Annex 1 Logical Framework for Capacity Building of Water Resources Sector

DESIGN SUMMARY	TARGETS	MONITORING MECHANISMS	CRITICAL ASSUMPTIONS
GOAL			
To strengthen institutional capacity at national and provincial levels for sustainable, multisectoral and economic management and use of water resources on a river basin basis	Water resources effectively, efficiently and equitably allocated across sectors and regions in support of Repelita VI goals and targets Improvement of water quality standards and monitoring Cost recovery allocation and collections meet or approach O&M and management financing requirements	National Development Monitoring and Project Implementation Reports	
OBJECTIVE			
To strengthen (i) operational policy making, (ii) the institutional framework for coordination, (iii) management systems and processes, (iv) technical standards and practices, and (v) human resource systems and skills of water resources management agencies, for both integrated and coordinated water resources planning and allocation based on river basin units, and for improved water quality monitoring and management	Water resources database, allocation systems and regulatory coordinating bodies established and functional Water quality standards, monitoring and regulatory procedures established and operational Design and project management skills, standards, supervision streamlined and improved Systems for enhancing beneficiary participation reviewed and upgraded	Database and PTPA reports Quality standards, regulations and monitoring reports New standards, project and skills training reports Database, procedures and cost recovery reports WUA evaluations and project reports	Enactments establishing standards, coordinating bodies, etc. provided Supporting personnel and budget provided and sustained
COMPONENT 1 & OUTPUTS			
Strengthening the National Policy and Coordination Framework A national water resources coordination framework is established	Agreement obtained from concerned agencies on the composition, terms of reference and operating procedures of the National Water Resources Coordination Framework The National Water Resources Coordination Framework operationalized Procedures for coordination established and operationalized Needs for capacity building across the sector identified	Coordination framework procedures document Operational reports Operational policy for coordination, meeting minutes Capacity building needs report	High-level policy support and high-level institutional commitment National WRDM policy formulation and implementation mechanisms clearly defined

Annex 1 Continued

DESIGN SUMMARY	TARGETS	MONITORING MECHANISMS	CRITICAL ASSUMPTIONS
Water sector management guidelines are established	National database system established to monitor demand and supply across provinces and sectors Studies initiated to review existing water resources operational policies and regulations for demand and supply management, and consideration of alternative approaches National water resources management guidelines established for all concerned agencies	Database operating manual and project reports Operational policies for supply/demand management Management guidelines	Availability of data from participating agencies High-level management support and mid-level commitment
COMPONENT 2 & OUTPUTS			
Strengthening Capacity of Regional Institutions for Integrated Water Resources Development and Management Water resources planning and management strengthened in selected provinces	Water management committees established (on the basis of prior Governors' decrees) and operationalized at province and river basin levels as required Hydromet networks upgraded, facilities and equipment procured and hydrology unit staff trained Water resources database established by river basin Water allocation and accounting system established and operationalized in each province Staff skills in concerned agencies upgraded	Guidelines for provincial coordination, meeting minutes Hydromet operations manual, project reports, training reports WR database operating manual, project reports Operational guidelines, project reports Training program, training reports	Local government, budgetary and personnel support extended to establishment of systems database and implementing coordinating and technical units Necessary policy and technical guidelines/support provided by DGWRD Qualified personnel available for training and DGWRD training support provided
Water quality management strengthened in selected provinces	Preventative river maintenance system upgraded and strengthened Water quality standards disseminated by DGWRD to concerned regional agencies Water quality database and monitoring system operationalized in each province Water quality coordination with Prokasih and BAPEDAL established through provincial water management committees Staff skills in concerned agencies upgraded	Improved system recommendations Operational guidelines, project reports Water quality database operating manual, project reports Documented procedures for coordination Training program, training reports	Water quality standards issued and adapted to local conditions in a timely manner Budget and personnel support provided by local government PWMCs established and functional Personnel available for training and committed to new functions

Annex 1 Continued

DESIGN SUMMARY	TARGETS	MONITORING MECHANISMS	CRITICAL ASSUMPTIONS
COMPONENT 3 & OUTPUTS			
Strengthening the Capacities of DGWRD Policy analysis and management systems strengthened in DGWRD	Policy Analysis and Management Systems Team set up and coordinated by the Deputy Director General Result-oriented (as against budget-driven) management system established and operationalized Twenty in-house staff advisers selected, trained and placed in DGWRD and regional water resource agencies to support institutionalization of the result-oriented management systems Public awareness campaign designed and implemented	DG's appointment letter, team's existence Operational guidelines, project reports DG's appointment letter, training reports, project reports, handover report Campaign design, campaign reports	National WRDM policy formulation and implementation mechanisms clearly defined High-level management support and mid-level interest and commitment High-level management support and functional positions established
Processes for technical support to provincial agencies strengthened	New policies on water resources management and water quality disseminated to the regional water resources agencies with implementation guidelines Management Information Systems (MIS) upgraded between new directorate of DGWRD and regional agencies in areas such as: status of water resources, water allocation by sector, water quality, irrigation efficiencies, and water user groups Implementation strategies upgraded and disseminated by DGWRD to regional agencies in such areas as: river and irrigation system database management, water quality monitoring, preventative maintenance, strengthening of water user associations (WUAs), system turnover and cost recovery Result-oriented management systems extended to regional agencies Staff skills of the DGWRD directorates upgraded	Documented systems, project reports MIS operating manual, project reports Operational guidelines Operational guidelines, training reports, project reports Training program, training reports	High-level institutional support and mid-level interest and commitment Reorganization of DGWRD proceeds as planned Implementation strategies developed and confirmed Relevant expertise is available or upgraded by project Qualified staff available and committed to training
Project design and implementation capacities of DGWRD strengthened	In-house training capacities established in project economic analysis, social analysis, environmental assessments, and PBME Systems for contractor supervision reviewed and strengthened Processes for involving beneficiaries strengthened	Operational guidelines documented techniques Operational guidelines	Top Management support Cooperation of PUSDIKLAT is obtained

Annex 1 Continued

DESIGN SUMMARY	TARGETS	MONITORING MECHANISMS	CRITICAL ASSUMPTIONS
Human resources management strengthened	Human resources management systems upgraded (to support DGWRD's new mandate) in areas such as: staff planning, recruitment, placement, job rotation, transfers and promotion Career path development and manager succession program established for DGWRD and regional agencies Staff skills of the Personnel Division of DGWRD and Personnel Subdivisions of regional agencies upgraded	Operational guidelines, project reports Functional positions, project reports Training program, training reports	High level policy commitment to establishing and implementing rational HR policies High-level commitment and availability of interested and qualified staff Qualified staff available and committed to training
Human resources development strengthened	A more operations-responsive system established and operationalized for identification and analysis of training needs of both DGWRD and regional agencies Water Resources Specialist Education Program strengthened Training capacity in water resources development strengthened at central and regional levels In-house manager development program established in MPW in coordination with LAN and proposed new Training Institute of MPW	Operational guidelines, project reports Operational guidelines, project reports Performance Improvement Plan, project reports, handover report Capacity building needs report, training reports, project reports Operational guidelines, project reports	High-level commitment to establishing rational HR policies Agreement reached on common elements to be shared by MPW and MHA Qualified MPW/DGWRD training staff available and committed to support role in training design Qualified MPW/DGWRD training staff available and committed to support role in training design MPW and LAN agreement on structure, content and management of program
Technical support for the private sector strengthened	Information system for the private sector on investment opportunities and project contracts in the water resources sector strengthened Consultation mechanisms between government agencies and private sector organizations established and strengthened Mechanisms for more active involvement of private sector to be considered, developed and adopted Systems and methods for training private sector agencies and WUAs reviewed and strengthened	Operational guidelines, project reports Operational guidelines, project reports Operational guidelines, project reports Systems and methods document, program report, project reports	Private sector organizations agree on nature of expanded role and consultative mechanisms Private sector financial support and personnel participation provided

Annex 2 Part of Revised Project Framework

DESIGN SUMMARY	TARGETS	MONITORING MECHANISMS	CRITICAL ASSUMPTIONS
GOAL			
To strengthen institutional capacity at national and provincial levels for sustainable, multisectoral and economic management and use of water resources on a river basin basis	Water resources effectively, efficiently and equitably allocated across sectors and regions in support of Repelita VI goals and targets Improvement of water quality standards and monitoring Cost recovery allocation and collections meet or approach O&M and management financing requirements	National Development Monitoring and Project Implementation Reports	
OBJECTIVE			
To strengthen (i) operational policy making, (ii) the institutional framework for coordination, (ii) management systems and processes, (iv) technical standards and practices, and (v) human resource systems and skills of water resources management agencies, for both integrated and coordinated water resources planning and allocation based on river basin units, and for improved water quality monitoring and management	Water resources database, allocation systems and regulatory coordinating bodies established and functional Water quality standards, monitoring and regulatory procedures established and operational Design and project management skills, standards, supervision streamlined and improved Systems for enhancing beneficiary participation reviewed and upgraded	Database and PTPA reports Quality standards, regulations and monitoring reports New standards, project and skills training reports Database, procedures and cost recovery reports WUA evaluations and project reports	Enactments establishing standards, coordinating bodies, etc. provided Supporting personnel and budget provided and sustained
COMPONENT 1 & OUTPUTS			
Strengthening the National Policy and Coordination Framework A national water resources coordination framework is established	Concurrence from concerned agencies to establish a National Team for coordination in Water Resources Development and Management (WRDM) obtained Agreement on the composition, terms of reference, operating procedures and establishment of the Secretariat/Working Group(s) of the National Team for coordination in WRMD obtained Regulation establishing the National Team for coordination in WRMD and its Secretariat/ Working Group(s) issued	WRDM national coordination procedures document Operational policy for WRDM coordination, minutes of meeting, regulations WRDM policy/strategy coordination reports WRDM coordination capacity building needs report	High-level policy support and high-level institutional commitment National WRDM policy formulation and implementation mechanisms clearly defined

Annex 2 Continued

DESIGN SUMMARY	TARGETS	MONITORING MECHANISMS	CRITICAL ASSUMPTIONS
	Procedures for coordination in WRDM established Coordination system in WRDM operationalized Needs for capacity building in WRDM policy identified		
Water sector management guidelines are established	National WRDM database and management system in DGWRD/ MPW to monitor and manage demand and supply in river basin and in sectors established Studies to review existing WRDM operational policies and strategies and applicable regulations to improve demand and supply management initiated National WRDM policies and strategies revised Regulations to implement policies as applicable issued	National WRDM database report and operation manual WRDM operational policies and strategies report WRDM regulations	Availability of data from participating agencies High-level management support and mid-level commitment
COMPONENT 2 & OUTPUTS			
Strengthening Capacity of Regional Institutions for Integrated Water Resources Development and Management Water resources planning and management strengthrned in selected provinces	Provincial Water Resources Management Committee (PWMC) established and operationalized (based on MPW PERMEN 67/93) Basin Water Management Committees (BWMC) established in selected basins and operationalized Basin Water Resources Management institutions identified and established in selected basins WRDM database and management system developed and established in the provinces WRDM database and management system developed for river basins and established in selected river basins Hydromet networks upgraded, facilities and equipment procured and hydrology unit staff trained Water allocation system and procedures developed and operationalized in selected river basins on pilot basis	Manual for WRDM provincial coordination (for PWMC/BWMC), meeting minutes WRDM database project reports, operating manual Hydromet Project reports, operation manual, training reports Water allocation operation manual, water allocation and water accounting reports Training program, training reports	Provincial government, budgetary and personnel support extended to establishment of coordination systems, database and in implementing coordinating and technical units Necessary policy and technical guidelines/ support provided by DGWRD Qualified personnel available for training and DGWRD training support provided

Annex 3 Part of Project Outputs (Planned and Actual)

Component 1: Strengthening of National Policy and Coordination Framework			
Output 1.1: National Water Resources Institutional Framework			
	Planned Outputs		**Actual Outputs**
1.1.1.	Agreement on operating procedures for national water resources coordination framework.	1.1.1.	Agreement on operating procedures reached with previous DGWR organization; this initial agreement has led to the preparation of guidelines on framework (see 1.1.2)
1.1.2.	National water resources coordination framework operationalized	1.1.2.	Guideline "Strengthening National Policy and Coordination Framework" prepared by package 1 consultants to the Project CBP-1 in 1998, but procedures not operationalized. Academic paper for the National Apex Body for Water Resources also prepared by CBP-1, and the guidelines and academic paper were used to prepare the draft presidential decree (see 1.1.5)
1.1.3.	Capacity building needs identified	1.1.3.	A training needs assessment was completed in December 1997 and a more detailed assessment was carried out in mid-1998
Additional WATSAL Activities			
1.1.4.	Water resources reform policy prepared	1.1.4.	CBP-1 assisted working group in drafting National Policy for Water Resources Management and academic paper for draft presidential decree for National Policy for Water Resources. The draft of the presidential decree was sent to the deputy of the cabinet secretary on law and regulations on 4 May 2001, and was issued as Ministerial Decree No. KEP-14/M.EKON/ 12/2001 by the coordinating minister forthe economy on 10 December 2001, Guideline on National Policy for Water Resources
1.1.5.	Draft of presidential decree regarding the National Water Resources Council prepared	1.1.5.	CBP-1 assisted DGWR in drafting presidential decree for Establishment of National Apex Body for Water Resources. The draft of the presidential decree was sent to the deputy of the cabinet secretary on law and regulations on 4 May 2001, and was issued as Presidential Decree No 123/2001 on 5 December 2001, concerning the national coordination team for water resources management. This was followed by Ministerial Decree No. KEP-15/M.EKON/ 12/2001 from the coordinating minister for the economy on 10 December 2001, concerning the setting up of a secretariat for the national coordination team for water resources management
1.1.6.	Revision of draft law on water resources development prepared	1.1.6.	CBP-1 assisted working group in preparing a technical paper and a draft law for water resources and several draft regulations. The draft law was originally sent to the head of commission IV of the People's Consultative Assembly on 23 February 2001, but was revised under the new minister MPW with assistance from CBP-1, and was resubmitted to the president on 17 May 2002. A new water law No. 7 2004 was passed in January 2004
Output 1.2: National Operational Management Guidelines Resources Institutional Framework			
Planned Outputs		**Actual Outputs**	
1.2.1. National database system established to monitor water supply and demand		1.2.1. Guidelines prepared on how to establish a monitoring system for water supply and demand, used in the preparation of the technical paper on management information systems	

Annex 4 Summary of Consulting Services (at Appraisal and Actual)

Expertise	International		Domestic		Schedule of Completion	
	Appraisal	Actual	Appraisal	Actual		
	Person-Months		Person-Months		Original	Actual
Package 1. Policy, Human Resources Management and Institutional Development	92	135	206	472	30-Jun-00	25-Jun-02
Package 2. Provincial Water Resources Planning, Hydromet and Water Quality Team	84	100	441	538	08-Feb-00	15-May-02
Package 3. Management Development Program	0	37	0	87	02-Mar-00	15-Jun-00
Package 4. Capacity Strengthening of Water Resources Specialist Education Program	0	60	0	15	30-Jul-99	28-Feb-00
Package 5. Public Awareness Campaign (Pre-Phase I)	0	0	0	88	02-May-99	02-May-99
Package 6. Hydrology Advisory Services Capacity Building Project	0	12	0	0	18-Nov-00	18-Nov-00
Package 7. The Improvement of Water Resources Data Management	0	35	0	118	16-Apr-02	16-Apr-02
Total	**176**	**379**	**647**	**1318**		

Source: Capacity Building for the Water Resources Sector, Project Completion Report (June 2002) prepared by IndoConsult and Associates on behalf of the Government of Indonesia.

Annex 5 Cost Breakdown by Project Component ($ '000)

	Appraisal			Actual		
Category	**Foreign**	**Local**	**Total**	**Foreign**	**Local**	**Total**
I. Investment Costs						
1. Civil Works	1690	4681	6371	352	1025	1377
2. Equipment	8325	176	8501	4647	324	4971
3. Consulting Services	2866	3987	6853	4169	2642	6811
4. Training						
- Management Development Program	1466	294	1760	2214	994	3208
- Specialist Education Program	4140	772	4912	1696	208	1904
- Other Training	431	3492	3923	131	364	495
5. Project Administration Support		3839	3839		599	599
II. Recurrent Costs		3120	3120		173	173
Base Cost	**18918**	**20361**	**39279**	**13209**	**6329**	**19538**
Taxes and Duties		3360	3360		412	412
Interest During Construction	3617		3617	3000		3000
Total	**22535**	**23721**	**46256**	**16209**	**6741**	**22950**

Source: PCR

Annex 6 Yearly Expenditures by Component ($'000)

Items	1995	1996	1997	1998	1999	2000	2001	2002	Total
Component 1			**836**	**366**	**525**	**1131**	**956**	**1155**	**4969**
Civil Works							39		39
Equipment			63	11	135	369	24	91	693
Consulting Services			625	315	350	544	455	565	2854
Management Development Program			140			78	365	437	1020
Other Training			8			100	33	22	163
Project Admin. Support				40	40	40	40	40	200
Component 2			**569**	**483**	**1564**	**1746**	**1347**	**899**	**6609**
Civil Works			45	7	119	276	153	151	751
Equipment			255	188	935	597	366	104	2445
Consulting Services				268	492	377	283	264	1684
Management Development Program								64	64
Water Resources Special Education Program			254			387	476	235	1352
Other Training						62	29	21	113
Project Admin. Support			15	20	18	47	40	60	200
Component 3			**1138**	**1138**	**1911**	**1319**	**1228**	**1457**	**7786**
Civil Works			22	35	145	50	180	155	587
Equipment			24	134	726	386	431	131	1832
Consulting Services			707	304	317	296	279	370	2273
Management Development Program				271	387	464	266	736	2124
Water Resources Special Education Program			127	207	218				552
Other Training			3	3	92	83	22	16	219
Project Admin, Support			11	23	26	40	50	49	199
Total (Components 1 to 3)			2299	1826	4000	4196	3531	3511	19365
Recurrent Costs			8	28	42	56	18	21	173
TOTAL BASE COST			**2307**	**1854**	**4042**	**4252**	**3549**	**3532**	**19538**
Interest During Construction	24	97	263	439	560	713	893	11	3000
Taxes and Duties			0	0	0	0	0	0	412
GRAND TOTAL	**24**	**97**	**2691**	**2293**	**4602**	**4577**	**4830**	**3543**	**22950**

Source: PCR

Annex 7 Chronology of Significant Water Resources Sector Events

Year	Action	Notes
1974	Law 11 on Water Resources	Including river basin management
1987	BAPPENAS issued the Government Policy Statement on the Operation and Maintenance of Irrigation Systems.	Turnover to farmers of schemes <500ha. Introduction of ISF on larger schemes
1989	Decree of MPW on the Determination of 90 River Territories divided into 90 river territories (*Wilayah Sungai*) that in turn encompass 5,590 river basins.	
1989	PROKASIH (Clean Rivers) program initiated by Ministry of Environment in 11 river basins implemented by its regional offices (Bapedalda) Converted to PROPER PROKASIH in 1994	covers about 5% of Indonesian manufacturing facilities in Java, Sumatra and Kalimantan.
1995-2002	World Bank aided Java Irrigation Improvement and Water Resources Management Project (JIWMP)	

Annex 7 Continued

July 1997 to early 1998	Asian financial crisis	Rupiah fell from Rp2,400 to 14,500/$ by 23 January 1998, recovering to Rp9,500 by early February
May 1998-Oct 1999	End of Suharto government in May, establishment of Habibie Government	Launch of WATSAL
January 1999	Tim Koordinasi formed	9-member inter-ministerial team, chaired by the Minister for Economic Affairs
April 1999	Launching Irrigation Management Policy Reforms under Keppres No. 3/1999, later followed up by PP No. 77/ 2001 on Irrigation	Regarding with tasks redefinition, WUA empowerment, irrigation management transfer, decentral-ized self financing, and sustainability
Oct 1999-July 2001	Abdurrahman Wahid Government	
1999	MPW broken up into Ministry of Settlements and Regional Development (*Kimbangwil*) and a smaller State Ministry of Public Works (*MeNeg PU*)	Water reform program initiated
May 1999	Law 22 - Local Government Law 25 and regulation 25 on "Fiscal Balance Between Central Government and the Regions	Decentralization Policy
2001	TKPSDA (Coordination Committee for WRDM) created & established	Minister of Economic Affairs Decree 15/M.EKON/12/2001
July 2001- Sepember 2004	Megawati Government	2003 reversed several reform laws and attempted to backtrack on regional autonomy
July 2001	Merger of *Kimbangwil and MeNeg PU* to form new Ministry of Settlements and Regional Infrastructure (*Kimpraswil*)(MoSRI) with a Directorate General for Water Resources (DGWR)	DGWR included of: River Basin Planning, Technical Guidance, and Western, Central and Eastern Region Implementing/ Supervision directorates
2001-2003	Indonesia Water Resources and Irrigation Reform Implementation Project (IWIRIP)	
2003	Ministry of Environment completed PP 82/01 on Pollution Control as well as in June 2003 all implementation guidelines)	
March 2004	Law 7 passed and declared	Superseded Law No. 11/1974 and PP No.77/2001
2004	Laws No. 32/2004 and Government Regulation No. 32/2004 and seek to set up transparent governance of water resources within the river basin through the BWRC	
December 2004	SB Yudhoyono Government	Committed to consolidating selected reforms
2005	Regulation 16/2005 on Drinking Water Provision System	
April 2005	SumUt WR Council formed	
June 2005	Reorganization of MPW, including reorganization of DGWR (replaced old to new directorates)	MPW Regulation No. 286/PRT/ M/2005
March 2006	Meeting TKPSDA on Finalization Schedule of all regulations (PP and Perpres) related to the Law 7/2004	
June 2006	PP on Irrigation No 20/2006 is the first regulation released, out of 14	

Source: PPER for Capacity Building in Water Resources Sector, 29 June 2006

Monitoring and Evaluation of Capacity Development for Irrigation Modernization

Abstract

Effective capacity development monitoring and evaluation (M&E) depends first upon targeted capacity development programmes, with well-defined and attainable objectives that can be evaluated after completion of the programme. This paper focuses on capacity development related to technical issues of irrigation modernization.

