



5th Delft Symposium on Water Sector Capacity Development

DEVELOPING CAPACITY FROM RIO TO REALITY WHO'S TAKING THE LEAD?

Delft, The Netherlands, 29-31 May 2013

Abstracts of papers presented at the Symposium

in order of appearance during the sessions

Please note that not all sessions included paper presentations but consisted of panel discussions instead. Therefore the numbering of the sessions below is not all-inclusive.

Theme: *Challenges for water sector capacity development*

Session 3 Exploring water leadership development

From Rio to Reality: Who is Taking the Lead? Exploring Water Leadership

Wouter T. Lincklaen Arriëns (Asian Development Bank)

In the slipstream of the Rio+20 Earth Summit in 2012 that articulated *The Future We Want*, UNESCO-IHE has convened development practitioners, researchers, sector specialists, policy makers, and capacity development specialists to the 5th Delft Symposium on Water Sector Capacity Development on 29-31 May 2013 to examine who is taking the lead in developing capacity 'from Rio to Reality.' This paper maps some of the major challenges and choices to increase water security in the 21st century; outlines trends and relevant models in leadership development; and explores how leadership can be nurtured and catalyzed through capacity development for individuals, organizations, and networked communities to deliver on our shared visions, especially in developing countries. The author argues to adopt modern approaches that will expand individual and collective leadership at all levels and combine cognitive competencies, including deep knowledge of integrated water resources management, with transformational individual development.²

Note: This draft paper aims to frame and stimulate discussions at the Symposium, and will be finalized afterwards with the benefit of insights from the participants.

Session 4 Boosting Proficiency in Water Professionals

Competency framework for transboundary IWRM: the case of the Mekong River Basin

W. Douven, M. Mul and U. Wehn de Montalvo (all three UNESCO-IHE), V.T. Hong, M. Huong and S. Bitter (all three Mekong River Commission, Vientiane, Lao PDR),

Adequate capacities of riparian countries to address transboundary issues in river basins and implement transboundary Integrated Water Resources Management is an important condition for successful river basin management. This paper analyses the competencies needed to implement transboundary IWRM at different levels (river basin organisation, line agencies, individual staff), and the tools required to analyse the current competencies among professional staff, identify options for

identifying competency gaps through different modalities, and developing suitable learning activities. The case study is the transboundary Mekong River and Mekong River Commission (MRC), which is currently in the process of riparianisation and decentralisation. In this paper we present the main elements of the transboundary Competency Framework that has been developed by the MRC and reflect on its application and implementation of the framework based on input received during national workshops in each of the MRC member countries. We place the results in the perspective of the function of such frameworks in enhancing the capacity within a transboundary basin for effective cooperation, mutual understanding of the issues at hand in order to effectively address and resolve transboundary issues. Finally we present recommendations for the development and implementation of Competency Frameworks for transboundary IWRM in collaboration with national and regional training and education institutes.

Developing T-shaped water professionals: reflections on a framework for building capacity in collaboration, learning and leadership

Brian S. McIntosh and André Taylor (both International Water Centre)

In developed and development contexts, change is an increasingly central theme for water professionals. Growing populations, rapid urbanisation and increasing absolute and per capita demands for water, food and energy, are set against a backdrop of significant changes in water availability and the emerging impact of trade-offs between the water required for water supply, energy provision, food production, livelihoods and ecological / environmental support. Building the capacity of water professionals to lead change in policy, planning, management and communities is an essential component of our collective response to global water challenges. This paper provides a contribution to the growing field of water leadership by outlining, then discussing how a concept, the T-shaped professional, is being used as a framework to guide the design and delivery of postgraduate education programs to build leadership capacity in the water sector. The T-shaped concept integrates insights from leadership, organizational management, learning theory, collaboration, critical thinking and praxis. In doing so, the concept and the way in which it has been applied provide an intellectually coherent and practical response to two basic questions – (i) what skills and knowledge do water professionals need to stimulate and lead change, and; (ii) how can we develop them?

Session 5 Strengthening governance capacities to overcome mismanagement and corruption in the water sector

Capacity to tap into services: Link between capacity building, participation, transparency and decision making

Safa Fanaian (UNESCO-IHE), M.V. Ramachandrudu (WASSAN)

In the research that was carried out for Water Sanitation and Hygiene Cost (WASHCost)¹ by WASSAN to investigate costs and service levels within 107 villages in the State of Andhra Pradesh, India, several underlying elements of costs and services were observed. More than 420 groups across the villages gave their opinions and views on issues ranging from tariffs and water user fee collection to capacity building efforts. These groups include village leadership called Gram Panchayath, Self-Help Groups, Youth Groups and focus groups within Scheduled Caste/Scheduled

¹ WASHCost is a five-year action research programme, running from 2008 to 2012. The WASHCost team gathered information related to the true costs of providing water, sanitation, and hygiene services for an entire life-cycle of a service - from implementation all the way to post-construction.

