Basin Management Planning (draft version is available but not yet approved)
- Communication plan

List of documents for Component 3:

- **Groundwater Manual** Course Package (a draft manual (how to implement the pilot) and PowerPoint are available but not yet used because pilot study was cancelled)
- Ground Water Assessment Pilot Study report (methodology)
- Groundwater Resource Assessment
- Groundwater resource map
- **TNA** for groundwater specialists
- Assessment on Groundwater Information and Monitoring System

List of documents for Component 4:

- Students records (2012-2015) (with contacts)

- **Graduation records** / List of graduates (2013-Present) and way to contact them
- New curriculum
- Old curriculum
- Labor Market survey
- Training reports (includes list of concerned lecturers)
- Report on Strategy Action Plan implementation
- Number of applicants for water resources in entry evaluation (2012-2015)
- Activity report on IWRM Road Tour Seminars to introduce the Faculty of WRE

	Annex 6: Detailed	Summary of C	1 supported	trainings
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Ν	Topic of	Trainee	Ra-	Main	Main Training	Main Reported Outputs	Main outcomes as reported by	Main reported	Main
0	the	s (f/m)	ting	organizatio	Contents		limited sampling of interviewees	weaknesses	Recomme
	training			ns reached			from Tracer Study		ndations
Int	egrated Water	Resources	Manag	ement (IWRM) F	ramework Trainings				
1, 5, 9	IWRM Framework Training for Central, Southern and Northern Region	47 (8/39) 53 (17/36) 59 (14/45)	8.5 7.5 9	MoNRE, PoNRE, DoNRE, DWR, partner agencies and lecturers	 Introduction to IWRM principles, tools and regional best practice to encourage discussion about regional water management issues establish connections amongst stakeholders 	 need for participatory solutions know about river basin management know about difficulties in current water management division of land and water resources as a way to more sustainably manage water resources need for river-basin planning to improve water quality and water reservation 	 now regular collection of water samples awareness raising current plan to develop a sustainable tool used for village forest planning useful to get to know different relevant people outside the own department and stay in touch with them, contacts used for planning for tourism project, for water resources management in Luangnamtha Province and for a village forest project 	 shortness of the training need for regular similar trainings 	 developm ent of IWRM- ecosyste m based demonstr ation site participato ry water monitorin g for youth group in Vang Vieng
10	IWRM Ecosystem based Approach: Exchange Visit and MoNRE Demonstrati on Site Center Proposal Developmen t	14 (3/11)		DRW, PoNRE and MoNRE	 to better understand about participatory planning, about adoptions at community level to apply suitable measures at the MoNRE demonstration site in Vangvieng. 	 Learn about implementation of land and water resources division Learn about implementation and management of organic farming Learn about river basin planning to sustainably use water resources Learn about homestay developments 	 Lessons used for writing management plan for the Nam Song River organic farming ideas passed on to villagers helped implementing regular water measurements helped for village forest planning and for homestay development helped to set up a water resources conservation area and water quality monitoring area at the demonstration site division of land and water resources building of a water weir 	 shortness of training more trainings like this should be carried out 	

Ν	Topic of	Trainee	Ra-	Main	Main Training	Main Reported Outputs	Main outcomes as reported by	Main reported	Main
ο	the	s (f/m)	ting	organizatio	Contents		limited sampling of interviewees	weaknesses	Recomme
	training			ns reached			from Tracer Study		ndations
3	Integrated River Basin Management and River Basin Planning	41 (12/39)	8	NIWRMSP, PoNRE and DWR	 to introduce participants to concepts and tools of integrated river basin management (IRBM) and planning to share information on critical experiences in IRBM planning at local and international levels to encourage trainees to adopt concepts and tools to build connections amongst participants 	 subject was entirely new know about how to deal with floods and flood preparedness/prevention 		• more colleagues should join in a training next time in order to better discuss contents and exchange knowledge at work	 to facilitate a stakehold er platform to discuss on EIA/SIA, benefit sharing and impact mitigation measure ment
2	Project Cycle Management	41 (17/24)	8.5	NIWRMSP, PoNRE, DWR and MoNRE	 to better understand: Logical Framework Analysis, project planning cycles, project monitoring and evaluation; roles and responsibilities of technical and admin/finance officers 	 know how to develop goals, objectives and indicators know and how to accordingly formulate proposals 	 training has helped to better understand own tasks application in the formulation of proposals for Provincial Water Quality Management and for government funding application at the IWRM demonstration site and for a capacity building plan 	 difficult for provincial staff to travel to the training venue 	
78	River Basin Knowledge Training for Central and Northern and Southern Regions	77 (17/60) 49 (19/30)	6 8	PoNRE, DWR, DoNRE, other line agencies, NUoL and development partners working in key river basins	 to introduce participants to key principles of river basin development and to the establishment of a 'river basin profile' 	 know what is meant by river basin planning know that different sites have different issues with water and its allocation know what should be done in case of a draught or a flood 	 input for compiling basin profiles use methodology to propose improvement of 2013 State of the Nam Ngum Basin Report included data collection methods prevention of waste water, water retention and proposal planning content for teaching students helps for consultancy on IWRM improvement of monitoring improvement in summarizing data 	 shortness of training no time for practicing limited amount of case studies understanding difficulties of the presentations no conclusion or consensus of the 	