The Irrigation Training and Research Center (ITRC) performs diagnostic research on irrigation projects and field irrigation systems in advance of developing targeted capacity development programmes. If the capacity development is appropriate, and if it is targeted in both content and to specific audiences, one can expect an eventual improvement in post-capacity-building performance. ITRC has found that the improvements are incremental, and often require substantial changes in internal indicators (such as reliability, improvement of structures, etc.) before external indicators such as irrigation project efficiency can be noticed. Therefore, evaluation (before and after) requires acknowledgement of process indicators as well as external indicators.

Introduction

"Capacity building" for irrigation modernization has become a popular phrase. Effective capacity building programmes intended to develop/strengthen technical skills require several magnitudes of effort and resources (attention, financial resources, time) beyond what are currently being allocated to most projects. It is unrealistic to expect a technical capacity building programme to be based on one or two short courses of two-week duration. Capacity building for irrigation system modernization is a complex, long-term effort that must be carefully targeted, requires highly qualified instructors, needs continual feedback, and must involve field implementation and evaluation to be effective.

The author has been involved in over a dozen short-term capacity building efforts in international projects. They have all been helpful as starters, but in general they been insufficient for sustained improvement. This paper will focus on the successful strategy that the author and others at ITRC have implemented to support successful modernization efforts in well over a hundred irrigation projects in western United States of America.

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The Effectiveness of Capacity Building Programmes

Before the idea of a capacity building programme can be approached, the question always arises as to whether or not such programmes are effective. The answer to this is simple: Sometimes. Historically, a project's effectiveness has depended upon the specific effort that was made and how it was done.

The difficulty in declaring a project a success lies in the amount of time it takes for results to manifest themselves. This can take from years to decades, depending upon the programme's starting point. The author frequently begins discussions of modernization and capacity building efforts in western USA irrigation projects 5-10 years before the first modernization steps begin. Once things begin to happen, success generally requires a slow, methodical approach in which ideas are tested and proven and acceptance is gained for new ideas. Therefore, significant proof of success may not occur until 10-15 years after initial efforts are made. Other cases, of course, are more rapid. However, a minimum of several years is generally required to even begin to see results.

When considering Monitoring and Evaluation (M&E) of capacity building, it is logical to ask what eventual results should be expected. However, there can be significant benefits by examining the programme itself, rather than waiting for results. Therefore, the M&E should address process-oriented questions such as:

- What quantifiable objectives (QO) were defined before the start of the capacity building exercise? Two criteria go along with this question:
    - The objectives must be realistic; and they must be attainable.
    - The capacity building programme must be carefully targeted to address the specific objectives. Otherwise, it is unfair to evaluate the programme based on objectives that were not stated or which did not exist.
- What time scale was assigned to achieve these QOs?
- Exactly how these QOs were to be evaluated? Or more specifically, was it even known what the original condition was?
- Do the QOs involve process, internal indicators, or external indicators for the project itself? For example:
    - Process may include the mechanism of computing irrigation routing and communications.
    - Internal indicators may include a measure of the reliability and flexibility of water delivery to fields – which should be a result of improved irrigation routing and improved communications.
    - External indicators may include improved payment of water fees, higher yields and increased cropping intensity or reduced diversions.

In addition, there are other points that can indicate whether a capacity building has or will be successful. An M&E programme can benefit by examining whether the following have occurred:

- Something has actually changed in the project, and that action persists over time. That is, the project authorities, farmers or other interested parties accept the action as beneficial and work towards maintaining and expanding it.
- Conversations among irrigation professionals begin to include correct new concepts of efficiency, water conservation, the service mentality, etc.
- Grant and loan programmes, and approval of new projects, include requirements related to proven water or energy conservation, water quality improvements, provision of better service to farmers or other specific targets.

- Politicians and funding agencies at least pay lip service to effective modernization concepts, and allow appropriate projects to be funded.
- Papers are published and presented in local technical journals that are based on successful, sustained implementation of modernization principles – as opposed to descriptions of policy, plans for a project, theoretical models and other paper ideas.

Are the Capacity Building and M&E Programmes Realistic?

The M&E programme should include an initial analysis of what capacity building needs exist, and if there is sufficient funding and support to implement the knowledge gained through capacity building. Perhaps one of the first steps in any M&E programme is to define whether the capacity building programme is properly targeted, and whether it will succeed. If the answers are "no", the capacity building programme should be re-defined or delayed.

There appear to be certain external circumstances essential for success, all of which must be met prior to beginning a capacity building programme. Identifying these should be part of the M&E programme. They include:

- A true need for irrigation performance improvement must exist – whether it be related to the environment, crop yields or energy consumption.
- Both trainees and their bosses must perceive that there is a need for improvement.
- Adequate funding must be available to implement modernization programmes. Without successful field applications, the capacity building will remain a theoretical exercise.
- There must be adequate funding for long-term (approximately 10 years) capacity building.
- If an M&E programme is planned, there must be a well-defined programme, with well-defined objectives, and sufficient funding that extends past the capacity building period.
- Adequate funding, time and resources must be allocated to work through the inevitable problems that occur with any modernization programme – regardless of how simple. "The devil is in the details", and if all of the details are not taken care of, the implementation of a modernization effort will fail. With failure of field implementation, the capacity building effort will fail because there is nothing to show for it and people will be demoralized.

> *The success of a capacity building programme is dependent upon the successful implementation of the knowledge gained.*

An ideal M&E programme, even if modest in nature, should be incorporated into the capacity development effort in the very early stages of the thought process. This stems from the fact that the success of a capacity building programme is highly dependent upon the organization and skills of the instructors and how the material is presented in the earliest stages of a capacity building programme.

The reality is that there is often a very limited choice in instructors. However, a pragmatic M&E programme does need some way to gauge the capacity development training process itself in addition to the irrigation project's circumstances and results. In reality, there exist certain "process indicators" in the capacity development programme itself:

- The instructors must have practical field experience – not only in design, but also in field construction, and in living with their designs and in receiving criticism for problems. The instructors must be "real world" people who can distinguish between simply theoretical, interesting topics, versus those that are actually important.

- Some topics are strictly technical in nature – such as how to design a broad crested weir. However, knowing the hydraulics is simply insufficient to be a qualified instructor. The person who teaches about the weir design must also be very familiar with why so many field installations of broad crested weirs have failed … and how to avoid those failures in the future.
- Beyond the strict number-crunching issues, there is a whole different level of expertise that must permeate a successful capacity building programme. At least some of the instructors must also understand strategies of project modernization, and how to select various strategies under various conditions. These are the people who would know why a weir is even needed in a particular application, how it would be used, how it ties into the overall operation …. and why that particular device was selected rather than another.
- The training topics must be targeted to the specific audience. If they are not, they will be interesting at best. At worst, the audience will become indignant (unless, of course, the capacity building is held at a nice resort and only requires a few hours per day).
- The training topics must be targeted to problems that can realistically be solved by the specific audience.
- In all but the most extreme and narrow cases, it is completely inappropriate to use calculus, differential equations, complex simulation computer models, etc. for capacity building that trains people who will be involved in actual planning, design and implementation of irrigation modernization.

For some people involved in irrigation projects, a few capacity building sessions are adequate to raise awareness and to provide a few tools. However, other individuals must deal with more complicated problems that require considerably deeper training and repeated refresher sessions and backup.

The programmes must absolutely do more than have classroom and laboratory sessions prior to irrigation modernization efforts. Capacity building programmes must include support for people who are actively implementing modernization. These people will need backup at a variety of stages in their attempts in order for them to be successful and to gain confidence.

Capacity building includes support before, during and after implementation of new concepts, software and hardware in the project.

Benchmarking – A Buzzword for the M&E Process

Success requires meaningful improvement over previous conditions. For irrigation projects, this entails the improvement of performance indicators. In the western USA, ITRC uses a shortened version of the ITRC Rapid Appraisal Process (RAP), developed for the Food and Agriculture Organization of the United Nations (FAO) and the World Bank, to diagnose internal project operations (Table 1). Many of the performance indicators and benchmarks that are included in the ITRC RAP are now common knowledge by irrigation districts. However, a diagnosis of system operation and internal solutions is still needed.

Therefore, a basic concept of evaluation of the success of a capacity building programme is that the pre-project condition must be benchmarked properly. The definition of "sufficient" benchmarking will vary depending upon the irrigation project. USA modernization projects are generally categorized by either of the following motives.

Internal Initiative and Funds

Districts that completely self-fund their modernization efforts typically have these essential characteristics:

1. The manager, engineers and operators are generally empowered to be innovative.
2. The irrigation districts are governed by a board of directors who are completely responsible for setting the budget and fees. The board will not spend money unless the members sense that there is a true need – because that money must be collected from them in the form of higher water fees.
3. The irrigation districts place little importance on fancy reports. They want to deliver water with good service at a low price. Therefore, they are very pragmatic and understand their budgets.

Because of these characteristics, the benchmarking that is done is often very simple and does not involve developing many classical "performance indicators". The management knows what types of problems exist, but generally does not know the causes/effects or how to solve them. If the modernization effort eliminates their problems, they consider it a success.

Table 1. Examples of irrigation projects that have received an ITRC RAP in Western USA

Irrigation District	**Imperial**	**Turlock**	**East Columbia Basin**	**Panoche WD**	**Chowchilla WD**
Location	Southern California	Central California	Eastern Washington	Central California	Central California
Irrigated Ha.	189 000	60 000	61 000	15 000	38 000
Age (yrs)	110	140	60	70	110
Administration	Public; each voter has one vote	Public; one vote per registered voter	Public; 1 vote/ farmer	Public; one vote per acre	Public; one vote/acre
# of turnouts operated by district personnel	5 600	1 700	2 500	142	850
% of canal structures automated	5	10	3	5	40
Approx. % of laterals piped	1	90 (monolithic large diameter concrete)	5	0	10 (monolithic large diameter concrete)
Approx. % of canals lined	90	90	5	90	10
Density of turnouts (offtakes)	One/field	Delivers to private laterals serving 2-50 fields.	One/field	One/field	One/field
Number of Irrigation Districts	1	1	3	1	1
State/federal assistance (0=none; 10=major)	2	1	8	5	1

In the USA the primary **internal** indicators that have been used are related to flexibility of water delivery and various budgetary items. The flexibility is understood by the farmers, and also by the operators. For the operators, flexibility is generally associated with hardware modifications that enable them to manipulate unsteady flow rates with ease – and the operators quickly respond positively to those improvements.

External Forces

In other circumstances, external forces (environment, power costs, etc.) drive the desire to modernize an irrigation district. Funding is typically a combination of irrigation district sources and outside grants (federal or state government). In these cases, the initial emphasis is typically on solving the external requests. That often requires benchmarking of **external** indicators in the form of a water balance – or at least determining a few key indicators such as the volume of spill. It also requires an excellent understanding of the internal processes involved in moving water around within the project. In general, USA irrigation districts already have excellent records of the volumes of water that are brought into the district.

ITRC develops modernization efforts to simultaneously solve both internal and external problems – even though the external problems are the driving force for action. Quite often, improvement of internal indicators (such as improved flexibility of delivery, better water level control, improved communication, etc.) is necessary to achieve the external goals (such as reduced spill, fewer diversions from an impacted river, etc.).

Capacity Building for Irrigation Modernization Technical Issues – Western USA

In western USA irrigation districts were often constructed with the help of US Bureau of Reclamation (USBR) design guidance. Most irrigation projects were put in place several decades ago, and gradually the availability of pragmatic technical assistance from US federal and state agencies has declined. Government agencies began to focus more on environmental monitoring and similar programmes rather than the bolts and nuts of making things work in irrigation projects.

However, the federal government agencies had historically developed a wealth of technical literature and research that was used in various publications and universities. Most hydraulic texts in university civil engineering programmes used parts of that information. However, in the past 20 years irrigation engineering has largely disappeared from USA university curriculums (the BioResource and Agricultural Engineering Department at Cal Poly State University, San Luis Obispo is a rare exception) and it would be extremely unusual for a civil engineering student to have had even one irrigation class. Instead, a typical civil engineer may have a couple of fluid mechanics classes.

As of the late 1990s, most of the universities that had large irrigation programmes focused on international work instead of focusing on modernization in the USA Also, although the USBR continued (and still continues) to have an excellent research center and does have an annual short course on canal operation, the direct technical assistance from the USBR for irrigation district modernization became minimal. The net result is that new USA engineers typically have little or no background in the special aspects of irrigation project hydraulics and operation – and they are indeed special. In short, USA irrigation districts were entering a critical time of environmental and power problems with little technical support.

Starting in the mid-1990s, the Irrigation Training and Research Center began to offer limited technical assistance to irrigation districts – generally via various USA or state grants for capacity building. Gradually, ITRC received contracts from various USBR area offices to provide technical assistance for modernization in those areas. Now, ITRC provides technical assistance for modernization on behalf of the USBR in much of western USA, is directly hired by numerous irrigation districts, and manages programmes for the California Energy Commission, the EPA, and others for irrigation districts.

The capacity building by ITRC in western USA is very deliberate. It has involved the following aspects:

1. Diagnostic research on approximately 150 districts to benchmark key indicators related to water charges, structures, flexibility (detailed components of frequency, rate and duration), attitudes, etc. This initial benchmarking of districts in general helped to shape various training programmes, research priorities and technical assistance programmes.
2. Construction of a large outdoor training facility at ITRC to assist in teaching concepts of flow measurement and control, water level control, pumping, sensors, supervisory control and data acquisition (SCADA), etc.
3. A wide array of short training courses has been developed, along with customized training materials. Subject matters include:
    a. Flow measurement in open channels
    b. Flow measurement in pipelines
    c. Pumps – introduction and advanced
    d. Variable frequency drive controllers
    e. Canal control concepts
    f. Specific canal control design subjects
    g. Supervisory control and data acquisition (SCADA) systems
    h. Hand held data recorders
    i. Basic hydraulics
    j. A whole host of related farm irrigation classes including drip/micro irrigation, chemigation, sprinkler design, irrigation scheduling, drainage, soil-plant-water principles, irrigation evaluation and pumps.
4. These classes are tailored to fit the audience and location. Examples include:
    a. At the ITRC, several two-week series of classes are scheduled annually. Irrigation district and engineering firms send employees to these every year.
    b. Customized classes, usually 1-2 days in length, are often developed for operators at specific irrigation districts. Those are customized for the hardware and management that exist in those districts.
    c. Prior to modernization efforts in irrigation districts, ITRC attempts to bring the complete Board of Directors, along with staff, to ITRC for a short course on basic principles of modernization as they apply to that district. This gives everyone a common vocabulary and a common understanding of basic ideas. This has been very successful.
    d. Some irrigation districts send groups of operators to ITRC for special short courses designed just for the operators of their specific district.
    e. Some series of courses are designed for engineers (private and district) and managers; others are designed for operators.
    f. As new topics arise, such as new commercial software for irrigation ordering, hand held data recorders, some particular new technology related to SCADA, or new techniques for canal membrane lining, ITRC works with groups of manufacturers to provide a single one-day session for irrigation districts.
5. A key aspect of the training is that the materials and subjects are constantly upgraded based on field experiences of the training staff. The same persons that do the training are constantly

involved in modernization projects with irrigation districts, as well as having academic degrees in irrigation engineering.

6. ITRC has an active web site that provides technical information to irrigation districts (www.itrc.org).
7. For anything related to sensors, electronic automation, Programmable Logic Controllers (PLCs), SCADA, etc. the cardinal rule in capacity development is to teach people how to use commercial equipment effectively, rather than attempting to develop low-end products locally. Developing local low-end electronic products and software is an almost certain guarantee for failure and a waste of capacity development efforts.
8. For effective modernization, all levels of personnel are involved in capacity development – including managers, engineers, maintenance staff and operators. Farmers also receive information about what the modernization will and will not do.
9. Capacity development requires continual re-affirmation of basic principles, which take a single session to teach, but recurrent repetition to learn. The re-affirmation does not need to come in the form of a regular class, but repeated visits by qualified technical experts are required after training during planning for and execution of modernization plans. It is during those visits that questions are asked and answered, points clarified, ideas expanded upon, and progress reviewed. Even after new structures are installed, it may take 1-2 years before everyone understands how to use them.

M&E for Capacity Building – ITRC Approach

Although the author has defined the capacity building effort that ITRC directs for western USA, the M&E approach for ITRC projects is somewhat non-traditional.

In western USA the M&E programmes have traditionally been implicit rather than explicit. Much of this is due to the way ITRC has developed and carried out its capacity building programmes. ITRC has the following characteristics:

- An excellent staff of motivated people, who have designed and defined topics and techniques for the capacity building programmes under individual impetus rather than government mandate.
- Agencies generally fund specific short courses through ITRC, and participants must almost always pay to attend. In addition, agency funding is required for short course development and upgrading, and construction of training facilities.
- No permanent funding. This is a key aspect of ITRC's efforts. ITRC is not a government-established programme; it is not supported by the University, but instead supports the University irrigation teaching programmes. Because of this, ITRC operates through the law of supply and demand, more like a business than a government organization. ITRC must be extremely responsive to true Capacity Development needs of their customers. If the customers are not provided with information and assistance that they find valuable and responsive, they will simply stop attending the ITRC short courses. In western USA irrigation world, news about successes and failure and poor information travels very fast. ITRC must continually listen to districts, come up with new ideas and respond well.

The lack of centralized funding for capacity development, and the self-motivated aspect of ITRC, are probably key reasons that a formal M&E programme does not exist. The process is simple. If people stop coming (and stop paying to come) and the feedback from the field is that the ideas are not being implemented, then it is obvious that the capacity building is not effective. In turn, if the irrigation districts tell the funding agencies that the ITRC programmes are ineffective, the funding agencies will stop funding programme development.

Conclusion

In western USA, there is no M&E programme of capacity development by any central agency. Capacity development for technical expertise in irrigation modernization has evolved. In addition, most international programmes still lack formalized M&E programmes.

The usefulness of an M&E Programme lies primarily in its application during the formative stages of Capacity Development. Success depends on proper funding and proper design of pragmatic programmes to solve real-world problems. Locating qualified trainers is perhaps the weakest link in the process.

An M&E programme must determine:

1. If the objectives (process, internal and external) of the Capacity Building Programme have been clearly established.
2. If the objectives have been properly established through previous benchmarking efforts, a clear understanding of the present situation of irrigation projects, and perceived needs and available funding.
3. If the capacity building programme has been specifically designed to address the defined needs and objectives.
4. If the proper audiences have been identified.
5. The status of the internal functioning of the capacity building programme. That is, are the people qualified and motivated, is the programme properly financed, and is the capacity building being done in a pragmatic fashion?
6. How does the capacity building programme define success? Are there quantifiable objectives? How are they measured?

Only item #6 above relates to evaluation of results. Items 1 through 5 – used to develop the programme – help ensure the success of the programme.

Monitoring & Evaluation of Capacity Development Programme as part of APFAMGS Project, India

Abstract

Monitoring and evaluation (M&E) of any programme is always said to be important and given enough attention while formulating or designing the programme, however experiences have shown that, in reality, during implementation this is neglected. In case of capacity development programme it is even more neglected as many a times projects and programmes fail to utilize fully the allocated budget for the capacity development component resulting in poor implementation of this component.

The Andhra Pradesh Farmers Managed Groundwater Systems (APFAMGS) project, of the FAO Land and Water programme in India, has an elaborately spelt out capacity development programme for various stakeholders (farmers, NGO staff), various disciplinary professionals, NGOs as institutions themselves, government staff – programme staff as well as policy makers and consultants/technical staff of the project. Consequently, a detail monitoring and evaluation framework – both inclusive and exclusive – was spelt out while designing the project and implemented well. Experience has shown that the M&E system is rewarding in enriching the programme, with learning constantly being brought back into the programme at every level and every stage.