Tribe communities (SC/ST)². The research also showed even though there is strong emphasis on training and capacity building at the policy level in India, this not similarly reflected within practices. This paper provides a picture of what is happening in practice and why the picture is not entirely bleak. In instances where WASH services are functioning properly through correlation one tries to identify the driving forces that facilitate community participation and decision making, and what facilitates governing bodies' contribution towards better service delivery, enforcement and accountability. It seeks to find the reason for why and how have these anomalies function when the rest failed. According to the surveys and focus groups, most people in Andhra Pradesh feel they have little say in the planning and implementation of water, sanitation and hygiene (WASH) services, while structures to oversee good management of WASH services are failing to have an impact. Village water and sanitation committees (VWSCs) are designated to be at the heart of village efforts to improve services – but the research shows that they either do not exist or are invisible to those they are supposed to be serving. With regard to capacity building efforts, it was noted that almost three quarters of the groups said that there have been no training held in their village on WASH related issues. Further, 16% stated that even when training occurred it did not contribute to their skills or capacity. Where training took place it was often provided by an NGO on hygiene, or was related to construction of individual sanitary latrines. Many also mentioned that they gained such awareness by watching television programmes. Despite the lack of formal capacity building there have been a few villages that have shown some success in WASH service management. It seems that within these villages the commonality was that they had regular Gram Sahba, within which participation was high and inclusive of all groups. This indicator could be a sign of higher level of functionality within a village of be a precursor of better functionality.

Role of community participation to conserve water in desert area of Churu district, Rajasthan state, India

Dr. Mohammed Muslim Sheikh (Govt. Lohia PG College, India)

While the Rajasthan State Government has come up with lasting solution to the chronic water shortage in Churu district, an ambitious project like the Community participation water supply project in Churu district with the help of Kfw, Germany (called Aapni Yojna) appear to be like the mile stone. The people's participation in community-based water supply system has begun to dispel the myth that drought is due to paucity of rain. Community participation is a challenge that can help align the economic, social and environmental needs of the country. It bridges the gap between the public and government. In order to carry out the complementary measures of Aapni Yojna Project, Community Participation Unit (CPU) was established in the year 1994 by a consortium of five NGOs. Aapni Yojna is an integrated rural water supply, sanitation and health education program. Phase first of the project covers 370 villages and 02 towns in three northern districts of Rajasthan, viz., Churu, Hanumangarh and Jhunjhunu. The project has created a modern water supply infrastructure, including treatment of plants, reservoirs, pump houses, trunk and distribution pipelines based on the latest technology and materials. The community should own the water supply system within the villages.

² Grama Panchayath are the leading governance bodies at village level which receive funds from Government for operation and maintenance of WASH facilities and manage service delivery. Self-Help Groups are women's groups set up to obtain loans for income-generating activities. Scheduled Caste / Scheduled Tribe communities are the lower caste and usually marginalized communities. The youth groups were ad hoc focus groups made up of boys and men aged 18-25.

Session 6 The local challenge: the role of citizens in capacity development to address their needs

Building Capacities at Ground level in the Context of Climate Change and Water Scarcities

M.M.M. Aheeyar (Hector Kobbekaduwa Agrarian Research and Training Institute, Sri Lanka)