N O	Topic of the training	Trainee s (f/m)	Ra- ting	Main organizatio	Main Training Contents	Main Reported Outputs	Main outcomes as reported by limited sampling of interviewees from Tracer Study	Main reported weaknesses	Main Recomme
	training			ns reached			and information	use of data	Indations
20	Leadership building and Communicati on Training for NNRBCS	22 (3/17)			 strengthen leadership skills, team building and communication planning skills amongst the NNRCBS to support the drafting of a NNRB Communication Plan 	 understand leadership and ways of communication know how to manage conflicts know importance of teamwork 	 training continuously benefitted communication and information exchange in daily work 	 shortness of training 	
Wa	ater Resources	Knowledge							
11	Sharing Knowledge; Websites Building and Management	24 (8/16)		NNRBCS as well as technical and admin staff from DWR, NREI, NUoL and the PMU	 Help NNRBCS to create, operate and maintain their webpage 	 learnt designing a webpage learnt website administration learnt about framing webpage content 	 little application yet, because the NNRBCS website has not been launched yet non-NNRBCS participants improvied own websites 	 lack of knowledge of many participants on software programs 	
6	Orientation for Collaborative Modelling Training - Series 1	68 (15/53)	7	MoNRE, PoNRE, DWR, NUoL and development partners from seven key river basins	 introduce participatory development approaches identify and work on problems in own basins select an appropriate modeling software set up a multi- disciplinary team to collect data and run/use the model in order to inform decisions and water planning 	 have learnt about different types of models know how to use the model and evaluate basin situations 	 no information available on how lessons learnt were made use out of 	 language barrier no input on how to actually use modelling software 	• trainees requested further technical
13	Collaborative	48	9	NUoL, NREI,	 background 	 learnt about a variety of 	 passed on information and 	 training too basic 	

N O	Topic of the training	Trainee s (f/m)	Ra- ting	Main organizatio ns reached	Main Training Contents	Main Reported Outputs	Main outcomes as reported by limited sampling of interviewees from Tracer Study	Main reported weaknesses	Main Recomme ndations
18	Modelling Consultation Meeting & Collaborative Flood Modelling Training, Basic	(10/38)		NNRBCS members, DWR staff and development partners	knowledge and hands on exercises in hydrology and modelling	 (rain) water calculations know how to create (outlook) graphs with a modelling programme 	knowledge on calculations to students	 little practical experience little insight on how data is collected no training manual 	
Wa	ater Security					_			
4	Perspectives of Water Quality Management in Lao PDR, Series 1	63 (16/47)	7.5	PoNRE, DWR, MoNRE, DoNRE, other line agencies and private sector operators	 to better understand about water quality management to strengthen skills on the water quality regulatory framework, institutional setting and law enforcement mechanisms and monitoring understand potential challenges in setting up a water quality management system 	 better understand about water quality and the need for protecting water know about management issues and monitoring of water quality need to measure water quality 	 the learnt was integrated into report writing learnt was used all the time when planning for water irrigation and animal raising techniques helped for water management planning and awareness raising among the lay and among own staff now increased water quality monitoring improved emergency preparedness 	 shortness of training difficulties in understanding English too little solutions presented to problems and too little discussion and explanations 	 to form the NNRBCS coordinatio n group for ensuring the water quality of the Nam Ngum basin further trainings on this topic
12	Workshop: Stakeholder Consultation on Water Quality Management in Nam Ngum Basin	60 (15/45)		PoNRE, DoNRE, DWR, NIWRMSP, NUoL and the private sector	 stakeholder getting to know each other to build up ownership 	 training methodology, tentative training schedule and work plan agreed on know about water quality at different locations critical knowledge exchange 		 why was data on water quality not passed on earlier 	
15	Ground Water Management Training – Preparation,	32 (3/29)		NUoL, Khon Khan University, IWMI, NRIE and DWR	 discuss and agree on a training schedule for a future ground water management training 	 agreement on training content, training outputs and targeted trainees 			

N O	Topic of the training	Trainee s (f/m)	Ra- ting	Main organizatio ns reached	Main Training Contents	Main Reported Outputs	Main outcomes as reported by limited sampling of interviewees from Tracer Study	Main reported weaknesses	Main Recomme ndations
	Kick-off Meeting								
16	Flood Risk Management Training	60	7.5	DoNRE, PoNRE, DWR, NIW RMSP, MoNRE, line agencies, private and development sector, village authorities	 understand about flood risk characteristics, impacts and causes of floods analysis of historical scientific data and also shared experiences 	 how to prepare for floods how to shelter when a flooding occurs follow up after flood events and water levels list for key action plan for flood mitigation and management in Xaybangfai 	 now able to advise villagers planning for data collection development of a Flood Risk Management Manual 	 shortness of training little practical application no training manual less attention paid to training by villagers coming from rural areas 	
19	Water Quality Management - Consultation	54 (3/51)		 representati ves from six provinces in the Nam Ngum river basin and key stakeholder s 	 NNRBCS met trainees' request to organize for a consultation meeting to discuss on continuous issues of water quality in the Nam Ngum river 	 agreement of immediate and short-term actions and on long-term plan to mitigate issues with water quality in the basin learnt about water quality and critical locations discussion of problems amongst stakeholders 	Not available	 why was the data on water quality not made known earlier 	
Ot	hers								
14	Administratio n and Finance training	19 (14/5)		NNRBCS, DWR, NERI, NUoL, and the PIU	 overview of disbursement of TA, of arrangement of fund flows to the project components introduction to disbursement and liquidation of ADB forms 6-15 know about checklist 	 know about regulations of TA and ADB budgeting and expenditures know how to prepare a budget 	 application of the rules and regulation learnt about very useful to clarify issues with the trainer 	 shortness of the training terminology too difficult to understand for those with non-financial background 	

N O	Topic of the training	Trainee s (f/m)	Ra- ting	Main organizatio ns reached	Main Training Contents	Main Reported Outputs	Main outcomes as reported by limited sampling of interviewees from Tracer Study	Main reported weaknesses	Main Recomme ndations
					documents and about disbursement procedures				