The capacity development activities are monitored at the ground level by the farmers themselves and feedback provided to the project staff, which also monitors their own activities and provides reports to the Coordinator at the district level. All the partner NGOs had setup a Coordination Committee to monitor their own part of activities at the district level and bring learning from one NGO to other. The Technical Support Team, headed by the project leader coordinates all 16 partners on a quarterly basis and monitors the inputs provided on specific technical areas and progress made by each partner. FAO India provides regular monitoring support and facilitates reporting on a half-yearly basis. The Project Steering Committee reviews annually the implementation and approves the annual work plan and provides interface with the policy makers to take the learning of the project into the government programmes. On financial aspects the accountants' team in the project monitors all the organizations on a quarterly basis and audits annually after each NGO implements their own internal audit. FAO India then carries out its own audit and discusses the findings with the partners.

This paper describes out the M&E system in FAO-BIRDS APFAMGS project in Andhra Pradesh, India and shares the experiences which helped to improve the quality of the project implementation and resulted in better results.

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Introduction

Capacity is defined by Goodman et al (1998) as "the ability to carry out stated objectives". Capacity building or development "is a process that improves the ability of a person, group, organization or system to meet objectives or to perform better". Performance "is a set of results that represent productivity and competence related to an established objective/goal or standard". Capacity building or development plays a central role in sustainable development initiatives.

Monitoring and Evaluation of capacity building usually forms part of the overall monitoring and evaluation of an intervention. It keeps track of the changes in the capacity of a person or group over a period of time. While monitoring of capacity building encompasses all efforts to understand the capacity change during implementation, capacity evaluation is conducted to establish links between capacity and performance. It is obvious that improved capacity does not necessarily lead to improved performance, as the performance is not only dependent on the capacity but also on several other variables such as equipment, seasonality, etc. Additionally, influence of socio-cultural, economic, legal, political and environmental variables greatly influences the performance. Therefore, what works in a certain situation does not necessarily work in another situation, in a different project environment.

Monitoring and evaluation of any programme is always said to be important and given enough attention while formulating or designing the programme. However experiences have shown that, in reality during implementation this is neglected, especially in the case of capacity development programme. As a result of this, many a time, projects and programmes fail to utilize fully the allocated budget for the capacity development component.

In this paper we look at the plan and practice of monitoring and evaluation of capacity building in a FAO supported project – Andhra Pradesh Farmer Managed Groundwater Systems Project, being implemented in South India.

APFAMGS Project – An Overview

The Goal of the APFAMGS Project is stated as: *"Stage is set for enabling the farmers to manage their groundwater systems in about 650 villages in seven drought-prone district of Andhra Pradesh by the year 2008"*. The project is located in seven drought prone districts of Andhra Pradesh, a southern state of the Republic of India (Figure 1). Parts of these districts are identified based on the socio-technical criteria and delineated into 62 Hydrological Units, in about 650 habitations. All the inhabitants, both men and women, are targeted for project benefits irrespective of economic status, caste, creed and religion.

APFAMGS is a Nationally Executed (NEX) project of the Food and Agriculture Organization India (FAOIN), utilizing the funds provided by the Government of the Netherlands (Figure 2). Bharathi Integrated Rural Development Society (BIRDS) is the Nodal NGO (NNGO) for the project implementation, which holds overall administrative responsibility of the project, under a contract signed with FAOIN. Eight other Partner NGOs (PNGO) of repute will be responsible for one Project Implementation area/district.

The Project Leader of the Technical Support Team (TST) is constituted to carry out day-to-day coordination tasks on behalf of the Nodal NGO. Consultants, both institutions and individuals, give inputs in specialized areas.

Figure 1. Operational Area of APFAMGS

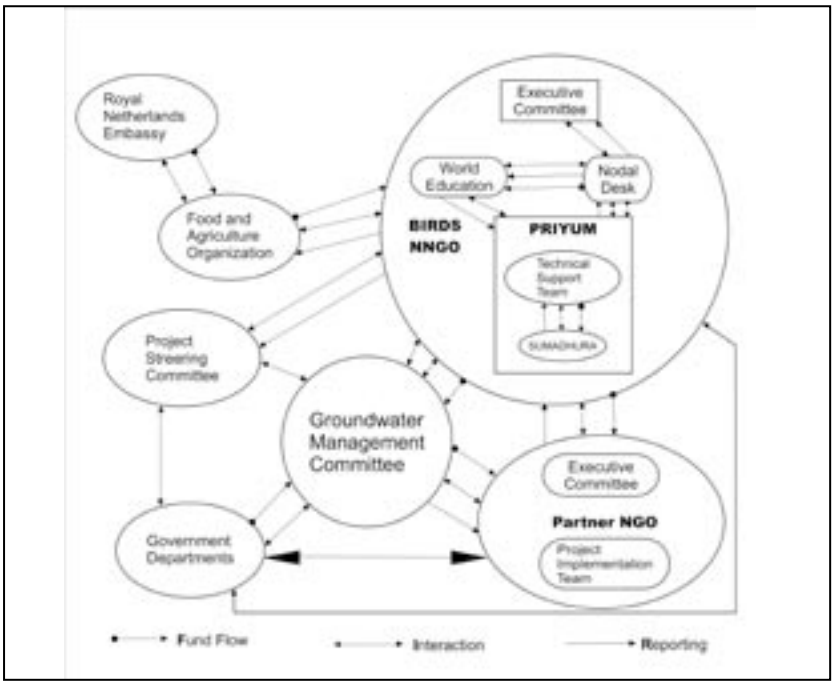
Each Subject Expert (in the TST) is responsible for coordinating with the PNGOs on matters related to his/her area of specialization. All procurements, technical designs and other matters of subject specific nature are referred to the Subject Expert and the implementation is carried out by the PNGOs, strictly adhering to the norms/ specification suggested by her/him.

Manager-Process Monitoring (MPM) coordinates with three PNGOs. She/he is responsible for assessing the field difficulties in realizing the project goal and carrying out problem solving exercises. She/he also brings out staff capacity building needs, apart from facilitating the process documentation at PNGO level. They guide the PNGOs on matters related to field operations and bringing out qualitative reports. MPMs have the additional responsibility of ensuring strict implementation of Operational Guidelines (including the financial and administrative guidelines), issued by TST from time to time. They are responsible for maintaining a project related data base of PNGOs and provide information to Subject Experts as and when required. She/he keeps track of NGOs with regular field visits as well as collection of press clipping and of their confidential reports.

Each Partner NGO appointed a Coordinator for routine coordination of project related matters, with the Project Leader. The PNGO Coordinator is responsible for field operations, personnel matters, and routine administrative and financial tasks. She/he coordinates with the Project Leader for technical guidance of Subject Experts, process documentation, staff appraisal and technical/regular monitoring/ reporting. She/he conducts a monthly meeting to draw up monthly action plans of each of the staff and inform the Project Leader. S/he conducts weekly meetings to review the progress and make necessary changes in the monthly action plan, based on the field realities. She/he is responsible for procurement and physical execution of all the project related works, with all technical guidance of the relevant member of Project Implementation Team (PIT).

Members of the Project Implementation Team are responsible for coordinating all the activities taken up in their area, pertaining to each one's expertise. At the village level, members of PIT coordinate with the Village Coordinator (VC) while at the team level they coordinate with the PNGO Coordinator. They report to the PNGO Coordinator on the functioning of the project on a weekly basis. The VC will be responsible for the implementation of all the activities, at the village level. Each VC is responsible for about 10-12 villages and coordinates with members of PIT directly, based on the nature of the activity taken up at the village level. The VC reports on the functioning to the NGO Coordinator on a weekly basis.

Figure 2. Organizational Structure of APFAMGS



Groundwater Management Committee (GMC) is a Community Based Institution (CBI) organized as part of the project, keeping in view the post-project sustainability. Every individual in a habitation is a General Body member of GMC. All habitation level[1] GMCs, in a Hydrological Unit (HU), form a Hydrological Unit Network (HUN), All HUNs in a district further form a District Level Network. Apart from the members of GMC, several members of the community play a role in sustainable groundwater management in a HU including farmer volunteers (who collect hydrological data), well owners, opinion leaders and peer groups.

Reporting in the project is a two-way process i.e., from CBI-Donor as well as Donor-CBI. At the community level, men and women volunteers report to the Village Coordinator/PIT members, both verbally and on paper. While the verbal reporting is documented by the project staff in the form of minutes of community meetings, reports on the participatory exercises and compilation of case studies, the paper form of reporting at the community level includes the hydrological and agriculture data.

The VC compiles the project experience at the village level and reports verbally at the weekly meeting and documents progress in the form of a monthly report. Members of PIT also report on a monthly basis to the NGO Coordinator, on subject specific matters. The PNGO Coordinator in turn reports to the Project Leader on a monthly basis. The Nodal NGO, through the Project Leader, compiles Half-yearly Progress Reports for submission to FAOIN. Reporting arrangements in the Project, at different levels, is summarized in Table 1.

As in the case of reporting, regular reviews are carried out at all levels namely, from the habitation to the project level. Table 2 gives an overview of the review scheduling for the project implementation.

[1] A human settlement, irrespective of its size is a habitation. Cluster of habitations form a village, so on.

Table 1. Reporting arrangement in APFAMGS Project

SN	Reporter	Reporting to	Report form	Periodicity
1	Farmer Volunteer	Secretary, GMC	Verbal/Written	Daily
2	Secretary, GMC	Village Coordinator	Verbal/Written	Weekly
3	Village Coordinator	NGO Coordinator	Written	Weekly
4	Facilitators	NGO Coordinator, Subject Experts	Written	Weekly
5	NGO Coordinator	NGO Head, Subject Experts	Written	Monthly
6	NGO Head	Project Leader, ED-BIRDS	Written	Monthly
7	Manager – Process Monitoring	Project Leader, Subject Experts	Written	Monthly
8	Subject Experts	Project Leader	Written	Monthly
9	Consultants	Project Leader	Written	Monthly
10	Project Leader	ED-BIRDS, MD-PRIYUM	Written	Monthly
11	Executive Director, NNGO	National Programme Coordinator, FAOIN	Written	Half-yearly

Table 2. Review scheduling of APFAMGS Project

SN	Chairperson	Participants	Place	Periodicity
1	Secretary, GMC	Farmer volunteers	Habitation	Daily
2	Village Coordinator	Secretary, GMC	Habitation	Weekly
3	NGO Coordinator	All PIT members	PNGO Office	Weekly
4	NGO Head	NGO Coordinator, PIT members	PNGO Office	Monthly
7	Manager – Process Monitoring	NGO Coordinator, PIT members	PNGO Office	Monthly
5	Subject Experts	MPMs, Facilitators, Consulting firms	TST Office	Monthly
6	Project Leader	NGO Heads/Coordinators	TST Office	Monthly
8	Executive Director – BIRDS	PL, SEs, MPMs, PNGO Heads	NNGO Office	Quarterly
9	Executive Director – BIRDS	Members of PSC	TST Office	Half-yearly

Monitoring and Evaluation in APFAMGS

Generally, Monitoring and Evaluation plan of a project or programme includes all components, including the capacity building component. In APFAMGS, monitoring is broadly categorized under four main heads namely, physical, financial, process and impact. While the first two monitoring tools ensure transparency and accountability of project implementation, the remaining monitoring themes are essential for outcome mapping.

The planning is bottom-up, starting at the habitation level and consolidating at the NNGO level. Keeping in mind the overall timeframe of the project, physical target fixing is done at habitation level, on a monthly basis. At the PNGO level, target fixing is finalized in consultation with members of PIT. Individual monthly plans of project partners are consolidated at the project level in a monthly meeting chaired by the Project Leader. Monitoring of target realization is carried out through monthly monitoring reports of project partners. Monitoring indicators are evolved by Subject Experts in consultation with all the stakeholders. The data generated as a result of monitoring are processed at the TST level through a Management Information. The data source is the filled in formats specifically designed and compatible with MIS. The main users of the Physical monitoring information are the SEs who is responsible for

generating qualitative reports. The information, however, are available for all the internal stakeholders. Apart from the main users, the information is shared with the end-users at the village level to facilitate improved performance. The information is extensively used to make necessary changes in the implementation process. It also influences policy decisions at TST, NNGO and FAOIN levels.

Comprehensive financial and administrative guidelines are evolved and followed by the project partners. This is necessitated by the fact that NGOs are handling large amount of funds. The internal control mechanism is well implemented in the project. The Manager-Accounts along with the Nodal agency Accountant visits all the PNGOs from time to time in order to streamline the accounting systems. Monitoring of financial aspects is done by an internal auditor, who conducts audit once a year. The Nodal Desk does the regular financial monitoring through visits of the Executive Director and his staff for checking the accounting and administrative procedures. A quarterly budget-realization statement of each project partner gives an indication of their financial discipline. Audited financial statements are also mandatory under the Foreign Contributions Regulation Act (FCRA), which is the responsibility of individual project partners. Audit Reports along with Utilization Certificates (UC) are submitted to FCRA, using a common format developed by the Nodal NGO.

Process monitoring is another important aspect, which is given high importance in the project. As part of process monitoring, Managers-Process Monitoring make regular field visits for physical verification of works, procurement and quality of implementation. While monitoring, new learnings were incorporated in the ongoing activities for added value. Periodical review and planning meetings on a monthly basis have been regularly conducted with all the project partners including PNGOs, SGPL, WE-I, short term Consultants and TST members. It consists of collection of press clippings, cross-checking the financial dealings in the open market, interacting with stakeholder outside the project environment, etc.

Internal Impact monitoring is carried out through Annual Plan and Budget Workshop sessions. Objective Verifiable Indicators (OVIs) are listed in the project document in a logical framework. These indicators are discussed in groups and plenary to review what happened during the previous year that ultimately leads to evolve strategies for the next year, culminating in the Annual Plan and Budget Document. An external evaluation was carried out recently to gauge the impact mid-way of the project. The report is awaited at the time of writing this paper.

Means of verification refers to the documentation that project partners are expected to upkeep, so that objective verifiable indicators are checked by any person or agency. Project has attempted to put in place all the required documentation namely, means of verification, during the reporting period. Table 3 gives an account of the status of means of verification, at the time of writing this paper.

Positive situations assumed in the external environment, essential for the attainment of project goal were identified in the project document. Let us look at the actual situation in the external environment, at the time of writing this paper. Table 4 tries to compare the assumed situation with the actual situation outside the project environment.

Table 3. Status of Means of Verification

SN	Objective Verifiable Indicator	Level	Target[2]	Achievement	Balance
1	Meeting Minutes book	GMC (Habitation)	650	527	123
2	Meeting Minutes book	GMC (HU)	62	62	0
3	Meeting Minutes book	GMC (PNGO)	9	9	0
4	Meeting Minutes book	GMC (Project)	1	1	0
6	Visitors Book	Project Partner	10	10	0
7	Hydrological Monitoring Record	Station	3000	2232	768
	Updated Display Boards				
8	HU type display Boards	Cluster	126	83	43
9	Rain fall type display boards	Habitation	650	615	35
10	Water Level type display boards	Habitation	650	608	42
11	Sign boards	Habitation	650	635	15
12	Base Document	Hydrological Unit	62	50	12
13	Monthly Reports	Project Partner	16	16	0
14	Half-yearly Progress Reports	Project	9	9	0
15	Mission Reports	Project	10	0	10
16	Press clippings	Project Partner	10	10	0

Table 4. Actual situation in relation to assumed situation in the external environment

SN	Assumed external environment	Actual external environment
1	Other agencies/projects base their interventions based on local hydrological situations	To some extent the desired situation is existing
2	APWALTA is able to control mushrooming of bore wells	Controlled to a large extent
3	Chemical Fertilizers/pesticide companies and departments realign their approach to promote organic farming.	Some realignment is already visible
4	Political parties, faction groups, government, and PRIs support the community level initiative	There is no animosity towards farmer volunteers or GMCs formed so far.

Based on the assessment of the numeric and qualitative information, generated out of different methods of monitoring and evaluation, the statements made in the project document are rewritten in the same format, in every Half-yearly Progress Report (HPR). Table 5 lists the rewritten statements, which also form part of the HPR for the period ending June 2006.

[2] The number of material mentioned under objective verifiable indicators

Table 5. Statements written in Project Document compared to rewritten statements based on M&E

	As stated in the Project Document	Rewritten statements, per June 2006
Output 1.1	Hydrological Monitoring Networks established, covering about 650 habitations in Andhra Pradesh, by 2006.	Hydrological Monitoring Networks established, in 62 HUs, covering about 650 habitations in Andhra Pradesh, by 2005.
Output 1.2	Farmer equipped to collect, record and share the hydrological data covering about 650 habitations in Andhra Pradesh, by 2008.	Farmers equipped to collect record and share the hydrological data covering about 650 habitations in Andhra Pradesh, by 2005.
Output 1.3	Additional groundwater recharge potential is created in overexploited aquifer zones covering about 650 habitations in Andhra Pradesh, by 2008.	Additional groundwater recharge potential is created in 8 overexploited aquifer zones covering about 33 habitations in Andhra Pradesh, by 2005.
Output 1.4	Staff possess the knowledge and skills to take up the tasks in Hydrology covering about 650 habitations in Andhra Pradesh, by 2005.	Staff *partially* possess the knowledge and skills to take up the tasks in Hydrology covering about 659 habitations in Andhra Pradesh, by 2005.
Immediate Objective 1	About 3 000 Men and Women farmers are in a position to understand groundwater systems within which they are operating at about 650 habitations in Andhra Pradesh, in a scientific manner, by the year 2008.	About 6 882 Male and Female farmers are targeted for putting them in a position to understand groundwater systems within which they are operating at about 650 habitations in Andhra Pradesh, in a scientific manner, by Dec 2005.
Output 2.1	Pilot GIS Stations established at 9 PNGO base towns, by the year 2005.	Pilot GIS Stations established at 9 PNGO base towns, by the year 2004.
Output 2.2	About 20 Staff members equipped with necessary skills in GIS and GPS, by 2005.	Thirty six technical staff members equipped with necessary skills in GIS and GPS, by 2005.
Output 2.3	Data necessary to build up base maps of pilot Hydrological Units procured, by 2005.	Data necessary to build up base maps of *9*pilot Hydrological Units procured, by Dec 2005.
Output 2.4	Nine GIS Stations customized for application of Crop Water Budgeting, by 2006.	*No* GIS Stations customized for application of Crop Water Budgeting, by Dec 2005.
Immediate Objective 2	Hydrological database, using GIS platform, is developed for use of Groundwater Management Committees, covering 650 habitations, by the year 2006.	Hydrological database, using GIS platform, is *being* developed for use by Groundwater Management Committees, covering 650 habitations, by Dec 2005.
Output 3.1	Crops suiting the groundwater balance promoted, in about 650 habitations in Andhra Pradesh, by 2008.	Crops suiting the groundwater balance promoted, in about 496 habitations in Andhra Pradesh by Dec 2005.
Output 3.2	External Inputs in the Agriculture reduced by 2007.	Efforts are made to reduce external Inputs in Agriculture by Dec 2005.
Output 3.3	Staff possess the knowledge and skills to take up the tasks in Agriculture, by 2005.	36 Staff possesses the knowledge and skills to take up the tasks in Agriculture, by Dec 2005.

Table 5 Continued

Immediate Objective 3	About 6 500 farm families enabled for adoption of alternative agricultural practices suiting the availability of groundwater, by the year 2008.	About 7 029 farm families enabled for adoption of alternative agricultural practices suiting the availability of groundwater, by Dec 2005.
Output 4.1	CBIs formed for groundwater management, covering 650 habitations in Andhra Pradesh by 2006.	CBIs formed for Groundwater management, covering 650 habitations in Andhra Pradesh, by Dec 2005.
Output 4.2	Enabling environment created for women's participation in groundwater management, in 650 habitations of Andhra Pradesh by 2007.	Enabling environment created for women's participation in groundwater management in 650 habitations of Andhra Pradesh by Dec 2005.
Output 4.3	Institutional capacity of GMCs, covering 650 habitations in Andhra Pradesh, built up, by year 2008.	Institutional capacity of GMCs, covering 450 habitations in Andhra Pradesh, built up, by Dec 2005.
Output 4.4	Functional linkages between CBIs and Line Departments established, covering about 650 habitations, by year 2008.	Functional linkages between CBIs and line departments established, covering about 372 habitations, by Dec 2005.
Output 4.5	Staff possesses the knowledge and skills to take up the tasks in Institutional Development and Gender, by 2006.	93 Staff possesses the knowledge and skills to take up the tasks in Institutional development and Gender, by June 2005.
Immediate Objective 4	Community based institutions established for alternative management of groundwater resources with equal representation/ participation of men and women, covering about 650 habitations, by the year 2008.	Community based institutions established for alternative management of groundwater resourced with equal representation/ participation of men and women, covering about 650habitations, by June 2005.
Project Goal	Stage is set for enabling the farmers to manage their groundwater systems in about 650 villages in seven drought-prone districts of Andhra Pradesh by the year 2008.	Stage is set for enabling farmers to manage their groundwater systems in about 650 habitations in seven drought-prone districts of Andhra Pradesh by June 2005.