The impacts of climate change on water and agriculture sectors will be very high and crucial for the sustainable development. There are ample evidences to suggest that the climate of South Asian region has already changed. Rainfall in upper watershed areas of Sri Lanka is reduced by 39.12% and predicted to continue at 16.6% during the next 21 years. Recent research findings on climate change perception studies show that majority of the local communities are experiencing increased rainfall, shift in monsoonal seasons, increased day and night temperatures, decreased river flow, increased frequency of floods and increased incidence of landslides. The findings indicate the well awareness of the people on climate variations who engage in natural resource related employment for a long period of time. However, the majority of the public is still unaware of the concept of global climate change and its possible causes and impacts. Moreover, farmers are not aware of or are keen to take any short or long term adaptation measures to minimize the harmful effect of water scarcities despite their know how on traditional water harvesting and conservation measures, water saving technologies, and agronomic practices. In most instances it appears that there are no specific policies, legislations, regulations etc. for education, training and public awareness to create awareness on climate change and related issues. The past capacity building efforts have been decidedly patchy though some excellent work has been done by all sectors in addressing climate change. The measures initiated were without a proper action framework and sufficient focus on results, very little management of the process or process outcomes and very marginal ownership of effort with respect to the citizens of Sri Lanka. As a result, capacity building action can be best described as a start-again, stop-again phenomenon where measurable results are few and unsustainable. The existing extension network in water and food sectors have to play dominant role in creating awareness, transferring new technology and building capacity of the beneficiaries. There should be a plan to strengthen the current extension network and building capacity of grass root officers. The necessary funds and other support should be given to the line agencies to build the capacities and strengthen the existing agricultural extension delivery systems with mainstreaming climate change issue and making appropriate inter-sector coordination of activities. There is enormous traditional knowledge among the communities, which can be easily utilized and shared among communities to manage climate risks, and formulate appropriate community based adaptation strategies. Climate change in the context of water scarcity is a complex cross cutting issue which has the ability to generate different types and levels of impacts over various sectors. There are common as well as sector specific issues. However all these national, provincial and sectoral issues should be integrated into the broad national agenda in a meaningful manner in order to make necessary linkages and coordination in an effective manner to achieve the best results from capacity building programs.

Capacity building through direct participation in rural-urban communities in Brazil

Norma Angélica Hernandez-Bernal (UNESCO-HidroEX)

This paper presents an action proposal focused on the articulation of solution mechanisms to a water use conflict already installed, due to the diversified and intensive use of water in the *Rio Piedade* Basin, in the state of Minas Gerais, Brazil. The UNESCO-HidroEX Foundation is acting directly with

the stakeholders, local governments and water management organisms to facilitate the dialogue between them and, at the same time, to elaborate capacity building actions as well as field activities with the communities. In doing so, the stakeholders can acquire the theory and knowledge to apply the tools of Integrated Water Management in order to be part of the solution through the empowerment of the population based on accurate information and knowledge on the process of water management and participation of the decision taking process.

Theme: *Experiences with water sector capacity development*

Session 7 **WOPs: how to make them even better?**

What Counts as 'Results' in Water Operator Partnerships? A Multipath Approach for Accountability, Adaptation and Learning

Maria Pascual Sanz (Erasmus University), Siemen Veenstra (Vitens Evides International), Uta Wehn de Montalvo (UNESCO-IHE), Rob van Tulder (Erasmus University), Guy Alaerts (UNESCO-IHE)

The ongoing debate on aid effectiveness highlights that for capacity development (CD) interventions to remain relevant and their results sustainable, case-specific approaches are needed for planning, monitoring and evaluation of CD, that in addition to account for results, build in flexibility to adjust the interventions during implementation. Partnerships between water operators for CD are portrayed as a promising approach for sustained performance. However, it is observed that CD interventions require, among others, adequate time to lead to targeted water operator performance gains. Managing partnerships for CD solely by using key performance indicators (KPIs) does not inform about the progress and effectiveness of the partnership in developing capacity, limiting the insights for partners and stakeholders to better manage the process. Drawing from several streams of literature this paper proposes a multipath approach to evaluate performance of partnerships (understood as different from performance of the targeted water operator). The approach is applied to compare the performance of two partnership projects, namely of the Lilongwe and Blantyre Water Boards in Malawi, respectively, with Vitens Evides International, a Dutch water utility, over a period of two and a half years. Qualitative and quantitative methods were used for data collection. While KPI gains did not provide much substantiation of progress and effectiveness of the projects, evidence derived from the other evaluation paths indicated how substantial progress had been achieved in both projects, having worked so far more effectively and achieved more Blantyre than in Lilongwe. Furthermore, it reveals insights of the process undergone by both partners and points at emerging aspects that need to be addressed for the project to remain relevant and effective. The findings of the multipath approach envisage a great potential for learning on optimisation of CD through Water Operator Partnerships.

Transformation of WOPs into Bankable Formats

K. Schwartz, M. Pascual Sanz (both UNESCO-IHE), A. Thawe (Blantyre Water Board) and S. Veenstra (Vitens Evides International)