Capacity Development in APFAMGS

Capacity development in the project is carried out using a variety of methods including: cultural shows, practical training, exposure visits, exchange visits and peoples workshops. Farmer Field Schools (FFS) focusing on sustainable groundwater management is the cornerstone of the project intervention, which extensively uses Non Formal Education (NFE) methodology. The capacity building activities are timed suiting the seasonality in a Hydrological Year. In the first cycle of FFS, project staff trains Farmer Trainers, who multiply the capacity building efforts on a large scale, with target coverage of about 5 million groundwater farmers, by the end of the project period.

GMCs at the habitation level are equipped to take up the data collection and storage tasks, while the Hydrological Unit (HU) level GMCs are capable of analyzing and understanding the problems beset to their aquifer system. Linkages with relevant institutions for professional support are coordinated by HU level GMC. Operation and Maintenance of the physical infrastructure such as observation wells and rain gauge stations is the mandate of habitation level GMC. The most important strategy successfully implemented in APFAMGS is to bring in gender equity in peoples institutions as well as its training and other capacity building efforts.

The APFAMGS Project could create a huge skilled human resource in 650 habitations, as part of its huge capacity development component. The community based institutions organized for the purpose are now geared to take on the task of groundwater management. Presently, 2 262 farmers collect daily rainfall data, from 194 rain gauge stations. Static Water Level (SWL) data is collected from 2 043 Observation wells, Pumping Water Level (PWL data) from 1993 Observation wells and bore well discharge data from 940 observation wells. Scientific information, stored in a booklet, and its analytical results are disseminated to the entire community through different types of information boards such as rainfall board, HU board, etc. Crop Water Budgeting (CWB) is the climax of the hydrological data collection, wherein results of recharge-draft calculations (based on farmer data) are shared with all the farmers in a HU. Three hundred and eighty (380) farmers in 506 habitations, covering 39 HUs are presently equipped with skills of conducting CWB exercise. The overall reach of the project in terms of number of farmers is about half a million.

Monitoring and Evaluation of Capacity Development in APFAMGS

A Conceptual Framework for M&E of capacity development in APFAMGS is illustrated in Figure 3.

At the center of the framework is the ultimate goal of the project to which capacity building contributes. Three levels of capacity are identified, namely community, Partner NGO, and TST/Nodal NGO, which in turn form part of the larger groundwater management system. Individual capacity contributes to group capacity, whether at community or organizational level. TST/Nodal NGO capacity determines the capacity level at PNGO level, which again determines the capacity at community level.

Figure 3. Conceptual Framework

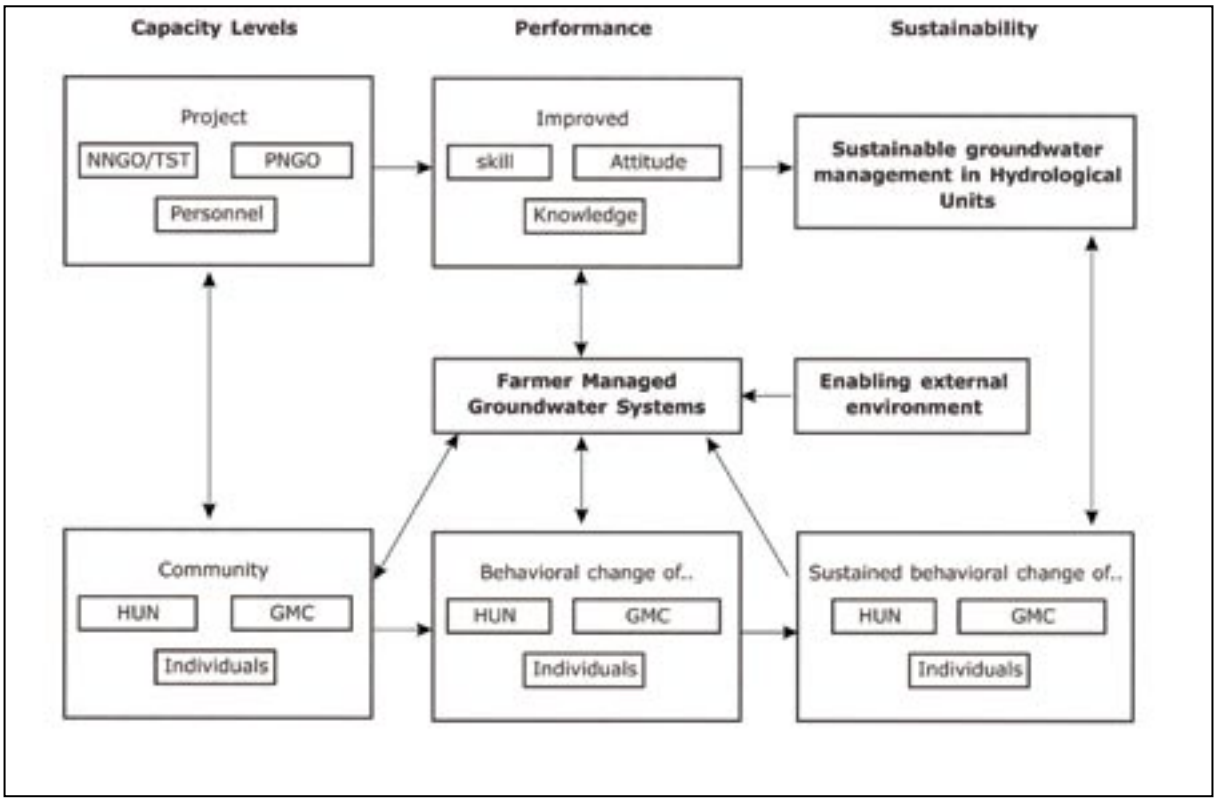


Table 6. Performance Indicators for M&E of capacity building in APFAMGS

Level	Performance Indicators
TST/NNGO	• Time of financial inputs • Quality of technical inputs • Frequency of field visits • No. of publications • Quality of publications • Presentations • Training Manuals • Technical Guidelines
PNGO	• Quality of infrastructure • Frequency of field visits • Regularity of meetings • Data availability • Financial reporting • Progress reporting • Conflicts resolved • Book keeping
PNGO Staff	• Number of field visits • Number of habitations visited • Number of times visiting the same habitation • Motivation levels • Facilitation skills • Reporting skills • Analytical skills
HUN	• No of HUs identified for AGR measures (CWB results) • No of HUs for which GWB is estimated by men/women farmers • No of HUs for which thematic maps are available • No of HUs for which database is available • No of HUs conducting regular meetings • No of HU meetings conducted with 60% attendance • No of HUs keeping updated books • Men and women attendance to HU meetings • No of water related issues discussed in HU meetings (details) • No of water related issues addressed by HU (details) • No of water related issues brought to the notice of line departments (details) • No of water related issues solved through GMC-Line department cooperation (details) • No of HUs mobilizing financial resources
GMC	• Drinking water issues solved by women/men • No of men/women farmers contributing for *neellamucheta*[3] • No of women/men reading *neellamucheta* • No of GMCs conducting regular meetings • No of GMC meetings conducted with 60% attendance • No of GMCs keeping updated books • No of water related issues discussed in the GMC meetings (details) • No of water related issues addressed by GMC (details) • No of GMCs mobilizing financial resources • No of GMCs sharing data with line departments • No of GMCs having Hydrological database • No of GMCs supported by CBIs • No of GMCs advising farmers on crop choices • No of GMCs completing base document validation

[3] A quarterly newsletter published by the project in local language, when translated into English means “discussion on water”

Table 6 Continued

Volunteers	• No of men/women farmers collecting Rainfall data • No of men/women farmers collecting water level data • No of men/women farmers collecting bore well discharge data • No of men/women farmers updating Hydrological Monitoring Record • No of updated Hydrological monitoring records • No of updated display boards- Water level • No of updated display boards- Rainfall • No of updated display boards- HU information • No of men/women farmers reading maps • No of men/women farmers handling equipment
Farmers	• No of men/women farmers updating HMR No of farmers making crop choices suiting rabi groundwater balance estimate • Quantity of Chemical fertilizer applied in the HU (Quintals/hectare) • Quantity of chemical pesticide applied in the HU (Liters) • Quantity of organic fertilizer applied in the HU (Quintals/hectare) • Quantity of organic/botanical extract /non-pesticide applied in the HU • Vermicompost production (in hectares) • No of irrigations reduced (mm/hectares) • Water saving techniques used (mm/hectares) • Water saving devices used (mm/hectares) • Reduced groundwater use in high water consuming crops (mm/hectares)

Capacity determines the performance at all levels including the system, organizational and community levels. Behavior change at community level, both individual or as a group, contributes to the project goal. From the other side, personal staff performance as well as organizational performance contributes to the project goal. Through institution building at the community level, supported by the building of linkages with the established government institutions results in sustainable management of groundwater, in general, and in a given HU in particular.

Keeping this framework in mind, a set of performance indicators (Table 6) is evolved for monitoring and evaluation of capacity development in APFAMGS. The list not only includes relevant indicators identified at the time of writing the project document but also some more identified as crucial, during the implementation process. Here again, capacity development is tracked at different levels. Monitoring at field level is carried out by PNGO staff, including the performance of farmers, volunteers, GMCs and HUNs. PNGO level monitoring is done by TST and NNGO, while performance of TST/NNGO is assessed by FAOIN through visits of its National Programme Coordinator. Internal evaluation using the same set of indicators is carried out by TST, on an annual basis.

External evaluation missions are commissioned by FAOIN, constituted with outside agencies and individual consultants. As the project is halfway through, an external evaluation (Mid Term Review) was commissioned by FAOIN in July, the report of which is awaited. The recommendations of the Review Mission will be incorporated into the project design to improve the performance at all levels.

How M&E Influenced Capacity Development Strategies

M&E is only meaningful when the project is able to find gaps or shortfalls in implementation and then plan to overcome these gaps/shortfalls in the ensuing period. Learning the reasons for shortfalls and fixing them is a routine practice in the project. However, few examples are highlighted in this section to bring out how M&E influenced the capacity development strategies during the implementation.

Staff motivation level is a key qualitative indicator of their capacity reflected in the performance. This indicator is monitored as part of process monitoring visits of MPMs to different operational areas. By the end of the first year of project implementation (2004), it was found that Village Coordinators across the project lacked the required motivational levels on account of two reasons viz., inability to meet basic requirements of life due to low salary and high workload due to high number of habitations each VC has to cover in a week. This finding lead to a serious thinking in the Annual Plan and Budget Workshop-2005, and decisions were taken to increase the salary to a level the VC can lead a decent life and reduce the number of habitation per VC by making provision of one additional VC per PNGO. Accordingly, the budget was altered that was later approved by FAOIN.

As discussed earlier, improved capacity does not necessarily result in improved performance as it is controlled by other factors specific to local conditions. Number of hydrological records (rainfall, SWL, PWL and Discharge) is a key quantitative indicator of performance. By mid-2004, it was found that, hydrological data collection was not of the desired level in some PNGO areas. A quick assessment study was undertaken using a common checklist of variables to take stock of the situation and find out reasons for data gaps. Three main reasons were found to be resulting in data gaps viz., water levels depleting beyond the pump installation depth, delay in supply of water level indicators and absentee volunteer. A special report was submitted to the NNGO on the matter. In the quarterly review meeting in September 2004, this issue was discussed at length and it was decided to provide additional lengths of probe-insertion pipe after lowering of pumps, regular follow-up of procurement of water level indicators and training more number of farmer volunteers (preferably both husband and wife) to overcome the difficulty of absenteeism.

Training is a key methodology of capacity development that aims to enhance the skills in a specific area. In the APFAMGS project, it is directed towards skills to collect hydrological data. Four Modules of Participatory Hydrological Monitoring (PHM), evolved in the pilot phase were effective in transfer of skills. When it came to data analysis and crop water budgeting, it was found that farmers depended on technical staff heavily to estimate groundwater balance, used in Crop Water Budgeting exercise. This was discussed during mid-2005, resulting in change of strategy from staff-farmer facilitation to farmer-farmer facilitation, during the CWB workshop. The experience of Training of Trainers in Farmer Field Schools (IPM-Vegetables) led to the conclusion that FFS methodology could be effective in developing the capacity of farmers in conducting CWB on their own. The project then went on to try this approach in 39 Hydrological Units, with positive results. A rigorous monitoring and evaluation of the FFS-CWB process led to the design of eight session guides for FSS-CWB. Presently, the entire farmer training component of the project is adopting FFS approach, sequenced appropriately in the Hydrological Year 2006-07.

Though the project is centered around gender balanced approach by design, staff faced difficulties in implementing what is envisaged in the project document, as indicated by the gender segregated monitoring indicators. Reasons cited were the distance to venue, timing of training, coercion of spouse. By mid-2005, it was discussed in the PNGO quarterly review meeting which resulted in three decisions namely, women-friendly venue, women-friendly timing and inviting both husbands and wives for training or meetings. This increased the participation of women by 10 percent.

Conclusions

It is important to detail the Monitoring & Evaluation plan of any programme in the design phase of the programme itself. For capacity development programmes, a realistically implemented M&E system is highly useful not only to achieve the objectives of the programme but also to enable mid-course improvements, redeploy the inputs to be more efficient and improve the quality of the outputs of programme. The experiences from FAO APFAMGS project in India have amply proven that a well thought out and detailed M&E plan at the time of design of the programme would enable smoother and quicker implementation of the programme. The capacity development component of the project which was complex and huge did not pose any new problems due to the rigorous implementation of the M&E system. The quarterly reviews of the project indicated a good contribution of the M&E system in improving the quality of inputs to the programme and in mapping the outcomes from time to time at various levels.

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References

APFAMGS Project. 2004. Completion Report (July 2003-April 2004). BIRDS.

APFAMGS Project. 2004. Half-yearly Progress Report (July-December 2003). BIRDS.

APFAMGS Project. 2004. Half-yearly Progress Report (May-December 2004). BIRDS.

APFAMGS Project. 2005. Half-yearly Progress Report (January-June 2005). BIRDS.

APFAMGS Project. 2006. Half-yearly Progress Report (July-December 2005). BIRDS.

APFAMGS Project. 2006. Half-yearly Progress Report (January-June 2006) – In Press. BIRDS.

Chandrasekhar, C.P. & Jayati, G. 2005. *New "Knowledge" and the Farming Community*. MACRSCAN, an alternative economic web center – themes "food and Agriculture".

FAO, APFAMGS Project. 2004. Project Document. BIRDS.

FAO. 2005. *International Conference on Agrarian Reform and Rural Development: New Challenges and options for revitalizing rural communities – Concept Note*.

FAO. 2005. *The State of Food Insecurity in the World*. Eradicating world hunger – key to achieving the Millennium Development Goals.

Gopal, K.S. & van Walsum, E. 2005. *Learning to practice – Learning from practice: Participatory evaluation in projects – a process document*. Netherlands Embassy.

Govardhan Das, S.V. & Somasekhara Rao, P. 1999. *Participatory Hydrological Monitoring (PHM) – An effective tool for community managed groundwater systems,* Proceedings of the National conference on land resource management for food, employment and environmental security, Volume: "Advances in Land Resource Management for 21st Century". Soil Conservation Society of India.

Govardhan Das, S.V. 2003. *Judicious management of groundwater through Participatory Hydrological Monitoring: A Manual*, Arcadis EuroConsult, Arnhem, The Netherlands.

Govardhan Das, S.V. 2001. *Monitoring, assessment and legislation of groundwater resources in Andhra Pradesh, India: Recent developments*, Proceedings of the workshop on "Agriculture Water Demand Management", The International Land Research Institute (ILRI), the Netherlands and Acharya N.G. Ranga Agricultural University, Andhra Pradesh, India.

Govardhan Das, S.V., Raja Rao, P.V. & Somasekhara Rao, P. 2003. *Andhra Pradesh Farmer Managed Groundwater Systems Project – Project Document,* Bharathi Integrated Rural Development Society (BIRDS), the Nodal NGO of the project.

La Fond, A. & Brown, L. 2003. *A Guide to Monitoring and Evaluation of Capacity-Building Interventions in the Health Sector in Developing Countries*, MEASURE Evaluation Series, No. 7, with the support of USAID.

Vernooy, R., Qiu, S. & Xu, J. 2006. The power of participatory monitoring & evaluation: insights from China. *Development in Practice*, Vol. 16, No.5.

Watson, D. 2006. *Monitoring and evaluation of capacity and capacity development. Discussion paper No. 58B, European Centre for Development Policy Management.*

Capacity Building for Sustainable Management of Peatlands in the Humid Tropics: From Research to Application

Abstract

About one quarter of the world's tropical peatlands (11 million hectares) occur in Borneo. These peatlands have global ecological significance, being some of the largest remaining areas of lowland rainforest in South East Asia that provide the habitat of many endangered species. In addition, they are large stores of carbon and water and have an important regional economic role, providing forest products and land for settlement and agricultural development. Owing to a lack of awareness and understanding about sustainable land management practices, however, many peatland development projects fail, resulting in serious environmental degradation and impoverishment of local communities.

A number of Southeast Asian and European universities have established a multilateral collaborative research network to address the sustainable management of tropical peatlands through a number of research, education and advisory projects. The research projects aim to improve the understanding of the unique features of the tropical peatlands. In the education projects, the newly acquired knowledge is used to develop university curricula. Course materials and training modules that incorporate up-to-date research results and advice on the wise use of natural resources, are developed and introduced with the use of innovative educational tools. Finally, in the advisory projects, the newly acquired knowledge is applied. All these activities are carried out in close consultation with the future end-users: professionals working in tropical peatlands. The network partners actively involve these professionals in all phases of the projects: from the formulation of the research agenda and curriculum development process to the implementation of the results through advisory projects.

This paper describes how the network partners have interacted with the end-users to develop and introduce newly acquired knowledge on the sustainable use of tropical peatlands, with special emphasis on how, during the whole development cycle (research ó education ó application), monitoring and evaluation have been incorporated.

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Introduction

By the year 2025, the world's population will increase from the current 6 billion to 8 billion and we would need to double our food production. The figures for Asia are even more worrying: Asia covers 24 percent of the world's land area, but it has 60 percent of the world's population (ICID. 2003). For humid Asia, the figures are 14 percent and 54 percent respectively (Keizrul, B.A. 2003). To be able to feed the growing world population and to remain competitive in the global economy, countries are developing new areas for food and commodity crop production. As a result, agriculture is intruding increasingly in sensitive eco-systems such as tropical peatlands. These tropical peatlands have global ecological significance, being some of the largest remaining areas of lowland rainforest in SE Asia that provide the habitat of many endangered species. In addition, they are large stores of carbon and water and have an important regional economic role, providing forest products and land for settlement and agricultural development (Rieley, J.O. and Page, S. 2001). Utilisation of this resource for agriculture or plantation crops requires drainage that, unavoidably, leads to irreversible loss of peat through subsidence, resulting in severe disturbance of the substrate and creating problems for cultivation and peoples' livelihoods. If the specific characteristics of peatlands are taken into consideration, these peatlands can be managed in a sustainable way to ensure a sufficient and continuous supply of raw materials and agricultural products and to maintain biodiversity and environmental conservation, see for example the development in Western Johore and Sarawak in Malaysia (Hock, L.C. 2003, Ritzema, H.P. et al. 2003). If, however, the specific characteristics are not taken into consideration, the results can be destructive, as can be sadly demonstrated by the failure of the Mega Rice Project in Central Kalimantan, Indonesia, see for example Rieley, J.O. and Page, S. (2005).

Research on tropical peatlands has, over the years, yielded valuable information on its natural functions as a reservoir of biodiversity, carbon stores and hydrologic buffers. Despite the knowledge, many development projects on tropical peatlands have failed through a lack of understanding of the landscape functions of these ecosystems. These failures resulted in a severe degradation, fires and jeopardizing their natural functions. In 2000, a number of European and Southeast-Asian research organisations decided to join hands with the aim to reverse these negative trends and instead to promote wise use of tropical peatlands by integrating biophysical, hydrological and socio-economic data within strategies for sustainable management. They initiated a number of projects in the field of research, education and application. The membership of the consortium changes from project to project, depending on the activities and the required expertise of that specific project. The partners were capable of doing this, as they not only work in research, but also in education and training and in applied research and applications (Table 1).

To achieve the twin challenge of increasing demand for agriculture land and at the same time to manage the tropical peatlands in a sustainable way, capacity building plays an essential role. The main objective of capacity building is to improve the quality of decision-making, sector efficiency and managerial performance in the planning and implementation of sector programmes and projects (IHE, UNDP. 1991). For tropical peatlands, this can be obtained by improving knowledge on the functions and characteristics of these peatlands so that more sustainable management strategies can be developed and implemented. Capacity building should focus on the following elements (Ritzema, H.P. and Wolters, W. 2001):

- Creating an enabling environment with appropriate policy and legal frameworks.
- Institutional development, including community participation.
- Human resources development and strengthening of management systems.