Capacity building is at the core of water operator partnership and allows partners to gradually develop and guide their relationship in a flexible and demand based manner. A WOP is thereby defined as any form of simple or structured partnership aimed at capacity building on a not-for-profit basis. Partnerships can take a multitude of different forms and have various technical, legal and social shapes depending on individual circumstances. A distinctive characteristic of the WOPs mechanism compared to PPP formats is that the mentor does not take over the driver seat of the operator but assumes a coaching role, sitting next to the driver. This to enable the operator itself to sustain the operational improvement trend in the long term securing that the interventions introduced are better embedded within the operator. On the negative side is the complaint that WOPs are input oriented rather than output based and as such a too soft tool to induce substantial and sustainable changes within the strategic context and culture of water operators to perform better. For financing institutions WOPs therefore are often considered "*too little too easy*". Lessons from the private sector service

contract of the EU/EIB financed project with Lilongwe and Blantyre Water Board reveal that more contractual arrangements are necessary to turn the input of a service contractor into decisive and productive action. Based on the experiences of Vitens Evides International recommendations are drafted for bankable WOPs to become effective instruments to convert investment budgets into profitable operations by water service providers. Capacity Development thereby is instrumental to ensure focus on the long term sustainability of the achieved (short term) improvement in overall performance.

Session 8 Capacity development - key to sustainable water operations

Local solutions in NRW management through North-South Water Operator Partnerships. The case of Nakuru: translating policy to practice

Nancy Ndirangu (SNV- Netherlands Development Organization), James Ng'ang'a, Anthony Chege (both Nakuru Water and Sanitation Services Company), Reint-Jan de Blois, and Adriaan Mels (both Vitens Evides International)

Improving access (and sanitation) services in Kenya (estimated at 59% and 32% respectively), is one of the country's commitments. However, efforts to remedy the situation through a rigorous water sector reform have not resulted in the expected improvements. One key challenge is inadequate capacity of sector institutions to deliver on their mandates.

In particular, high Non-Revenue Water (NRW) levels (currently estimated at 45%) negatively affect financial viability of water utilities. Key stakeholders are currently collaborating to improve NRW levels. Through capacity development support to the utilities, underlying issues have been addressed and service delivery improved. The case of NAWASSCO where local and international partners are implementing an innovative NRW model has resulted in commendable gains is described. The NRW pilot adopted an action research approach to apply (theory of) the IWA methodology of reducing NRW to the local situation through a pilot (NAKA) whose lessons will be up-scaled to other areas within and beyond Nakuru. GIS and MIS tools were also developed to support the pilot and facilitate decision making. The pilot resulted in a marked reduction in NRW levels; increased billing; and increased revenue. The pilot has demonstrated that capacity, when properly developed and locally owned, can result in commendable development gains.

Water Operator Partnerships and Institutional Capacity Development for Urban Water Supply

Richenel Breeveld, Leon Hermans (both Delft University of Technology), Siemen Veenstra (Vitens Evides International)

One way in which international Water Operator Partnerships can contribute to capacity development, is through the exchange of experiences with water institutions in different countries. This paper looks at a partnership between water operators in the Netherlands and Malawi to see to what extent institutional experiences in the Netherlands can contribute to capacity development of the Lilongwe Water Board in Malawi. For this, it combines insights from policy transfer, with a conceptual framework based on the Institutional Analysis and Development (IAD) framework. Stylized game theoretic models are used to analyze in-depth the institutional (dis)incentives that contribute to improved performance for customers. Experiences in the Netherlands are analyzed by studying five

specific action situations, such as asset management at drinking water company Vitens NV. Potential lessons are derived from this, which are evaluated for potential transfer to Malawi. The analyses suggests ways in which improved information gathering and data management can support allocation of investment and O&M budgets. Furthermore, it suggests ways to increase the frequency of encounters between government and financing institutions and water utilities, as well as the use of a system of benchmarking to provide a platform for sharing best practices and to create competition.

Structural arrangements and sustainability of rural water facilities in Tanzania

Christina Geoffrey Mandara, Anke Niehof and Carja Butijn (all Wageningen University)

This article answers the following questions: how do the current structural arrangements at district and village levels affect sustainability of the rural water facilities (RWFs) at the village level in terms of technical and managerial aspects and how can the current structural arrangements be adjusted to integrate providers and users capacity building towards sustainability of the RWFs? The article bases on empirical research conducted in nine villages in Kondoa and Mpwapwa districts. Results revealed that the sustainability of the RWFs is endangered and the villages located far away from the District Council headquarters experience numerous technical and management problems. The national water frameworks have not clearly defined roles of the key actors at the district, village and household levels. District Water Department has limited number of technicians, motorcycles and funds to adequately and timely render technical and managerial services to the villages. There were no local technicians specifically trained for basic operation and maintenance in all the villages. To address capacity development in terms of changing roles and relations, this study suggests establishment of maintenance workshops at zonal level for clustered villages to repair breakdowns and solve non-functionality problems, and coordinating availability, quality and affordability of the spare parts.

Session 9 Country case studies on Bangladesh, Liberia and South Sudan

Aspects of South Sudan's Water Sector Capacity Development. "A Visionary Mission on a Long Road towards a Tangible Goal"

Eng. Isaac Liabwel C. Yol (Ministry Water Resources and Irrigation, South-Sudan) and Maryam Darwesh Said (PhD) (Euroconsult Mott MacDonald, Ministry of Water Resources and Irrigation, Egypt)

The signing of the Comprehensive Peace Agreement (CPA) in January 2005 and Independence on 9th July 2011 provided a platform and legitimacy for South Sudan to establish and build its administrative and functional structures. However, the long civil war made the development tasks overwhelming. In addressing its mandate, MWRI faces serious capacity limitations, since the liberation war resulted in breakdown of organisational structures and created shortage of core technical and managerial skills. The shortage of qualified personnel is compounded by lack of relevant specialized training institutions, leading to giving of *ad-hoc* trainings and solutions. MWRI and partners are thus streamlining capacity building efforts through institutionalisation of training and research activities. Based on a series of capacity assessments, MWRI adopted a phased approach to gradually achieve and sustain organisational, institutional and human resource capacity at all levels. MWRI tapped into a number of national, regional and international training opportunities, which raised the capacity of sector technicians, practitioners and professionals. The long-term strategy is to

gradually establish training and research within the country, and incrementally enhance planning, managerial, operational, maintenance and implementation capacities in a sustainable manner. Thus, the expansion of Amadi Rural Development Institute under the Multi Donor Trust Fund of South Sudan is geared toward this aim.

An overview of capacity building efforts in Liberia's Water, Sanitation and Hygiene Sector

Christine Ochieng (World Bank)

Liberia is a fragile state, and is classified as such due to weaknesses in its institutions, capacity, presence of United Nations peace keepers, among other considerations. Liberia is but one of many other fragile states that account for a quarter of the world's population. This is a sobering figure, and one that calls for concerted efforts in improving the quality of life for citizens in these countries. Liberia's civil war affected all sectors, water and sanitation included. The water, sanitation and hygiene (WASH) sector is an avenue that can contribute to enhancing the stability of the country, as service provision is a hallmark of a good and well-functioning state. This paper looks at the efforts the country has made, at rebuilding the WASH sector. It highlights the recently launched Capacity Building Plan 2012 – 2017 as a road map for the country. Monitoring and evaluation is examined as one area where the sector should make concerted efforts due to its importance. The paper notes that improving the sector will call for overall improvement of the labor force who staff the ministries and New Public Management approaches can be considered. The paper also shows that \$74m is needed develop the sector's capacity.

Session 10 Country case studies on Indonesia and Egypt

Ossama Salem (Capacity Building International)

This paper analyzes initiatives and mechanisms of capacity building in the Water Sector in Egypt using case studies and samples on on-going projects. It looks critically to the efficacy, underpinning assumptions and results of capacity building in the sector. The rationale is to analytically review the existing approaches and deeply seated beliefs of the governmental and external support agencies framing capacity building in the sector. It argues that capacity building continues to be perceived as training and provision of equipments. External support organizations working in the sector tend to be concerned more about investment and disbursement of loaned funds. Accordingly, capacity building is designed and seen as a means to more important objective which is investment. This understanding limits the scope of capacity building into training in functions related to investment and diminish any interest in organizational and institutional development as suspect if not irrelevant. Governance and accountability issues affecting organizational and individual behaviour are frequently shunned as irrelevant. Existing capacity building mechanisms of the sector that are financed by public funds tend to concentrate on training. International projects targeting the sector occasionally suffer from design issues in their capacity building components, in addition to competition among partners in the same consortium that affects results. There are recurring cases of reducing resources allocated to capacity building in favour of more input to engineers - assuming that this would accelerate investment, or sending a bigger number of staff in overseas observatory tours. The paper provides a number of recommendations addressed to different categories of stakeholders to remedy presented issues.

Session 13 **Monitoring, evaluation & pro-poor benchmarking**

Experiences of Enhancing Technology Adoption Amongst Urban Poor – Kampala

JB Otema Adonga, Andrew Sekayizzi (both National Water & Sewerage Corporation, Uganda)

In Uganda, access to safe water in urban areas stands at 75% (MWE 2012). Piped water service delivery for informal areas is through privately owned public stand posts (PSP); their charges are not regulated by National Water and sewerage corporation (NWSC) thus susceptible to overcharging the poor. Introduction of the Pre paid meter technology in the informal settlements in Kampala is the latest pro poor initiative. Consequently, consumer education on Pre-pay-Technology was vital to create demand for new connections with pre paid meter technology, and accelerate the acceptance of prepaid meter installation. Stakeholder mapping and social marketing through the local leadership provided easy buy-in by the community. Use of Information, Education and Communication (IEC) materials translated to three widely understood languages (English, Swahili and Luganda) complimented the household visits in sharing information. Media, customized messages and formal program launch within the community facilitated wider information flow and fostered leadership support. Community involvement at all levels coupled with customized messages that are widely acceptable in the cultural setting in the Urban Poor Communities was critical for the acceptance of the new technology. To the Urban poor, the pre paid meters provided affordable (real time) tariff offered by NWSC.