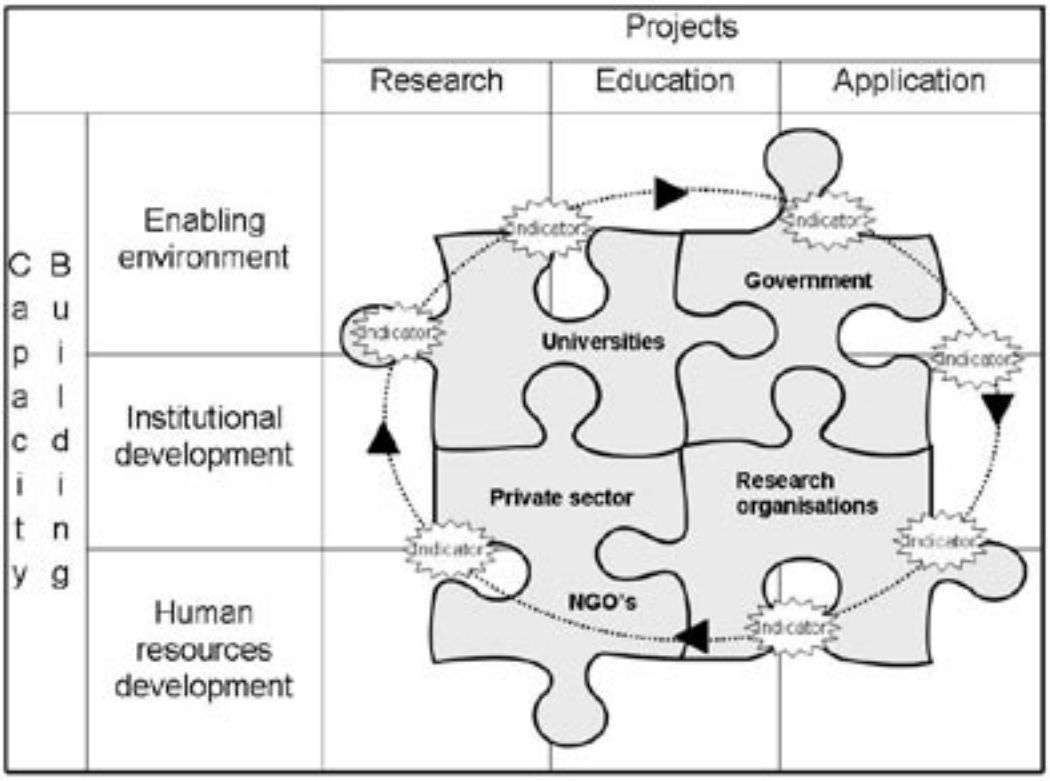
Table 1. Partners in research, education & training and applications

Organization	Research	Education	Application
Agency for the Assessment and Application of Technology, Indonesia	•		•
Alterra, Wageningen University and Research Centre, The Netherlands		•	
	•		•
Can Tho University, Vietnam	•	•	
Department of Irrigation and Drainage, Malaysia			•
Gadjah Mada University, Indonesia	•	•	
Jambi University, Indonesia		•	
Ludwig Maximilians University, Germany	•		•
Malaysian Agricultural Research and Development Institute, Malaysia	•		
			•
Mulawarman Universities, Indonesia		•	
PS Konsultant, Malaysia			•
Remote Sensing Solutions, Germany	•		•
Universiti Malaysia Sarawak, Malaysia	•	•	
Universiti Sains Malaysia, Malaysia	•	•	
University of Helsinki, Finland	•	•	
University of Leicester, UK	•	•	
University of Nottingham, UK	•	•	
University of Palangka Raya, Indonesia	•	•	
University of Sriwijaya, Indonesia	•	•	
Vapo Oy, Finland	•		•
Wetlands International	•		•

In this respect, capacity building is as much a process as a product (Kay, M. and Terwisscha van Scheltinga, C. 2003). This paper discusses the role of monitoring and evaluation to assess the capacity building in several research, education and advisory projects for the wise use of peatlands in the tropics (Figure 1). The research projects address issues that are relevant for finding a balance between livelihood (the challenge to increase food production) and resources (the challenge to manage the tropical peatlands in a sustainable way). In the education projects, the newly acquired research knowledge is used to develop and implement teaching materials. In the advisory projects the focus is on applying this knowledge. All projects have activities focusing on the above-mentioned capacity building elements. Capacity building is a complicated process as many stakeholders, organizations as well as individuals, are involved, namely:

- Research organizations and universities.
- International, national and regional government organizations, acting as the principal funding agencies, but also the users of the end-products.
- Private companies: both as co-developers of the knowledge (as they bring in their experiences) and users of the end products.
- Non-governmental organizations (NGOs): also as co-developers of the knowledge (as they bring in their experiences) and users of the products.

Figure 1. The role of indicators in the monitoring and evaluation process (•••••••►) for capacity building, finding a balance between: (i) an enabling environment; (ii) institutional development and; (iii) human resources development in research, education and advisory projects to address the wise use of peatlands.



The three elements of capacity building have been addressed by the following activities: (i) promotion of partnerships; (ii) involvement of stakeholders; (iii) integration of the various disciplines; (iv) acquiring new knowledge; (v) dissemination of knowledge; and (vi) implementation of the newly acquired knowledge and skills. To assess whether these elements have been addressed successfully a number of indicators were used (Table 2). In the following sections is described how this was done and which indicators were used to assess whether these objectives were reached.

Capacity Building through Joint Research

Five years ago, twelve European and Southeast-Asian research organizations (Table 1) initiated the multi-disciplinary research project "Strategies for Implementing Sustainable Management of Peatlands in Borneo" (STRAPEAT) (Wösten, J.H.M. 2005). This three-year project (December 2001 – November 2004), which was supported by the European Union (EU) through the International Cooperation for Developing Countries (INCO-DEV) programme, was a follow-up of other EU-INCO funded projects. Compared to the previous projects, which were more focussed on the natural resource functions, the scope of the STRAPEAT project was wider: it included more disciplines and not only focused on doing research to better understand these complicated ecosystems, but sought actively to implement strategies for practical use in critical peatland areas in Borneo. Capacity building was an integral part of the activities. Indicators to assess the effects of these capacity-building activities are summarized in Table 2 and discussed is the following paragraphs.

Table 2. Capacity-building indicators for the main project activities

Indicator	activity				
	partnerships	new knowledge	integration	stakeholders	dissemination
Books		x	x	x	x
Collaborative research					x
Conference presentations					
Decision support system	x			x	
Edited conference proceedings				x	x
External funded projects	x	x	x	x	x
Guest-lectures					x
Guidelines/handbooks		x	x	x	x
Joint action			x	x	x
Joint studies and consultancies	x	x	x	x	x
Market survey			x	x	
Training modules					x
M.Sc.s and Ph.Ds	x	x			x
Papers published in International Journals		x			x
Partner Meetings	x				
Post-graduate course		x		x	x
Project evaluation	x	x	x	x	x
Web site	x	x	x	x	x
Workshops/seminars/symposia	x	x	x	x	x

Human resources development: Increased knowledge on the natural resource functions

At the start of the project, two workshops for the project partners and representatives of the local research organizations were organized, one in Palangka Raya, Kalimantan, Indonesia and one in Sibu, Sarawak, Malaysia. During the workshops, 12 status reports, covering all disciplines involved in the management of tropical peatlands, were presented and based on these reports, the research agenda for the three projects was agreed upon by the project partners and the local research organizations (STRAPEAT. 2002). Project partner meetings were organized every following year to review the ongoing research activities, to reach internal consistency, to update the research agenda, to integrate the various disciplines and to exchange information between partners and the local stakeholders. To enhance the exchange of information, a web site was developed (www.strapeat.alterra.nl). The main functions of the web site are: (i) to give background information of the project and the research partners, (ii) to present news, and (iii) to make available the project results through downloadable reports and presentations. On the opening page of the web site, the number of visitors is automatically updated, indicating the relevance of the site. To train partners and at the same time to guarantee that the research is of academic quality, the partners embedded research activities in their formal education system. This resulted, among others, in three

completed Master of Science (MSc) and four completed Ph.Ds. To present the project results to the international research community and to discuss the results with them, an international symposium and workshop on Tropical Peatland was organized (Rieley, J.O. 2006). The fact that the research findings are of high academic quality is also illustrated by the number of presentations and papers produced by the project partners (see Enabling environment).

Institutional development: participation of stakeholders in setting the research agenda and dissemination of the results ("wise use principles")

A series of annual seminars/workshops with local stakeholders was organized in Southeast Asia to inform stakeholders on the research findings, to interact with them on the research agenda, etc. To mark the end of the project, presentations of key outputs were made in a series of seminars/workshops held in Kuching, Sarawak, Malaysia, Palangka Raya, Central Kalimantan and Jakarta, Indonesia. Participants from both the private and public sectors agreed on a 'Statement' on the "Wise Use of Peatlands in Central Kalimantan, Indonesia" (Wösten, J.H.M. 2005). This statement was distributed widely, among others, through the web site. Contact with funding agency was not only maintained through reports, but a briefing was also organized at the European Union (EU) in Brussels to inform the EU, the main funding agency, of the progress and activities and the synergy with the education and advisory projects. The fact that the EU selected the project to illustrate international cooperation for sustainable development (http://ec.europa.eu/research/leaflets/inco/article_2991_en.html) shows that the activities are highly appreciated by the funding agency.

Enabling environment: dissemination of the wise use principles to all stakeholders

Partner meetings were often held in conjunction with other symposia and/or workshops in Europe (for example Päivänen, J. 2004) and in Southeast Asia (for example Rieley, J.O. 2006). This allowed the partners to present and discuss their findings with other scientists interested in tropical peatlands. This has resulted in a huge number of conference presentations and papers in both conference proceedings as well as in international journals (Wösten, J.H.M. 2005).

The outputs were the results of working together as a group for some years: partners were clearly stimulated by the internal consistency as well as openness for the ideas of other partners and stakeholders. In the follow-up project, RESTORPEAT (www.restorpeat.alterra.nl), the capacity building activities are enhanced even further, through the following actions/activities:

- Extension of the partnership with a partner from the private sector (Vapo Oy, Finland) and a Vietnamese University (Can Tho).
- Creation of stakeholder platforms and skill transfer to stakeholders through partnership with local governments and local people.
- Dissemination of project results, not only to the scientific community, but also to a whole range of other stakeholders ranging from international and national governmental organizations to farmer and landowner organizations.

RESTORPEAT is again co-funded by the EU. Competition for funds for international research is stiff and only a small percentage of the proposals is accepted. RESTORPEAT being the third successive project clearly illustrates its relevance.

Table 3. Indicators for the capacity building activities

Indicator	Research	Education	Advisory
Collaborative research		4	2
Conference presentations	133	2	4
Decision support system		1	
Edited conference proceedings	1		
External funded projects	2	2	3
Guest-lectures		12	
Guidelines/handbooks	3		3
Joint action/studies and consultancies	1		5
Market survey		2	
M.Sc.s and Ph.D.s	7		
Papers published in International Journals	23		2
Partner Meetings	7	5	
Post-graduate course		1 (+ 1)	
Project evaluations	2	1	3
Training Modules		6	
Web site	2	1	
Workshops/seminars/symposium	6	2	5

Capacity Building through Joint Education

The partners in research use the newly acquired research knowledge to update their education programmes. Four of the partners, namely the Universities of Leicester, Palangka Raya, Sarawak and Wageningen, joined forces in the project titled **"**New Educational Tools for Sustainable Management of Peatlands in the Humid Tropics" **(**PEATWISE) (Ritzema, H.P. et al. 2004), supported by the EU, through its Asia-Link Programme. The Asia-Link Programme is an initiative of the European Commission to promote regional and multilateral networking between higher education institutions in Europe and developing countries in Asia. The programme aims to promote the creation of new partnerships and new sustainable links between European and Asian higher education institutions and to reinforce existing partnerships. The project covers the entire sequence of curriculum development, the production of educational tools and course materials and the training of staff in the dissemination of the knowledge. To allow for a correct scientific development of the project within the budget framework, a phased approach was adopted (www.peatwise.alterra.nl):

- Inception: (i) Market assessment; (ii) Inventory of existing curricula and courses; and (iii) Inventory of existing educational infrastructure.
- Development of the curriculum: (i) Ecology and natural sciences; (ii) Water resources and hydrology; (iii) Soil and land use (agriculture, forestry etc); (iv) Human dimensions and resource economics; and (iv) GIS and Remote Sensing.
- Implementation: (i) Marketing; (ii) Training; and (iii) Testing.

Compared to the research projects, the focus is more on the human resources development component of capacity building, however, the other two elements are also addressed (Table 3). In the inception phase, the Indonesian and Malaysian partners conducted market surveys to assess the needs of the target group, namely professionals dealing with tropical peatlands in planning, implementation and evaluation and monitoring. The inception phase was concluded by a two-day workshop in Kuching, Sarawak, in which the partners agreed upon a joint-framework for the curriculum development. It was decided to develop education packages on the sustainable management of tropical peatland consisting of six modules for post-graduate students on their way to an M.Sc. diploma. The development of the modules for the curriculum is a joint activity of the four partners: for each module one partner has the lead but all partners contribute to the development. In total about 22 staff members are involved in the development. Partners strengthen each others capacity by cooperating close together, for example in (i) collaborative research programmes at each others university for cooperation in the development of modules, and (ii) partners, not only from the PEATWISE project but also from the STRAPEAT and RESTORPEAT projects, act as guest lecturers in each others courses. Each participating University will embed these modules at the appropriate level in their own academic system. A workshop on curriculum development was organized at Leicester University, to discuss how ITC can be used in the curriculum. The starting point can vary depending on the needs and status of each partner: no ICT, only hard copies → use of digital tools, such as MS PowerPoint → CD-Rom → digital courses/local server → internet based materials → distance learning.

During the curriculum development process, feedback from the stakeholders was enhanced by organising try-out courses and workshops to review the curriculum development and contents of the modules. The results are promising: in January 2006, the University of Malaysia Sarawak (UNIMAS) started the first full-scale graduate diploma programme: a one-year post-graduate course for students with a Bachelors degree and working in peatland management. The course, which consists of six modules, is designed for professionals working for public and private organizations dealing with peatland management. As all students follow the course in addition to their regular job, the programme is organized during the weekend: from Friday to Sunday, blockwise per module. The number of students varies between 8 and 12 depending on the module. As in the development phase, partners assist UNIMAS with the implementation: they provide teaching materials and act as guest lecturers. At present most course material is available in MS PowerPoint presentations, in the second phase of the project these materials will be further developed in distance learning tools. All modules are evaluated by the students and these evaluations are used to improve and further develop the course materials. One year after the start of the project, a monitoring mission of the EU rated the project relevance, efficiency and impact as good to very good, although more attention should be paid to the potential sustainability.

In 2005, a new project on integrated water resource management was initiated to enhance the technical proficiency of Indonesian University staff at Jambi (West Sumatra), and Mulawarman (East Kalimantan) Universities by transmitting methodologies and knowledge on integrated water resources management (IWRM) at the river basin scale (www.air-co.org). This project aims to:

1. Upgrade and enhance skills and expertise of postgraduate students and university staff on hydrological and ecological functioning of tropical water and lowland resources at the river basin scale and as a component of an IWRM.
2. Strengthen networks of excellence within Asia (Jambi and Mulawarman Universities, Indonesia) and Europe (Wageningen University and Research Centre, The Netherlands and University of Leicester, United Kingdom) through scientific cooperation and exchange of experience built on existing projects.
3. Promote student and teacher mobility and portability of skills and academic credentials.
4. Enhance a core group of skilled scientists to keep abreast of cutting-edge research conducted on integrated water resources management.

5. Promote the use of Remote Sensing techniques as a component for research and teaching modules.
6. Develop innovative educational methods and novel technologies (distance e-learning, virtual library, etc.) to improve quality of teaching and learning.
7. Strengthen the country's institutional capacity to identify and implement efficient management of river basins within a framework.

Capacity Building for Application by Decision-makers and Other Stakeholders

Training people, however, does not guarantee that they are able to apply their newly acquired knowledge in their daily work. Therefore, the partners are also involved in the third element in capacity building, creating an enabling environment by assisting the stakeholders with this implementation through:

- Joint studies and consultancies to assist integrated agricultural development projects on peatlands with the implementation of the wise use principles. For these activities, the partnerships have been enlarged to include government organizations, NGOs and private consultancy firms.
- Preparation of guidelines and handbooks to provide sufficient information and insight to enable stakeholders to understand the tropical peat ecosystem so that they can anticipate problems before they arise and are able to put principles of wise use into effect.
- Development of a decision support system to visualize strategies for sustainable water management on tropical peatland.

The activities are directly funded by stakeholders agencies: this clearly illustrates the need for assistance and appreciation of the knowledge and experiences of the partners. In these projects, the direct and frequent feedback with the clients is a prerequisite for success. This feedback includes a continuous evaluation and monitoring through meetings with clients and other stakeholders, reports, presentations, etc. Capacity building activities are focussed on the third element (enabling environment), but also addresses the human resources and institutional development elements (Table 3), as can be illustrated by the outputs:

- Recommendations for the management of peat soils in Western Johore, Peninsular Malaysia: a multi-disciplinary collaboration between Wageningen University and Research Centre (WUR), the Malaysian Department of Irrigation and Drainage, Department of Agriculture and Agricultural Research and Development Institute (LAWOO. 1996). These recommendations were also published in international journals (Ritzema, H.P. et al 1998 and Wösten, J.H.M. et al. 1997).
- Publication on the Wise Use of Tropical Peatlands with the focus on Southeast Asia. This publication provides information and insights on tropical peat and peatland to enable stakeholders to understand this ecosystem and to put principles of wise use into effect (Rieley, J.O. and Page, S.E. 2005).
- Handbook for Environmental Impact Assessment for the development on peatlands: a UNIMAS-STRAPEAT-NREB jointly authored handbook describing the potential adverse impacts of development on peatlands and recommendation for possible mitigation measures to address these impacts (Murtedza, M. 2004).
- Water Management Guidelines for Agricultural Development in Lowland Peat Swamps of Sarawak: a multi-disciplinary collaboration between WUR and Sarawak Government organizations resulted in guidelines on the best practices for planning, assessment, design, implementation and management of water management systems for agricultural activities in the lowland peat swamps of Sarawak (DID. 2001). The activities included a seminar to discuss

the guidelines with the end-users (Chew, D. and Sim, A.H. 2003), presentations in international conferences (for example Alterra-ILRI. 2004, ICID. 2002, and Tan, A.K.C. and Ritzema, H.P. 2003) and publications in International Journals (for example Wösten, J.H.M. and Ritzema, H.P. 2001.).

- Demo of an internet-based decision support system to visualize strategies for sustainable water management on tropical peatland (www.peatwise-alterra.nl) (Veltman, D. 2006).
- Recommendations on the Air Hitam Laut river basin management based on research findings, community-based planning and workshops (Silvius, M.J. 2005). Collaborative research on modelling was one of the activities in this project.

Conclusions

Five years ago, a number of Southeast Asian and European research organizations established a multilateral collaborative research network to address the sustainable management of tropical peatlands through a number of research, education and advisory projects. The main challenge is to achieve increasing food production and at the same time to manage the tropical peatlands in a sustainable way. In this process, capacity building plays an essential role. In this capacity building process, many stakeholders, organizations and individuals, are involved, namely research organizations, universities, international, national and regional government organizations, private companies, NGOs and individuals working or living in these areas. Capacity building focuses on three elements: (i) creating an enabling environment; (ii) institutional development, including community participation, and; (iii) human resources development and strengthening of management systems. In the projects these three elements are addressed through a number of activities. Firstly, cooperation in research is promoted with the aim to get a better understanding of the unique features of the tropical peatlands and to develop principles of wise use. Secondly, this newly acquired research knowledge is used to develop new university curricula to train professionals working in the management of these tropical peatlands. Finally, to assist these professional with applying their newly acquainted knowledge, guidelines including decision support systems for the wise use of tropical peatlands are developed. To ensure that these capacity-building activities are carried out efficiently and effectively a continuous system of monitoring and evaluation is incorporated in the projects.

A number of indicators was used to assess the impact of the project activities (Table 3). These indicators address a whole range of activities during the complete project cycle: from the project formulation to the implementation of the products. The indicators “External funded projects” and “Project evaluations” address the relation with the funding agency: most projects are funded through international or national tendering: competition is severe, thus only consortiums with highly qualified staff and a proven track-record succeed in obtaining funding. The indicators “Collaborative research”, “Joint action/studies and consultancies”, “Partner meetings” and “Website” address the collaboration between the partners. As such, the projects demonstrated the big advantage of continuing a proven successful collaboration between partners, both in Europe and Southeast Asia, of different background, expertise and focus. Since partners are used to working together as a group for some years, internal consistency, openness towards the ideas of other partners as well as understanding of each others’ sometimes conflicting interests, and working together towards multidisciplinary, wise use strategies is stimulating. The indicators “Collaborative research”, M.Scs and Ph.Ds, “Joint action/studies and consultancies” and “Partner meetings” address the human development component. The indicators “Decision support system”, “Joint action/studies and consultancies”, “Market survey”, “Web site” and “Workshops/seminars/symposium” address the feedback with the end-users. The indicators “Conference presentations”, “Edited conference proceedings”, “Guest-lectures”, “Guidelines/handbooks”, “Papers

published in International Journals“ address the dissemination of the research findings to a wider audience in international fora. The indicators “Decision support system”, “Guidelines/handbooks”, “Post-graduate course” and “Training Modules” address the translation of the research knowledge in curricula, guidelines and handbooks to provide sufficient information and insight to enable stakeholders to understand these tropical peatland ecosystems and to put principles of wise use into effect before problems arise.