Monitoring Outcomes and Impacts of Capacity Development in the Water Sector: a Cap-Net UNDP Experience

I.P.P Gunawardana (Cap-Net Lanka), K. Leendertse (Cap-Net UNDP) and W. Handoko (CK Net, IHE Indonesia)

Cap-Net UNDP is an international capacity development network for Integrated Water Resources Management (IWRM). Cap-Net's approach of working through regional and country networks is an effective method to draw together various experts from different disciplines, fostering local ownership for capacity development and scaling-up implementation of IWRM. This paper discusses the lessons drawn from outcome monitoring of Cap-Net capacity development courses for two consecutive years 2010-2012. Cap-Net follows the Monitoring, Evaluation and Learning Plan (MELP) that it developed, and this helps Cap-Net to learn on progress towards its objectives. It also allows for corrective measures to the on-going process in capacity development program delivery. Lessons from the outcome monitoring exercises provided guidance for revision of monitoring approaches in order to capture the outcomes and impacts, and to contribute to the overall goal of Cap-Net. It was realized that interest and involvement of partner networks, continuous follow-up of the courses and standardized processes are important for successful monitoring.

An integrated approach to water and sanitation through capacity building for urban development in Ethiopia, the role of an integrated urban management master course at the Ethiopian Civil Service University

Meine Pieter van Dijk (UNESCO-IHE), Carley Pennink (both IHS) and Saskia Ruijsink (IHS of Erasmus University).

This paper analyzes the experiences with Capacity building in Ethiopia. Erasmus University has worked since 2000 with the Ethiopian Civil Service College (which has recently become a university) to build capacity at the master level. This paper reviews the experiences with an integrated urban management master course, which saw an increase from 20 participants to 400 students in a period of five years. The factors leading to the decline in quality and eventual scaling down of the number of course participants will be analyzed taking into account the desire of the Ethiopian government to train people to make decentralization a reality. From a unified course the course became a series of specializations, reflecting the priorities of the Ethiopian government. After a few years it became clear that it was difficult to absorb this number of master students in the government sector and that their skills did not match all the requirements, such as showing leadership as masters in urban management, or the ability to deal with private operators (NGOs and business sector). However the cooperation over a long period resulted in a partnership where leadership on the Ethiopian and IHS side contributed to the success in terms of the capacity built, the number of people trained and their contribution to dealing with water and environmental problems in an urban context.

Session 14 Measuring for sustainable success

Capacity development at Knust civil engineering department: a successful collaborative effort

N. Trifunović (UNESCO- IHE), R. Buamah, S. N. Odai (both Kwame Nkrumah University, Ghana)

Kwame Nkrumah University of Science and Technology (KNUST) and UNESCO-IHE Institute for Water Education have been collaborating since 1993. The successful implementation of two Dutch government funded projects run in the Nuffic programmes in the period 1996 – 2009 included the development of MSc curricula, staff training, refurbishment of teaching facilities, and spin-off activities in the WATSAN sector of Ghana. To date, the two MSc programmes: in Water Supply and Environmental Sanitation, and in Water Resources Engineering and Management, have produced close to 200 graduates. Nearly all the staff members recruited and/or trained are still at post at the university. Equally, all the teaching and accommodation facilities are still operational. Not exclusively but certainly with the massive help of the two Nuffic projects, KNUST has grown into a leading provider of WATSAN education and research in Ghana, and known partner in international projects. This success resulted from (1) the definition of initial project objectives done with active participation of both organisations and major national stakeholders, (2) clear support and developed sense of the project ownership by the KNUST management, (3) the capital injection of Nuffic that spanned over nearly 13 years, and (4) the mutual understanding and trust between the parties that led to a partnership.