These indicators clearly show that the project partners actively involve the stakeholders in all phases of the projects: from the formulation of the research agenda and curriculum development process to the implementation of the results through advisory projects. The research partners also benefit from this interaction: the expert knowledge of the stakeholders is used to update guidelines and handbooks. The same applies for the human resources development activities: feedback from students on the newly developed curriculum, etc. All these activities bring us closer to our ultimate aim: the wise use of the tropical peatlands in Southeast Asia. We should realize, however, that there is still a long way to go and we should remember that capacity building is as much a process as a product and that only by cooperation between all stakeholders, even stakeholders with conflicting interests, sustainable land management practices can be achieved.

Lessons Learned

- Capacity building needs a clear focus (in this case “*Sustainable management of tropical peatlands*”).
- Capacity building is not a stand-alone activity but an integral part of each and every project.
- Capacity building is a long-term process ó projects are short-term.
- Capacity building includes many activities.
- Indicators are a good tool for monitoring and evaluation.
- Indicators should be defined for each activity.
- Activities can have the same indicators.
- Indicators should be defined at the start of a project (Logical Framework).
- M&E for Capacity building extends beyond the project life.

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References

Alterra-ILRI. 2004. *Drainage for a Secure Environment and Food Supply*. Proceedings 9th International Drainage Workshop (IDW9), 10-13 September 2003, Utrecht, The Netherlands, Alterra-Report 998, CD-Rom, Alterra, Wageningen, The Netherlands.

Chew, D. & Sim, A.H. (Ed.). 2003. *Integrated Peatland Management for sustainable development*. A Compilation of Seminar Papers. Sarawak Development Institute, Sarawak, Malaysia, 296 pp.

DID. 2001. *Water Management Guidelines for Agricultural Development in Lowland Peat Swamps of Sarawak*. Department of Irrigation and Drainage, Sarawak, 144 pp.

ICID. 2003. *Important data of ICID Member Countries*. Int. Commission on Irrigation and Drainage, database on website: www.icid.org.

ICID. 2002. *Proceedings International Workshop on Sustainable Development of Tidal Areas*, 22 July 2002. Int. Commission on Irrigation and Drainage, Working Group Sus. Dev. Tidal Areas, Montreal, 159 pp.

IHE, UNDP 1991. *A Strategy for Water Sector Capacity Building*. Proceedings of the UNDP Symposium, Delft, 3-5 June 1991. IHE Report Series 24, Delft, The Netherlands.

Kay, M. & Terwisscha van Scheltinga, C. 2003. *Towards Sustainable Irrigation and Drainage Through Capacity Building*. Proceedings 9th Int. Drainage workshop, 10-13 September 2003, Utrecht, The Netherlands, ILRI, Wageningen (CD-Rom).

Keizrul, B.A. 2003. The Dilemma in the Humid Tropics: Conflicts in Drainage Needs for Food Production and the Environment. In: ILRI. *Drainage for a Secure Environment and Food Supply*. Proceedings 9th Int. Drainage workshop, 10-13 September 2003, Utrecht, The Netherlands, ILRI, Wageningen.

LAWOO. 1996. *Peat Soil Management Study – Western Johore Integrated Agricultural Development Project*. Land and Water Research Group, Wageningen, The Netherlands, 271 pp.

Hock, L.C. 2003. Peatland water management for the Western Johore Integrated Agricultural Development Project. In: Chew, Dr. D. and Sim Ah Hua (Ed.). *Integrated Peatland Management for sustainable development*. A Compilation of Seminar Papers. Sarawak Development Institute, Sarawak, Malaysia, pp: 166-184.

Murtedza, M. (Ed). 2004. *Handbook for Environmental Impact Assessment (EIA) of Development on Peatlands*. UNIMAS Publication, Universiti Sarawak, Malaysia.

Päivänen, J. 2004. *Wise Use of Peatlands*. Proceedings 12th Int. Peat Congress, Tampere, Finland, 6 – 11 June, Int. Peat Society, Finland, 2 Volumes, 1357 pp.

Rieley, J.O. 2006. P*roceedings of the International Symposium and Workshop on Tropical Peatland*. Palangka Raya, 22-25 September 2005 (in preparation).

Rieley, J.O. & Page, S.E. (Eds). 2005. *Wise Use of Tropical Peatlands: Focus on Southeast Asia*. Alterra, Wageningen, The Netherlands, 237 pp.

Rieley, J.O. & Page, S.E. (Eds) and Setiadi, B. 2001. *Peatlands for People: Natural Resource Functions and Sustainable Management*. Proceedings Int. Symp. On Tropical Peatland, 22-23 August 2001, Jakarta, Indonesia. BPPT and Ind. Peat Association, pp: 51-55.

Ritzema, H.P., Murtedza, T., Suwido, L. & Page, S. 2004. *New educational tools for sustainable management of peatlands in the humid tropics: The peatwise project*. Proceedings 12th Int. Peat Congress, 6-11 June 2001, Tampere, Finland: Vol II: 1331-1335.

Ritzema, H.P., Tom K.F. Chong & Liong, T.Y. 2003. A New Water Management Approach for Agricultural Development of the Lowland Peat Swamps of Sarawak. In: Chew, Dr. D. and Sim Ah Hua (Ed.). *Integrated Peatland Management for sustainable development*. A Compilation of Seminar Papers. Sarawak Development Institute, Sarawak, Malaysia, pp: 243-253.

Ritzema, H.P. & Wolters, W. 2001. *New Frontiers in Capacity Building on Drainage*. Proceedings Workshop Capacity Building for Drainage in Africa, Cairo, 10-14 March 2001. IPTRID Capacity Building Report No. 2, IPTRID, FAO, Rome, pp: 29-38.

Ritzema, H.P., Mutalib Mat Hassan, A. & Moens, R.P. 1998. A New Approach to Water management of Tropical Peatlands: A Case Study from Malaysia. *Irrigation and Drainage Systems* 12 (1998) 2, p.123-139.

Silvius, M.J. (Ed). 2005. T*he Air Hitam Laut River basin: life support functions of a black water river for people and biodiversity*. Wetlands International, Wageningen, The Netherlands, 40 pp.

STRAPEAT. 2002. *Strategies for implementing sustainable management of peatlands in Borneo: Status Reports, identification of knowledge gaps and priority ratings*. STRAPEAT Project, Alterra, Wageningen, The Netherlands, 213 pp.

Tan, A.K.C. & Ritzema, H.P. 2003. *Sustainable Development in Peat land of Sarawak – Water Management Approach*. Int. Conf. on Hydrology and Water Resources in Asia Pacific Region, Kyoto, Japan, March 13-15, 2003.

Veltman, D. 2006. *Visualisation of Land-use Scenarios on Tropical Peatlands in Central Sarawak*, Malaysia. M.Sc. Thesis, Larenstein University, Velp, The Netherlands, 77pp.

Wösten, J.H.M. (Ed). 2005. *Strategies for implementing sustainable management of peatlands in Borneo*. Final Report. Alterra, Wageningen, The Netherlands, 213 pp.

Wösten, J.H.M. & Ritzema, H.P. 2001. Land and water management options for peatland development in Sarawak, Malaysia. *International Peat Journal*, 11, pp. 59–66.

Wösten, J.H.M., Ismail, A.B. & van Wijk, A.L.M. 1997. Peat subsidence and its practical implications: a case study in Malaysia. *Geoderma 78*: 25-36.

Monitoring and Evaluation of Capacity Development Programmes at UNESCO-IHE: Reflections from Selected Cases

Abstract

UNESCO-IHE Institute for Water Education has a mission of contributing towards the process of capacity development in the water sector by providing best academic education and training on water-related topics to a diverse group of participants, mostly from developing/transition countries. In addition, undertaking various relevant research works for addressing pressing challenges, scientific advancement, and methodological innovations in this sector is a complementing part of institute's activities. Besides training of water professionals, in the past decades, several capacity development initiatives were undertaken with the collaborative support of various donors and partners, and most of which also contained monitoring and evaluation (M&E) component in some ways.

With regard to the approach for capacity development, since the 1990s a gradual shift has occurred in attention from delivering technical assistance, in which capacity development was perceived merely as training (skills to operate), towards creating enabling institutional environments, which enable or constrain the intended developments. This shift has also been influenced by the emergence of the systems approach and a progressive thinking in development cooperation: enabling rather than donating. Besides the technical or academic training of individual participants, institutional strengthening by building and supporting networks of professionals, involving both public and private sectors, have gained more importance. In recent years, the Millennium Development Goals (MDGs) have increasingly made the new undertakings more focused on outputs and targets than on inputs. This shift, which places a greater emphasis on the desired impacts at the ground, mainly aims to ensure that most efforts are precisely geared towards achieving the MDGs. Meeting MDGs has generally been perceived as a reliable proxy for monitoring the ultimate effects and impacts of development interventions, including the capacity development activities in the water sector as a whole, of which 'irrigation and drainage' are considered only as sub-sectors. In cognizance of the above shift, the process and approach for M&E of various capacity development activities have also been going through several modifications, notably a shift from emphasis on monitoring and evaluating exogenously defined project goals towards self assessment of endogenous knowledge network strengthening efforts in a wider policy context.

The evolving M&E process is largely centered on developing a refined and more meaningful M&E approach, in which not only the outcomes but also the participatory learning process of all involved, is part of the strategy and result. This paper describes and summarizes this evolvement by reflecting on relevant cases from Africa and Asia, vis-à-vis Nile Basin Capacity Building Network, CKNet-INA (Indonesia), and WaterNet (Southern Africa). Discussions and conclusions are made to make pertinent suggestions for devising a more effective participative methodology for M&E of relevant capacity development initiatives.

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Capacity Development by UNESCO-IHE, Institute for Water Education

As international educational institute, UNESCO-IHE has served over the past fifty years as a provider of academic education and training in the field of hydraulics, infrastructure and environment. Key is water, including in irrigation and drainage sector, and how to deal with its opportunities and threats. Starting in 1955 with the first courses, the institute has developed and extended its services to fulltime academic programmes, covering almost all aspects of water resource development and management, producing professional graduates with M.Eng, M.Sc. and Ph.D. In addition, the Institute is extensively engaged in undertaking a variety of research activities covering a wide range of topics in the water sector in collaboration with numerous partners from all over the world. Currently, the Institute has about 15 000 alumni all over the world, which in itself represents a community of knowledge.

Shift in Capacity Development Approach

From the 1980s the institute has been increasingly involved in international capacity development projects, building up and delivering training and education in several areas of the water sector including irrigation and drainage. Because of the mission of the institute activities are targeted at academic and scientific fields of work. However, what started with a focus on building capacity at the individual level, is extending now more and more towards (inter) organizational and institutional levels of capacity development. The main reasons for this shift in capacity development approach, i.e. from individual capacity development to support via developing knowledge networks, can be attributed to the following:

- Institutional gaps in research-capacity, both organizational and procedural
- Insufficient mutual trust and partnership
- Little Research and Development (R&D) by local experts
- Absence of an operational cooperative framework
- Inadequate contextual on-the-job training
- Need for practical and creative solutions

Additional foreseen advantages pertaining to the shift in capacity development approach are as follows:

i. It can be seen as an extra level of Capacity Development. If needed, 'traditional' training can be left intact.
ii. Strengthened 'local' capacity to play a role of importance in solving societal challenges locally.
iii. Possibilities for local resource mobilization to support its own activities through delivery of demand driven services.
iv. Opportunities for professionals to update their knowledge and personal networks through network activities.
v. More dynamic knowledge flows.
vi. Greater local impact through a collective network compared to individual efforts.
vii. Spin-off benefits from collaborative activities.
viii. Shared risks.
ix. Support for creating an 'enabling environment'.
x. Greater self-respect, ownership; and credibility among professionals.
xi. Localized and interdisciplinary solutions, etc.

However, there is always a threat that networks may become unproductively "closed". Therefore, efforts are geared towards making the network flexible and interactive with the external environment. As part of the strategy to develop a sustainable network, a virtual knowledge platform is also part of the collaborative capacity development effort.

Capacity Development and Knowledge Network

The concept of knowledge networking, besides merely a technical challenge, represents an organizational and cultural process, that challenges 'ways of working', mutual expectations, and many potential benefits from the network collaboration. Through the traditional training and education, only a few of the above-mentioned issues could have been addressed. Whereas, the knowledge network concept has the potential to help develop both individual and institutional capacity in varied regional, national, organizational, cultural and socio-economic contexts. Figure 1 below presents the basic levels of capacity building initiatives as visualized by the Institute, namely: individual level, institutional level and the enabling environment.

As per the Institute's mission, majority of capacity development efforts are still mainly targeted at the individual level: producing academically qualified professionals. However, greater emphasis on the capacity development of organization and that of the enabling environment through partnerships and professional networking is clearly evident within the academic programmes. The above concept of the knowledge network is primarily focused at stimulating and facilitating knowledge sharing.

Over the past years, the role of information and knowledge in enhancing the capacities of organizations has been considered central to improving the performance and effectiveness of individuals as well as that of organizations. However, an underlying assumption is that there is a basic capacity in place to manage the knowledge and information resources. The capacity to manage information and knowledge needs is viewed as an integral part of the organizational capacity building strategies. Both the knowledge and access to knowledge are considered to provide a competitive edge to an organization.

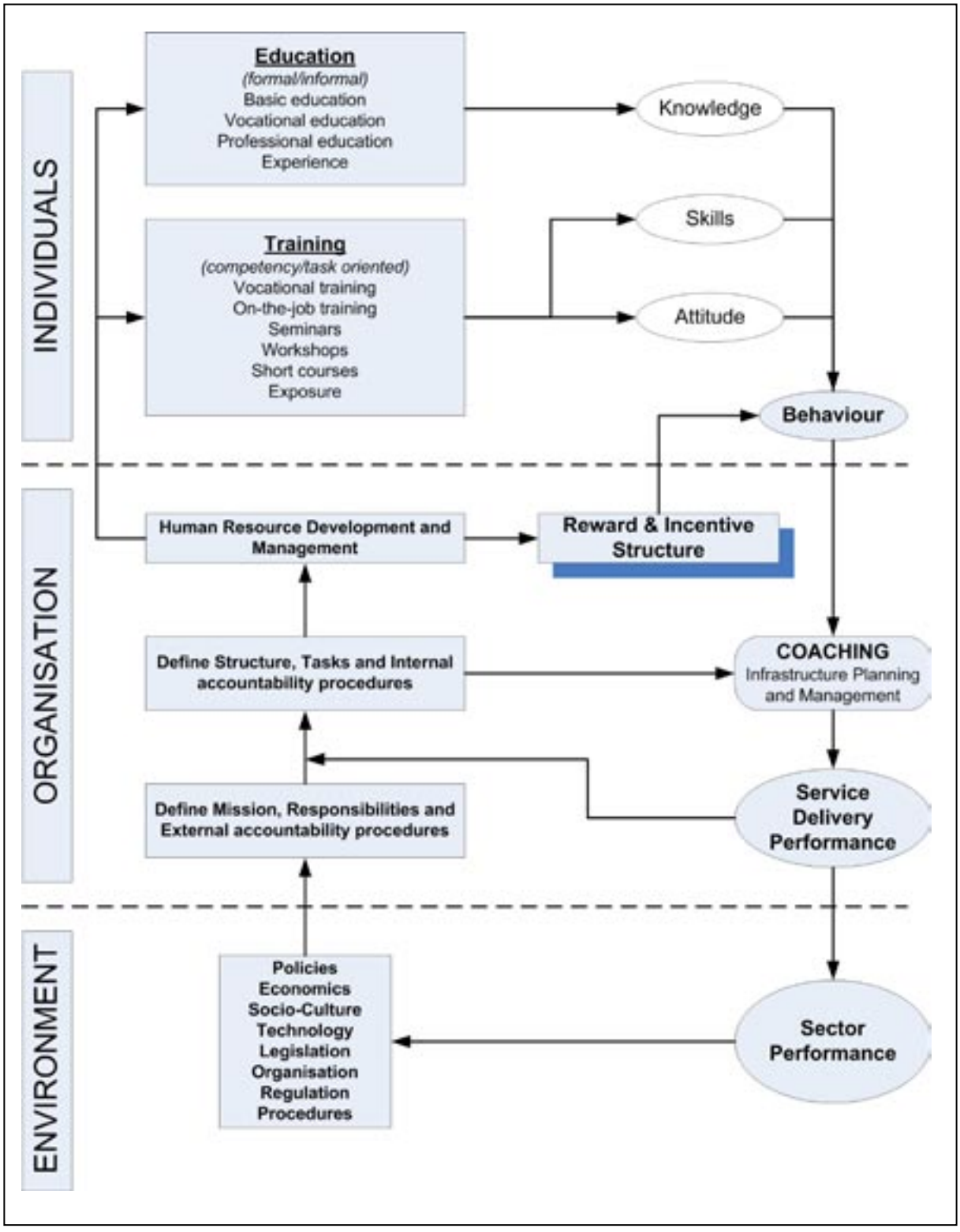
With the growing recognition that most learning is informal, and that connecting people can help sharing knowledge, the focus has sharpened on human groupings under various labels, like "knowledge networks", "communities of practice", "thematic groups" and "learning networks". These networks are being promoted as a principal organizing concept for sharing knowledge. The physical interaction of participants is essential in launching such communities or networks, but once they are launched, technologies can be very useful in extending the reach of a network around the globe. Accordingly, the Information and Communication Technology (ICT) has become a key catalyst in this process, making it possible to access and disseminate information globally in ways that was never possible before.

In sum, the previously discussed shift in the capacity building approach, i.e. from individual selected cases of capacity development to developing knowledge network, stretches beyond the traditionally conceptualized individual level capacity building notion, which primarily focused on the knowledge, skills, attitude of individuals to influence the behavioral outcomes through education and training (top level of Figure 1). Such a broadening of the conventional capacity building process so as to encompass organizational level and the enabling environment represents a complex inter-related process with several additional innovative dimensions, including the following (Figure 1):

- Superior behavioral outcomes
- Stimulation of incentive and reward structure
- Improved sector performance
- Coaching
- Enhanced service delivery performance
- Favourable institutional arrangements, both in terms of rules (policies, rules, regulations, etc.) and tools (organizational arrangements, human resources, incentive mechanisms, etc.)

Undoubtedly, an effective monitoring and evaluation can greatly help foster such a capacity development process. Nevertheless, it also poses a methodological challenge to be able to capture all these attributes in an encompassing and meaningful manner (elaborated in Section 6).

Figure 1. Capacity development concept at UNESCO-IHE



Description of Selected Capacity Development Initiatives

UNESCO-IHE has built up considerable experience in the last 5-10 years with the development and facilitation of professional networks in different continents and regions (South America, Africa, and Middle East, and even in one single country (Indonesia). Examples of such efforts include NBCBN-RE, CKNet-INA, and WaterNet-Southern Africa. All these initiatives have dealt with a more encompassing water sector as a whole in which the 'irrigation and drainage' constitutes an integral component as a sub-sector. The following section presents a brief overview of selected capacity development initiatives.

NBCBN-RE

In NBCBN-RE, three inter-related capacity development activities are addressed: research, training, and education (http://www.nbcbn.com/demo/home.asp). The main focus is on research, assuming that new knowledge generated by research will flow further through training and workshops into renewed and improved educational curricula. Research is the driver in this process. Implementing joint research has also been considered as an effective way of adult learning through knowledge sharing and thus developing professional capacity. In the set-up of the NBCBN-RE network, the water professionals are central. However, it looks at the individuals in the context of their own organization and their own country or region. Involving the decision makers in the network, to a certain extent, guarantees a commitment and support from higher levels. In other words, it creates for the water professionals an enabling organizational and societal environment, which is considered a key to the capacity development process.

Figure 2. Research Clusters, NBCBN-RE

The network has nodes in each Nile Basin country with six research clusters to undertake joint applied research and share and disseminate the results. A research cluster is a group of professionals coming from 5–7 different Nile basin countries focusing on a particular sub-topic. Each regional research cluster has formed 2 to 3 smaller research groups that functions as a Community of Practice (CoP) and deals with different specialized topics. Many of these are related to irrigation and drainage. The GIS and Modeling research cluster is hosted by Egypt, River Structures cluster by Ethiopia, Flood Management cluster by Kenya, River Morphology cluster by Sudan, Hydropower Development cluster by Tanzania and Environmental Aspects by Uganda (Figure 2).

CKNET-INA

In the case of CKNet-INA network, the focus is on 'enabling and extending the role of national capacity development institutions (universities) in the water reform' (http://www.cknet.ihe.nl). With a collaborative network of 10 universities, a future is foreseen in which the network develops and delivers demand driven services (training, research, consultancy, etc) to the Indonesian water sector. The current (first) project of CKNet-INA, with a focus on Water Resources and Irrigation Management (WRIM), develops and supports the network organization, trains the universities and trainers in WRIM related content topics and knowledge delivery mechanisms, and explores new relationships within the water sector, for example via Training Needs Assessment in 8 regions. The ultimate goal is that the network, through a network project office creates new educational, demand driven business and becomes sustainable.

The current WRIM-Capacity Building Network project of CKNet-INA is focusing on water resources and irrigation management. Within the network several universities have a long history of experience in irrigation and drainage. One of the goals of the project is to strengthen the capacity of these universities in WRIM related topics. Currently a training needs assessment is carried out by teams of the partners in 10 regions. On that basis stakeholder meetings will be organized in every region to build up new potential customer relationships and to identify topics for Short Courses for the universities. So the capacity building activities are based on the 'needs by the sector'. Thus, a dialogue has started among universities and the water sector, to explore in what ways the universities can play a role in supporting the water reform, which requires water institutions and professionals to operate in a different way.

The CKNet-INA represents a Collaborative Knowledge Network in Indonesia consisting of people working in public and private knowledge centers (universities, research institutes, etc.) in Indonesia concerned with the human resources capacity building and knowledge development in the fields of infrastructure, water and environmental management (IWEM). The CKNet-INA members adopt and undertake activities in support of decentralization and development programmes in Indonesia. Its mission is to contribute to the welfare of the people of Indonesia and their living environment by combining the strengths of the members of the network through:

- providing a dynamic platform for communication, collaboration and knowledge networking;
- serving communities of practice in the fields of infrastructure, water and environmental management; and
- developing appropriate and demand-oriented knowledge for all stakeholders in the infrastructure, water and environmental management areas.

The CKNet-INA members have embraced the following principles of their collaborative effort:

- commitment, cooperation and solidarity;
- communication based on respect, trust and equality;
- transparency and accountability;
- innovation; and
- quality assurance.

By conforming to these guiding principles, the knowledge network seeks to generate synergies among its activities and other initiatives, programmes, and projects in the areas of infrastructure, water and environmental management. Associated activities are as follows:

- training and education;
- joint research;
- integral consultation services; and
- facilitation of a knowledge and information center.

The concept of creating this network is largely based on past experiences with regard to:

- poor performance of public sector agencies;
- lack of trained human resources;
- policy of decentralization of authority and administration - from "waiting for orders from central government" to "designing a future and plan within national/regional guidelines; making people responsible and accountable for the results; and
- necessary change in paradigm from supply driven education to demand driven, quality assured education.

An additional underlying premise, which relates to the agencies devoted to capacity development, is that if there is a capacity to train people, inviting others to join the capacity development efforts not only increases the domain of training topics but also promotes knowledge sharing, mutual trusts and partnerships for many other related activities.

WaterNet-SA

WaterNet-SA, a consortium of more than 30 university departments and institutes in Southern Africa, has a mission "to enhance regional capacity in Integrated Water Resources Management (IWRM) through training, education, research, and outreach by harnessing the complementary strengths of the region to enable the people of Southern Africa to efficiently and effectively manage their water resources" (http://www.waternetonline.ihe.nl). It primarily aims at knowledge enhancement and dissemination believing that "the value to society of knowledge on water resources is greater than the direct economic benefits accruing from such knowledge; just as the value of water can never be reduced to its economic worth". It has four interrelated key activities:

i) promoting professional training programmes;
ii) curricula development for joint and shared masters level education in IWRM;
iii) collaborative research; and
iv) developing the WaterNet Association and information dissemination.

In particular, the WaterNet postgraduate programme in IWRM offers training in analytical and process-oriented knowledge and skills. This programme was developed by WaterNet. The first sessions of this new programme were launched at the University of Dar es Salaam in October 2002 and the University of Zimbabwe in February 2003. Through other activities, such as organizing annual water symposia, WaterNet aims to foster mutual understanding and respect by creating conditions for water friendships across borders to flourish and a new regional "water family" to evolve.

Despite differing in historical backgrounds specific objectives, in one way or another, all these initiatives are directed towards contributing to development of professional and institutional capacities in regions or countries in the water sector. Individual interest of participants in all these knowledge networks is a strong foundation for developing such a network, in which participants start to know each other, speak the same "professional language", and most importantly: trust each other. Together with the opportunities that Information and Communication Technologies nowadays offer, these networks have potential to grow towards high-value distributed communities.

A review of M&E aspects in these cases is presented in the following sections.

M&E of Capacity Development

Monitoring and evaluation (M&E) of capacity development activities are vital to ensure that the embraced approach for developing capacities, directed resources, and related activities lead to the intended, intermediate or eventual, results and outcomes. If found otherwise or unsatisfactory, necessary measures can be taken, at appropriate time and scale, to influence and/or steer the entire capacity development initiative in the intended direction.

Before looking into the M&E aspects of the selected cases it may be useful to revisit some inherent characteristics of M&E activities. Methodologically, the M&E activities are generally designed to focus either on the 'process' or 'value', or both. The process-based M&E approach is built around the operational component of capacity development activities that include, planning, implementing, synergizing with complementing institutional arrangements, stakeholders inclusion in design and implementation, etc. It is primarily meant to facilitate a smoother implementation of capacity development activities. Hence, indicators and parameters of interest built into such an M&E system are those that help monitor and evaluate the implementation process of the capacity development initiatives.

A value-based approach, however, can have many variations, based on its main aims, such as:

- developing competencies and capabilities in individuals, groups, organizations, sectors or countries, or/and
- sustained and self-generating performance improvement in the development and management of the irrigation and drainage sector.

In addition, the value-based approach has two dimensions: resources invested (X) and returns realized (Y). These dimensions can be conceptualized as 'costs (X) and benefits (Y)' or 'output (Y) and input (X)' respectively. From this point of view, a capacity development initiative can be monitored and evaluated in reference to the following four principles:

Target – Refers to an upper limit of the intended or potential gain over the existing condition. Herein the focus is on 'benefits' or 'outputs' – Y – with little or no consideration to 'costs' or 'inputs'. The central question is what is the ultimate achievement – Y?

Performance – Refers to how well the directed resources transform into intended and or potential gains, with little or no consideration of the input side, namely total X. It is about the rate at which the benefit/output (Y) is being achieved with respect to cost or input (X). In differential form, it can be expressed as dy/dx, namely rate of gain in Y with respect to X. While the limit of Y may be pre-defined, the quantity of total X is flexible.

Cost – Primarily examines whether similar results could have been achieved by other means, at a lower cost, and under similar conditions. It is focused on the input side (X). The output/benefit (Y) is very much predetermined and rigid. The central question herein is how much has been the total input/cost – X to achieve the desired results (Y)?

Output/input – Taking purely an economic point of view, it denotes the amount of output/benefit (Y) compared to the input/cost (X) – benefit and cost ratio, or output and input ratio, Y/X. The higher is the ratio, the more the efficacy of capacity development activities. This concept requires estimating both input and output in the same tangible units, generally at the predefined milestones of the capacity development initiative.

Thus, an M&E approach can be designed and adopted by following any one or a combination of the above discussed approaches depending upon the design of the capacity development initiatives. The following section looks into the M&E approach adopted in selected cases.

M&E in Selected Cases

As expressed by Paul Taylor of CapNet[1], "capacity can be an elusive goal, hard to describe and harder to measure. We know when it is missing but do not recognize its presence". Any capacity development activity is meant to be able to perform. At the same time, impacts are important but difficult to ascribe to a particular capacity development activity.

Despite the complexity mentioned in Section 3 and the challenge to accurately quantify the effects of various capacity development activities on the performance of individuals, institutions and enabling environment as well as to quantify the eventual impacts on the ground (e.g. in terms of MDGs), the perseverance to devise meaningful tools and methodology continues. Various lessons learned in relevant cases, including at UNESCO-IHE, can play an important role in the quest to fill the M&E methodological gap and shortcomings.

The M&E activities undertaken in the cases described below are primarily based on the most common framework in the design of their interventions: the Logical Framework. In this approach, a problem issue is identified, and is broken down into interrelated sub-problems. The goals and objectives of the proposed project address this problem 'tree', which usually are specified in terms of (welfare) outcomes of some target group. The framework posits a logical interrelationship between inputs and activities, outputs, intermediate objectives or outcomes, and welfare outcomes (sometimes called impacts). The causal chain of any intervention is the key to its systematic M&E. Monitoring checks what has happened, while evaluation examines why each step may or may not be materializing. Measurable or observable indicators at each level are specified so that it is possible to determine whether or not the stage of the intervention is materializing. Two examples of such Log-frames are provided as annexes.

With the help of the Log-frame, the indicators and the results of the input, it is intended to create change processes in the direction of the agreed goals and objectives. Behind the goals and the intended efforts to achieve them, there are assumed relationships, for example the support of collaborative initiatives between institutions supports new opportunities of knowledge sharing and access to (new) knowledge. The knowledge cycle process initiated through creation and strengthening of the knowledge network and associated CoP is envisaged to lead to a faster flow of knowledge towards the end users in the region which eventually will improve capacity, performance and impacts. Though perceived necessary, setting up an effective M&E method to monitor and evaluate a network development process continues to pose a challenge is likely to be there in the near future. M&E efforts currently are focused on assessing performance (for example how well the directed activities and resources transform into intended and or potential gains, with little or no consideration to the input side) based on the value-based approach (for example developing competencies and capabilities in individuals, groups, organisations, sectors or countries).

[1] Cap-Net was established in 2002 as a global programme under the United Nations Development Programme to address the need for capacity to implement reforms in the water sector towards sustainable management of water resources. The scale and scope of action encompasses: nurturing effective networking on a global scale, planning and delivering capacity building, managing a global knowledge base and developing new information and training materials on the emerging process of integrated water resources management. It is also an associated programme to the Global Water Partnership.

M&E in the NBCBN-RE project

At the end of the first phase of the network development process, an independent evaluation was organized through a questionnaire that was sent to all members of the network which mainly focused on the performance attributes. This evaluation has shown that such an M&E is a useful exercise, especially when it is done anonymously without revealing respondents' identity. The M&E exercise has greatly improved the understanding of the network performance and yielded valuable insights for improvements.

For the second phase of the network support project, an explicit M&E objective has been included to develop a Network Monitoring and Assessment System to measure what has been achieved through the network activities. This is due to be developed by mid 2007. The idea is that apart from the traditional M&E activities, like bi-annual progress reports, Steering Committee meetings, external review missions and anonymous questionnaires to network members, more objective performance indicators will be developed to continuously monitor progress. The following potential Performance Indicators may be considered as relevant for the NBCBN network:

1. Number of water professionals per institution or country (from Knowledge Map).
2. Number of interactions between network members, both South-South and South-North (monitored by the web-based platform).
3. Number of publications (conference papers, articles in peer reviewed journals) per professional, per institution and per country.
4. Number of scientific workshops and seminars organized in the Nile region.
5. Number of water professionals involved in national and regional R&D activities.

M&E in the CKNet-INA WRIM-CBN project

The recently started Indonesian network project (Water Resources and Irrigation Management Capacity Building Network) of CKNet-INA is essentially a continuation of a Fellowship programme, in which 20 participants ('future stewards of the network') from the 10 universities were 'trained' to build academic cooperation through: knowledge networking, developing services together, exploring strengths, budgeting a service, collaborating on-line, etc. The project is implemented with the help of an Indonesian Capacity Building partner. Thanks to their in-country knowledge and access to relevant supportive sources, the current network offers partners with strengths in different areas, covering water, infrastructure, environment and IT.

The network is considerably informal and flexible in relation to processes and contents. Partners are very aware of this flexibility and this provision has encouraged them to join in at their best suitable moments with contents relevant to them. In the beginning, such a flexibly-structured network suffered from lack of trust and transparency often generating deprecating discussions. However, after almost three years, discussions now tend to be more open. There is better trust, more topics are discussed, and the atmosphere is more focused on collaboration. There is neither a formal methodology in place, nor a 'capturing procedure' for these inter-subjective evaluations. Individual discussions with partners confirm this development.

The WRIM CBN project has three main goals, of which one concerns the network development, another, the improvement of trained capacity in WRIM knowledge topics, and yet another, the establishment of a network service delivery mechanism of training courses to the water sector professionals in Indonesia. With the help of process and value-based indicators (see Logframe CKNet-INA), the qualitative aspects of this joint learning process of network development and improved knowledge exchange, give meaning to the quantitative (to be achieved) numbers of trained participants, delivered short courses and written progress reports.

The initiative to develop this network was done with the objective to develop new training courses and services for professionals in the water sector. The M&E assessments will focus on the straightforward question, whether the network has been able to deliver training services that are satisfying to the water sector. In between the current phase of the project and the realization of that ultimate goal, there are several milestones and sub-goals. These are well-defined with outputs in the Logical Framework of the project which are taken as the main basis for undertaking M&E activities. Related activities include quantitative measurements (how many people trained - target) as well as qualitative measurements (how is the network perceived by the partners - performance). Basic quantifiable indicators for the WRIM CBN project are:

A. For the project as a whole:
    1. Number of university staff with adequate knowledge and experience in WRIM.
    2. Number of professional WRIM-sector staff trained by the CKNet-INA universities.

B. For the specific project objectives:
    3. A CKNet-INA Knowledge Network developed and active.
    4. A CKNet Knowledge Platform developed and operational, initially focused on WRIM Issues.
    5. Internal capacity achieved to develop, plan and manage short courses in selected WRIM related topics
    6. Most appropriate Delivery Systems for the short courses developed and field tested for selected short courses
    7. A portfolio of selected high priority short courses developed based on a Training Demand Assessment (TDA) of the sector in the regions.
    8. A number of short courses delivered and field tested based on the TDA and priority assessment.

The results of these indicators will be captured and shared in the different (progress) reports, but during the face to face meetings with the university coordinators and the steering committee members, the real progress will be perceived and evaluated, with needed actions and interventions as follow up.

M&E in WaterNet

The WaterNet's development objective is to "strengthen the overall human and institutional capacity of the water sector in Southern Africa in order to contribute to the wise use of water resources. The 'wise use of water' has been further explained using technical terms (for example efficient use), socio-political terms (for example equitable use), and environmental terms (for example ecologically sound use). The envisaged overall impact of the wise use of water resources, and more in general of the environment, is to improve the quality of life of the people in Southern Africa. For M&E purposes, the WaterNet secretariat keeps track of the numbers related to training, joint M.Sc., fellowships, symposia, research publications, member institutes, spin-off activities such as research undertakings, along with the financial expenditure figures.

In addition to counting the numbers, which is primarily meant for monitoring immediate outputs along with the costs, the adopted M&E process has also made use of a 'tracer survey" to assess the performance (how well the directed activities and resources transform into intended and or potential gains) of the WaterNet activities. Impact evaluation in terms of efficient, equitable, and ecologically sound use of water and eventual improvement in quality of life has largely remained an unaccomplished job. The tracer survey, which essentially was a respondent survey from among the participants of MSc programmes, reflects that the MSc programme:

- has positively influenced their professional lives;
- was useful for improving their professional performance; and
- their employment situations have improved.

The survey also provided some valuable insights, such as:

- need for improving quality of trainers and training materials;
- need for more contact time with trainers and supervisors; and
- need for more professional excursions and study tours.

Lessons Learned

Though some recent efforts, such as by AusAID (2004), have ventured on standardizing M&E of capacity development activities, a recent overview paper on M&E concludes that 'there is little agreement on how to identify and measure the concept of capacity development' as well as 'few studies have attempted to measure capacity'(Watson, 2006). Moreover, monitoring of performance is being adopted as one way of formulating conclusions as to the capacities that are being developed, and which need further development. On the distinction between capacity and performance, it is widely agreed that capacity is a means to perform, but that capacity is also a justifiable end in itself: 'capacity is that emergent combination of attributes, capabilities and relationships that enables a system to exist, adapt and perform'. The main questions on M&E are all about "what difference does it make" whether development banks, donors and through their financial support the capacity building institutes, invest in capacity development? How to value and evaluate all the impulses?

If we would only look at the MDGs as performance goals and evaluate on a country or regional basis the effect of capacity development efforts, then the result could become interpreted as negative. Yet this presupposes causal relationships between capacity development efforts and MDGs. It is implausible to reduce the complexity of societal development and interconnections to causal relationships. Hence, gains in capacity or performance are difficult to solely attribute to any capacity development intervention.

It is relevant here to discern between different sociological levels of societal development: micro - meso - macro. Micro level in this context refers to the individual or small group achievement because of the capacity development effort (e.g. trained people, involved individuals). The meso level refers to the institutional and organizational settings that these individuals are part of (university department, steering committee, inter organizational collaborative initiative, etc.) and that create or limit conditions of change and adjustment. The macro level refers to the national and international developments that have a specific stage of development within a country as a result (economics, politics, culture, natural hazards, etc.).

Most capacity development initiatives are efforts to change capacity or performance at the micro level, sometimes with an expected impact at the meso level. However, the more abstract the level becomes, the more complex the situation gets, in terms of explaining what input is responsible for what output, effect or impact. Should this lead to the conclusion that capacity development does not make a difference and that M&E is not relevant? We do not think so. But the answer is not simple. Nevertheless:

1. What we must not do is mix up levels of evaluation: to evaluate achieved project results from the point of view of their contribution to national (or even global) indicators, like the MDGs).
2. We will never know what would have happened, or what development would have been realized, if the capacity development projects were not carried out (we usually assume that the situation would have been worse otherwise).
3. It is important though to have indicators on different levels of abstraction, since together they are able to help the international development community to: a) direct priorities of effort, b) guide the individual, organizational and institutional aspects of change, and c) transform into concrete activities that are jointly developed as part of the capacity development effort.

4. It would also be helpful if we could have more knowledge on the interaction between the different levels of abstraction (e.g. how many people do we need to train in water resources management, until this capacity is able by its grown institutional power, to transform the use of water resources in a country in a sustainable way).

From a scientific point of view, this indicates a methodological pitfall in capacity assessments. Our experiences at UNESCO-IHE indicate that a pragmatic approach, based on reflection on practical experience in attempting to achieve goals, provides the best frame of reference for deciding 'what works, what does not, and why', and is therefore the useful guide for future decision making.

As described in the previous paragraph, most projects base their efforts on the use of the Logical Framework. This approach has proved to be valuable as it forces the capacity development agencies to reflect on its approach, to define measurable objectives, to describe expected outputs, and to describe the path of activities to achieve them. At the same time, it makes such agencies accountable to the donor, who reflects on the project's Logical Framework with its own accountability (Is it in line with main political goals and policies? Are outputs and activities feasible? Does the investment bring change to the current situation or are lessons learned for follow up? What will be left when the project is over? etc.). In addition, it also makes it possible to evaluate a capacity development project or programme at the concerned intervention levels: individual, institutional, enabling environment.

However, with the evolving approach of capacity development through knowledge networks, the traditional M&E techniques have increasingly proved to be inept in capturing transitional attributes of the capacity development process which can monitor and evaluate qualitative improvements or 'contributions' towards achievement of broad development goals.

It may be useful to note that various capacity development projects and programmes, particularly knowledge networks, are essentially human interaction programmes, based on values and beliefs. Contextual knowledge of both are needed to assess the meaning and potential impact of interventions. The 'rules of the game' defined by the donors, do not always reflect the contextual knowledge and can be difficult to match with regional and local socioeconomic settings.

Conclusions and Way Forward

Main conclusions derived from the above discussions are the following:

- M&E of capacity development activities is more meaningful and less abstract if it combines a focus on process and performance (value based).
- The Logical Framework of a capacity development programme is a useful instrument to be used for M&E of the capacity development process.
- It is important that M&E activity captures, besides quantifiable expressions, the qualitative attributes of a capacity development process including its inherent dynamic characteristics and learning experiences. The current M&E practices need improvements to address this gap.

One immediate challenge would be to develop some simple key performance indicators for the networks and its several sub-networks, research clusters and professional communities. Some possible indicators that can be useful are:

- Number and frequency of interactions between network members. This is easier to quantify in case all interactions take place over the collaborative platform.
- Number of research communities formed and active.
- Number of ongoing research projects.

- Number of (joint) publications by network members.
- Number of (regional) training courses.
- Quality of the water curricula at regional universities.

Some other related topics that need further discussion are the following:

- In contrast to traditional ways of 'project measurement', if capacity building and/or capacity development programmes work on different levels (individual, institutional and enabling environment), then how can the M&E 'toolkit' be adapted accordingly?
- Evaluation means to 'value' something to come to a judgment on the basis of comparing observations and experiences with a set of values. Are there generic 'values' for capacity development activities, which every initiative should use to e-value-ate?
- As discussed before, it is difficult to establish a robust causality between the impact and the capacity development activities. While M&E is important, both for the process- and valued-based assessments, experiences point toward a pressing need for striking a balance between process or value-based assessments at various sociological levels (micro, meso and macro) and that of eventual impacts on the ground. So what measures can be taken to make the prevailing M&E methodologies more credible and scientific?