From Knowledge and Capacity Development to Performance Improvement in Water Supply: the Importance of Competence Integration and Use

Silas Mvulirwenande, Guy Alaerts and Uta Wehn de Montalvo (all UNESCO-IHE)

In order to deal with the water supply challenges facing most developing countries today, many efforts are undertaken to develop the human, organisational and institutional capacities. Since the objective of knowledge and capacity development (KCD) is to improve institutional performance, capacity development is measured using performance improvement targets. In this paper, the authors caution KCD practitioners about the danger associated with such measurement: it makes sense to differentiate performance improvement from competence development because the latter does not always automatically translate into the former. Drawing on empirical evidence about the management contract between Aqua Vitens Rand Limited (AVRL) and Ghana Water Company Limited (GWCL), the paper demonstrates how the process of integrating and using competences is a necessary condition for KCD intervention to result in performance improvement. As this process often lags behind that of competence development, KCD providers as well as beneficiaries should set realistic performance targets, taking into account that it takes time for competencies to develop and translate into improved performance. Not doing so creates unnecessary frustration when unrealistic targets are not met and can often result in "throwing out the baby with the bath water".

Session 15 Assessment of capacity development progress in IWRM

Knowledge leads, policy follows? The Two Speeds of Collaboration in Transboundary River Basin Management

Ellen Pfeiffer (UNESCO-IHE) and Jan Leentvaar (Ministry of Infrastructure and Environment)

The 21st century started as a time period of increasing water scarcity, conflicts over shared water resources, and major flood disasters. This context keeps the establishment of effective basin management on the top of the global water agenda. Manuals educating water professionals in the field are often modelled on the experience of existing river commissions, such as the International Commission for the Protection of the Rhine (ICPR), widely perceived as case of success. Case studies often obscure the transient nature of river basin management and generate the misleading notion of 'the regime' as a somewhat static 'black box'. This pilot study opens the black box and investigates the internal dynamic between the policy-side and the knowledge-side of the ICPR, based on a phenomenological analysis of actor accounts. Preliminary results suggest indicate that different subgroups of the ICPR regime showed different levels of institutionalization at the same point in time, and that internal dynamics of the ICPR assumed patterns similar to scale-dependent, cross-level interplay. Such a dynamic would have significant implications for policy and practice, since cross-level interplay both contribute and obstruct environmental regimes.

Readiness and willingness of the public to participate in integrated water management: some insights from the Levant

Philippe Ker Rault (Alterra, Wageningen University), Heleen Vreugdenhil (Maastricht University), Paul Jeffrey (Center for water science, Cranfield) and Jill Slinger (Delft University of Technology)

Although public participation aroused much attention in integrated water resources management, little is known on readiness and willingness of the wider public to participate. The top-down perception that the public is badly organised, has limited knowledge and is not interested in participation, is a major barrier for the implementation of participation. We illustrate through four medium scale surveys in the Levant that the potential for public participation is present, even in countries with limited exercise of democracy. The study demonstrates that the public is willing to participate and knowledgeable about water management challenges both at the institutional and household level. These conditions for participation are particularly present in countries where water stress is high. Preferred style of participation is active involvement, in order to have a channel to communicate, express opinions and exchange personal understanding of the situation in which one

Towards Improved Professional Development System in the Water Sector of Central Asian Republics

Dinara Ziganshina (Interstate Commission for Water Coordination in Central Asia)

This paper considers existing challenges and outlines the main directions for improving water sector professional development system in Central Asian republics. It builds on extensive capacity building experience of Interstate Commission for Water Coordination (ICWC) in Central Asia and elaborates ideas and proposals raised during the implementation of the Capacity Building for Integrated Water Resources Planning and Management in Central Asia Project. This project was implemented in 2009-2012 by Scientific Information Center (SIC) of ICWC and UNESCO Institute for Water Education (UNESCO-IHE) with active involvement of water management organisations and educational institutions of Central Asian republics.

Session 16 Human resource capacity gaps in the water and sanitation sector

Meeting the water and sanitation MDGs: a study of human resource development requirements in Tanzania

Richard Kimwaga, Joel Nobert, Victor Kongo (all three University of Dar es Salaam, Tanzania) and Mpembe Ngwisa (Pöyry Environment GMBH, Tanzania)

In the water and sanitation sector, the human resource requirement to meet the MDG targets in Tanzania is relatively unknown. The study was conducted with the focus on the human resource requirements from the public sector and parastatal institutions, private sector (private consultancy companies, individual contractors, etc), as well as NGOs, Community Based Organizations active in the WASH sector. The competencies assessed were, design and construction of new infrastructure, operation and maintenance, community mobilization, sanitation and hygiene promotion. The study has found more human resources shortage for rural than urban areas. The lowest HR demand is for

social development estimated at 320 in the urban areas. In terms of water supply and sanitation sectors, the average number of WatSan engineers that will be required to achieve MDGs is estimated at 3,864 compared to sanitation sector that will need 637 engineers. In terms of competencies, water supply is highest for O&M (7,589) and lowest for mobilization (447). The study is recommending increasing the HR supply in WatSan through the following measures; Increase support for training institutions offering relevant courses in WatSan, Focus on skills required for asset management and O&M, Specific focus on capacity development in small towns and rural areas.