References

AusAid, 2004. *A Staged Approach to Assess, Plan and Monitor Capacity Building*. Australian Government, AusAID, Australia.

Cap-Net, 2006a. *Poised for greater impact* - first phase report on Cap-Net, 2002 to 2005. Cap-Net, UNDP.

Cap-Net, 2006b. *Network Management Tools – guidance for network management and planning*. International Network for Capacity Building in Integrated Water Resources Management. UNDP.

Mpala, T. 2004. *Education in Integrated Water Resources Management in Southern Africa: A Tracer Survey of Participants of the Postgraduate Programme in Water Resources Engineering and Management at the University of Zimbabwe*. University of Zimbabwe and IHE Delft.

WATERNet, 2005. *WATERnet: Final Report*. WaterNet Secretariat, Harare, Zimbabwe.

Watson, D. 2006. *Monitoring and evaluation of capacity and capacity development*, A case study prepared for the project 'Capacity, Change and Performance', Discussion paper No 58B, April 2006, European Centre for Development Policy Management.

Annex 1 LOGICAL FRAMEWORK - Knowledge Networks of Nile Basin (KNNB) under NBCBN-RE

	NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS/RISKS
1.	**Developmental objective**			
	To ensure that the Nile Basin water resources are developed and managed in an equitable, optimal, integrated and sustainable manner.	Enhanced participation in dialogue and R&D within the Nile countries in water-related (hot) topics by the end of year 2009.	Project Completion Report	
2.	**Long Term objective**			
	To contribute to the establishment of an overall knowledge network for the Nile region (NileNet) as a means to support **stability** and **solidarity**, and to support the activities of the Nile Basin Initiative (NBI) in building **strategic partnerships** between water professionals, research and government authorities in a sensitive environment in Africa.	The establishment of NileNet and its sub-knowledge networks, related to the research programmes within the NBI framework.	Project Progress report NBI records	Political and scientific dialogue and cooperation in the Nile basin is continued and strengthened
3.	**Project objectives**			
	1. To complete the development of a sustainable regional **Knowledge Network** (from six to ten countries) of water sector professionals from the Nile Basin and related Communities of Practice, on the basis of the **NBCBN-River Engineering** start-up, using the innovative concepts and best practices of Knowledge Networking and CoPs and **introducing and applying them to other domain fields of the water sector**.	The NBCBN-secretariat, the Nile Basin country nodes and the regional research clusters develop their networked future with a visible and respected impact on water research capacity, water research results and water resources dialogue. Their example of working with CoPs where mutual respect and indigenous knowledge are leading, where knowledge sharing and knowledge creation and collaboration, is an honorable way of bringing sensitive issues in a jointly defined process to dialogue and action.	The joint developed Knowledge Network Strategic Plan Project progress reports Node launches	The project builds on a further successful development process towards a cooperative framework for the Nile Basin Countries and implementation of the Shared Vision Projects (SVP) and Subsidiary Action Programmes (SAP)
	2. To strengthen regional water **Research capacity** on the basis of problem-solving, multidisciplinary and stakeholder-involved research-pilots and training-on-demand	The CoPs, in which stakeholders from all relevant key players in the water sector are involved, are more and more seen as innovative centers, where quality research, skill-building and external communication are fostered.	CoP Progress reports Knowledge Network platform Project Progress report	The project will be linked and complementary to the Applied Training Programme of NBI
	3. To develop a regional water **Knowledge base** and to build human and institutional capacity through a collaborative and participative process of knowledge sharing, creation, dissemination and application among water professionals of all ten Nile basin countries (S<->S) and experts from UNESCO-IHE and ITC in the Netherlands (N<->S cooperation).	The transparent way of working, the atmosphere of respect and trust, the equal access to all relevant data, information and people, and the open and maintained communication channels are all recognized drivers of the strengthened virtual knowledge network, accessible through the Knowledge Network Platform.	Knowledge Network platform Project Progress report	For the time being the Knowledge network platform will be hosted by the Hydraulic Research Institute in Cairo. During the project this location will be reconsidered, and other centers in different locations could be established.
	4. To support the involvement of CoP-members in market-driven R&D activities and to stimulate the network communities to become also involved in broader cross-cutting issues like Management of Water Scarcity, Impact of Climate Change and Climate Variability on the water resources system, Extreme Events, etc.	As a result of the reached level of research and improved market skills, there is an increase of 50% of involved regional/local research capacity in R&D activities at the end of the project	Project Completion Report	

Annex 1 Continued

5. To develop a sound monitoring and facilitation mechanism to guide and support the Network Development process at local, national, regional and international level.	The developed Knowledge network assessment toolkit has helped in making relevant support decisions and interventions during the project.	Project Completion Report	
4. Outputs			
1. Knowledge Network Development Process A mature and sustainable **regional Knowledge network** for River Engineering professionals from all ten Nile Basin countries, applying the concepts of Knowledge Networking and CoPs and to support other than River Engineering networks in the development of similar knowledge networks (finally: NileNet)	• The NBCBN-RE network covers all ten Nile Basin countries • Country node Coordinating Institutions and Country Coordinators (Focal persons) in place • 15-20 CoPs active, involving >200 professionals • Adequate Information and Communication Technologies installed at the country level • New (sub) networks and CoPs in other water domain areas initiated and supported by the NBCBN-RE network Secretariat through sharing experiences and Lessons Learned and the organization of launch events	• Network Strategy Plan developed and accepted • Annual Network Development Reports • Launch events	The project is building further on the achievements made by the Nile Basin Capacity Building network for River Engineering (NBCBN-RE). The present structure and arrangements will be used as the initial starting conditions for the project. It is assumed that under the Applied training programme of the NBI an overall NileNet will be developed. The NBCBN-RE network can be considered as the basis for that network and will be continued as a sub-network of NileNet Through stimulation of regional Applied Research activities by CoPs the quality and quantity of education and training activities will be enhanced as well and tailored to the specific conditions of the individual Nile Basin countries through the input and use of indigenous knowledge
2. Knowledge Sharing & Generation CoP's are involved in solving local, regional or national water-related problems and contribute to dialogue on solutions for management of extreme situations, like floods and droughts induced by climate change and growing aridity at both national and regional level.	• Research clusters create new applicable knowledge • Discussions and dialogue on results in workshops, etc. • Training-on demand • Regular production and dissemination of (quality assured) publications • Research clusters are becoming regional Centers of Excellence	• Progress Reports • Knowledge Network Platform • Google's search machine for publications	
3. Knowledge Dissemination A reliable, actual and viable Knowledge network information centre is in place and gives helpful access to all relevant knowledge and information sources on NBCBN-water topics. The project will strongly support *interregional exchanges* of research, lessons learned from other initiatives or networks. Ultimately, this will lead to more structural cooperation between regional institutes. Outputs of the project will be substantial regional participation in the activities planned under this programme. An exchange programme of researchers will allow them to contribute to activities conducted at member institutes.	• A well functioning, equipped and content-rich physical and virtual knowledge exchange centre, covering access to people, access to projects, access to documents and publications, access to data and (modeling) tools and access to organizations. • Links and interregional exchange of experience between researchers, networks, initiatives.	• Knowledge Network Platform	

Annex 1 Continued

	4. Knowledge Application Disciplinary-trained, with (inter disciplinary) research experience and connected to a (trusted) network of water-professionals are more and more involved in market-driven R&D activities and in solving societal urgent needs in the water sector within the Nile countries with tangible outputs.ntries with tangible outputs.	• CoPs linked to market-driven regional R&D activities • Demand-driven Applied Research programmes defined and applied for the main interdisciplinary topics – see chapter 3.2.2 – coherent to the planned activities by the Dutch Embassies from Nile countries in the water and environment sector. • Involvement of the different stakeholders active in the water sector at national and regional level • In each CoP professionals from more than 4 Nile Basin countries represented	• Ad hoc report on the Market of water-related R&D in Nile basin countries and the involvement of riparian researchers
	5. Network and CoP monitoring & facilitation A sound Knowledge network- and CoP - monitoring and assessment system facilitates the development and progress.	• A Framework for monitoring and assessment developed and in place • Annual monitoring and assessment reports prepared by the Network Secretariat emphasizing the project outputs. • Annual support and investment plan prepared by the Network Secretariat • Quality Assurance procedures in place • A Steering CIE of representatives from the hosting institutions meeting three times in the four years • Two bi-annual external Review Missions evaluating all aspects	• Ad hoc report on Monitoring and assessment Framework • Progress Reports • Ad hoc report on QA procedures • Minutes of meeting of the Steering CIE • Report of Review Mission
5.	**Activities**		
1.	1.1 Completing the NBCBN-RE 1.2 Orientation missions 1.3 Organization of node launch event 1.4 Prepare node development strategy plans 1.5 Preparing a medium-term network strategic development plan 1.6 Preparation of the annual network development reports 1.7 Linking the network with NBI's NileNet 1.8 Establish a network secretariat	• Internal review missions to all Nile basin Countries • Preparation of a medium-term Node Development Strategy Plan and a preliminary Node Investment Plan with the involvement of the Country Coordinators and the Research Group Coordinators • Active participation of all the key-players of the network • Regional meeting leading to an endorsement of the medium-term Network Strategic Development Plan and the (re-) nomination of the Country Coordinating and Research Cluster hosting Institutions and Country Coordinators • New (sub) networks and CoPs in other water domain areas initiated and supported by the NBCBN-RE network Secretariat	

Annex 1 Continued

2.	2.1 Direct support to research clusters as established by NBCBN-RE 2.2 Detailed formulation of the interdisciplinary topics and working plans 2.3 Provide scientific backstopping 2.4 Research capacity building	• Direct support to 6-8 Research Clusters and about 20 CoPs active under NBCBN-RE to execute regional collaborative research with coaching from internationally reputed experts • Detailed formulation of the research plans including clear formulation of the quantification of the tangible outputs • One training course including workshop and hands on experience organized by each cluster and hosted by the cluster hosting country	
3.	3.1 Develop, operate and maintain an internet-based knowledge platform 3.2 Build up a network library 3.3 Develop a knowledge map 3.4 Stimulation of scientific publications 3.5 Realizing a regional knowledge dissemination system 3.6 Production of regular network newsletters and brochures 3.7 Organizing regional seminars and workshops 3.8 Implementing national and regional training courses 3.9 Joint development of distance education modules	• A knowledge network information centre; a knowledge network Map and a knowledge network Dissemination system • Research cluster host organizations offer Fellowships for young professionals in their water-related field of interest. Young professionals are attracted by its Training-on-demand facilities. • Regular communication on research, training and output: o Two newsletters per year by the Network Secretariat o Once a year an (update of) course brochures of training opportunities in the region o Bi-annual regional seminars and workshops on their specific topics for a broader audience. • Distance Education becomes part of the knowledge base. First Modules (e.g. an introduction to a specialization) are prepared for general use by Universities and other educational institutions in the region. These modules will include specific cases from the region.	
4.	1.1 Stimulate knowledge application 1.2 Promote integrated multidisciplinary research	• CoP members will be coached and supported in becoming connected to market-driven R&D activities	The market-driven regional R&D activities are supposed to be funded by separate R&D funds. The KA Stimulation Fund (4, see above) is meant to get members of CoPs involved in real-life sector activities.
5.	1.1 Framework for monitoring and assessment 1.2 Annual network research reports 1.3 Quality assurance procedures manual 1.4 Steering committee meetings 1.5 External review mission	• Described and discussed responsibilities are clear and understood by all project-stakeholders; The knowledge network responsible and the CoP-moderators are helped in decision making through the Monitor and assessment toolkit. • CoPs know how they are facilitated and supported; • Q&A procedures are in place.	

Annex 2 LOGICAL FRAMEWORK - Knowledge Networks of the CKNet-INA WRIM Project

	NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS/RISKS
1.	**Overall objective**			
	To improve Indonesia's sector performance in the field of Water Resources and Irrigation Management.			
2.	**Overall project objective**			
	To increase the capacity of leading Indonesian universities in delivering capacity building services to strengthen professionals to perform in the future reformed Water Resources and Irrigation Management Sector	1. The number of university staff with adequate knowledge and experience in WRIM 2. The number of professional WRIM-sector staff trained by the CKNet-INA universities	a. Final Project Report b. Annual Project Progress Reports c. Annual reports of CKNet-INA partner universities	• Government of Indonesia and Donor agencies recognize and trust the WRIM Knowledge Network to participate and/or support their reform programmes; • Continuous support from the management of the participating universities
3.	**Specific Project objectives**			
	1. To support the development of the CKNet-INA Knowledge Network and Knowledge Base in the field of WRIM in addressing the human resources and institutional capacity building needs at national, regional and local levels.	• A CKNet-INA Knowledge Network developed and active by the end of 2006. • A CKNet-INA Knowledge Platform developed and operational, initially focused on WRIM issues by the end of 2006.	• Reports on Steering Committee meetings • Network operational procedures published by the end of 2006 • Network strategy paper developed and published by the end of June 2007 • Web site online by the end of 2006 and appreciated	• The project will be further developed based on the achievements made by the NFP project 'Building academic cooperation and training modules in infrastructure, water and environmental management". The present structure and arrangements is assumed valid and will be used as the initial starting conditions for the project. • Continuous support from the management of the CKNet-INA member universities. • Commitment of the participating organizations to fully support the objectives and approach of the project, irrespective mutation of their management and key personnel. • Active participation of the individuals representing their organization in the consortium, including their successors in case of replacement or mutation. • Participation of the key actors in this project based on the perception that they represent the interest of their institutes rather than representation on a personal basis. • Agreed Code of Conduct, Professional Ethics & Commitment for networking, collaboration and partnership respected. • Independent, dedicated and qualified Network Manager according to management core competences with high sense for innovation and entrepreneurship
	2. To develop and strengthen a decentralized Capacity Builder's Training Capacity & Delivery System in WRIM (incl. WQM), including an e-Learning system for Online Education and Training purposes	• A Capacity Building Programme to strengthen internal capacity to develop, plan and manage short courses in selected WRIM related topics developed at the end of 2006. • The Capacity Building Programme well underway in 2007 for participating CKNet-INA members in the region, with particular attention for the WRIM universities. • Most appropriate Delivery Systems for the short courses developed in 2007 and field tested for selected short courses by 2008. • A concise feasibility study on the introduction of e-Learning or online Training programmes carried out in 2008.	• A Position Paper on Capacity Building Needs Assessment published by the end of 2006. • A Position Paper on Training Demand Assessment of the WRIM Sector published by the end of 2006. • A Position Paper on Training of Trainers developed and published by the end of 2006. • Completion reports of selected training programmes published within 1 month after completion of each training. • Completion reports on the Training of Trainers published within 1 month after completion of each ToT programme. • E-learning feasibility Report	

Annex 2 Continued

3. To develop and deliver demand oriented WRIM Course Programmes and related modules, incl. WQM and gender participation, by academic staff of the participating knowledge centres for external target groups.	• A portfolio of selected high priority short courses developed based on a Training Demand Assessment of the sector in the regions developed by the end of 2009. • A number of short courses delivered starting 2008 and field tested based on the TDA and priority assessment by the end of 2009.	• Annual Project Progress Reports • Annual Steering Committee meeting Reports.	• Network Manager operating within clear and agreed mandates from the CKNet-INA members with transparent and enforced accountability mechanisms, including reporting system. • Common ownership, mutual respect, trust and partnership at same level of consortium members irrespective of status of their institution or representative in the consortium.
4. Outputs			
1. A CKNet-INA Knowledge Network and Knowledge Base especially in the field of Water Resources & Irrigation Management (WRIM) operational and sustainable.	• Knowledge maps of all 10 CKNet-INA universities available by the end of 2006 and regularly updated. • An active, visible and dynamic CKNet-INA Web site/Platform developed under the previous phase updated and further developed to become active and dynamic. • Basic Network Organization and Governance established and operational. • Establishment of 10 CKNet-INA branches at the participating universities as node of the network by the end of 2006. • CKNet-INA Network Administration and Secretariat established and operational by the end of 2006. • CKNet-INA Network Business Plan for 5 years (Strategic, Operational Plan and Budget) developed and agreed upon by the Steering Committee by the end of June 2007. • Open Network conferences to be organized in 2007-2008 and 2009. • A minimal portfolio of paid services and an operational financial surplus achieved by the end of 2009. • A minimal volume of prospective (pipeline) activities.	• Availability of documents (papers, journals, articles, etc.) on Knowledge Network Platform • CKNet-INA Knowledge Network Platform (Web site) • CKNet-INA steering committee meeting minutes • Official CKNet-INA Statute • CKNet-INA Node/Regional Offices established and operational • CKNet-INA Strategic Paper • National and regional media attention for CKNet-INA activities • Completion Report of the individual open network conferences • Number of acquired or new paid programmes/projects for CKNet-INA • Annual Progress Reports. • Position Papers and completion reports of the individual training programmes.	

Annex 2 Continued

2. Internal capacity to develop demand responsive learning programmes in the field of WRIM applying various delivery systems, including e-Learning.	• CB Needs Assessment tool developed and introduced for the participating CKNet-INA members by the end of 2006 and a plan developed and carried out at 10 participating universities by the end of 2006. • At least 200 university staff trained in WRIM-related aspects, learning methods and delivery systems, including minimal 40 trained female lecturers at the end of 2009. • At least 2 Training of Trainers course for selected lecturers who demonstrate specific capacity, professionalism and commitment conducted at the end of 2009. • A concise feasibility report and strategy on e-Learning for CKNet-INA prepared and discussed at the end of 2008. • If found feasible, at least one on-line training programme developed and pilot tested. • A programme for advanced training courses in the Netherlands identified and/or developed and implemented for selected and qualified trainers of the Training of Trainers courses.	• Annual Progress Reports • CBNA reports of 10 CKNet-INA members • Position Paper on CBNA. • Completion Report on the CBNA Workshop • Focus group meeting minutes • Administrative records from CKNet-INA Project Secretariat
3. A standard mechanism and capacities to identify needs for training and implement training programmes in WRIM for external clients and users on a continuous basis.	• TDA method for CKNet-INA developed by the end of June 2006 and applied for the WRIM-sector by the end of 2006. • At least 20% of the trained university staff actively involved in course module development for WRIM and WQM during the project. • Minimal 10 WRIM-related modules and programmes developed and delivered. • Minimal 4 short courses delivered to the sector by the trained lecturers based on self-payment from external resources by the end of 2009. • Minimal 50 sector professionals trained in WRIM related subjects developed by the project by the end of 2009. • Minimal 10% of the sector participants of the training courses female staff from the sector organizations.	• Position Paper on TDA • Completion Report on the TDA workshop • TDA reports of the individual CKNet-INA universities involved in the TDA research programme • Annual Progress Reports • Growth in portfolio of CKNet-INA products and services • CKNet-INA's Financial Reports

Annex 2 Continued

	NARRATIVE SUMMARY	INPUT REQUIRED
5.	**Activities**	
1.	1.1. CKNet-INA Knowledge Network organization established and operational	The required input in terms of manpower and expertise is detailed in the project budget sheet included as appendix of the Inception Report.
	1.2. Institutional & financial sustainability mechanism of the network identified and developed, including training on Collaborative Networking	
	1.3. Implementation framework for the WRIM knowledge base formulated	
	1.4. WRIM Knowledge Platform developed and initiated	
	1.5. Introduction and user guidance developed and established	
	1.6. CKNet-INA WRIM Knowledge base system back office (monitoring & maintenance)	
2.	1.1. Developing a knowledge map of existing education & training programmes and knowledge on Water, Infrastructure and Environment (incl. WRIM) at participating universities	
	1.2. Capacity Building Needs Assessment (CBNA) on Integrated Water Resources Management and Participatory Irrigation Management of National Capacity Builders conducted and analyzed	
	1.3. Capacity building needs and knowledge gaps identified at the CKNet-INA participating universities and required competencies formulated for the WRIM Components, incl. Gender Mainstreaming	
	1.4. A comprehensive capacity building program to address gaps in WRIM knowledge and skills developed and implemented for the four WRIM Consortium partners	
	1.5. A feasibility analysis of the introduction of E-Learning methodologies in the universities, including manpower and facilities required, estimate of required investment and possible cost recovery mechanisms	
	1.6. Trials of selected modules for E-learning and lessons learned reported, presented and a comprehensive strategic management plan developed for further development of Online Education and Training delivery methodologies	
3.	1.1. A Training Demand Assessment (TDA) Method to identify gaps in competence and skills in WRIM in the regions developed, conducted & analyzed	
	1.2. Course programmes & modules developed to address the identified knowledge gaps in WRIM at national, regional and local level and required competencies formulated from the results of the TDA carried out by all 10 CKNet-INA network members, incl. awareness for gender balance	
	1.3. A Training of Trainers programme developed and selected trainers of the WRIM consortium partners (and possibly other CKNet-INA partners) trained in capacity building delivery techniques and methods for training of professionals in WRIM	
	1.4. Marketing of priority course programmes at selected institutions, other universities and professional associations conducted	
	1.5. New demand responsive course programmes initiated on a regular basis	
	1.6. Provide selected training course programme in the Netherlands for selected qualified lecturers	

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