Session 17 Capacity development networks

RedeVale – Agent qualification in Water Resources: a plot between Development, Technology and Society

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This paper will explain the various ways that RedeVale (an education, research, and online education, network focused in water resources management of Paraíba do Sul river basin) act for agent training in water resources. It is a fact that in Brazil water resources management still a quarrelsome subject between managers, and in that way, training is crucial to solve the problems and avoid them. The approach used focus on information technologies (IT) with social purpose, as a mean of qualification and knowledge exchange. The technologic resources are used to expand the knowledge of water resources, leading society to a more conscious and instructed way to deal with the water resources management theme. The main focus of RedeVale is in online education, because it reaches a larger public with less effort than the traditional education method (attending classes), but presencial measures are also used to promote interaction and approximation, as well as experience exchange between society actors. Therefore RedeVale object is in the qualification, ensure a sustainable development, and a better water resources management, and this is where Development, Technology and Society, enters in a plot that will be explored in this paper.

Knowledge Networks as a Tool for Capacity Building in Transboundary River Basins. Case Study: Nile Basin Capacity Building Network (NBCBN)

A.M. Azab (Nile Basin Capacity Building Network) and C.W.H. Keuls (UNESCO-IHE)

The river Nile is the longest river in the world shared by 10 countries and it represents one of the most complex and sensitive hydrological systems in the world including different cultural, language, religious and historical background. The Nile Basin countries are experiencing a number of problems such as rapid population growth, limited water resources, environmental degradation, poverty and an increasing concern about the impact of climate change for the region. At the beginning of the '90's it was increasingly realized that co-operation among the Nile countries would become a prerequisite for the further development of the Basin and that capacity building would play a crucial role in that process. As a response to these needs, continuous and major efforts were done, and in the past ten years a unique network has emerged in the Nile basin to support capacity building through collaborative research among Nile water professionals: The Nile Basin Capacity Building Network (NBCBN). It is unique in that it achieved to create collaboration between formerly isolated water professionals in a region characterized by political tension, poverty and growing water scarcity. Collaboration between water professionals contributes to improved knowledge, based on applied collaborative scientific research on alarming water issues and problems in the basin, which at its turn contributes to the dialogue over water issues in the region. This paper presents the network establishment, activities and achievements and focuses on the impact of such organized network on the Nile basin capacity development in the last ten years and highlights the future trends of the network to continue its mission for more positive impacts and well established capacities in the basin.

Capacity development networks: a source of social capital for change

Damian Indij (LA-WETnet, Latin America Water Education & Training Network), Bekithemba Gumbo and Kees Leendertse (both Cap-Net UNDP)

Networks of organisations working in capacity development in sustainable water management for have emerged globally in recent years as strategic responses to the demands for increased skills and capacities in the water sector for implementation of integrated water resources management (IWRM) concepts and principles. These networks constitute inclusive alliances –at country, region, or global levels- by capacity development institutions such as universities, resources centres, NGOs, governmental organisations, water management agencies, and UN agencies, all involved with and committed to capacity development in the water sector. More than 10 years of working experience show that networks are bringing an important added value for capacity development in water. This has been proven possible as networks can: i) create a multidisciplinary knowledge necessary for the introduction and support of complex approaches, such as integrated water resources management; ii) combine scattered strengths of institutions into a critical mass; (iii) can maximise use of local skills; iv) share knowledge and expertise through communication and collaboration; and v) enhance the impact of capacity development activities by coordinating and making use of members' capacity, skills and experience. These factors are some of the outcomes from working in networks, “the things that networks do”. However, there is still room to explore why networks are functional; which are the drivers and values which make networks efficient, learning, and growing endeavours? Understanding the functioning of networks is key to understand why networks produce outcomes that enable increased impact, and for network-to-network learning. This paper addresses these issues by focusing on the values and strengths under the surface of networking that enable partnerships and collaboration. The analysis will explore the concept of networks as social capital. As Robert Putnam (1), one of the pioneer researchers of social capital suggests, social capital embraces at least four dimensions: the ethical values of a society; its associative capacities; the level of trust amongst its members; and public awareness. Although there is no unique definition of social capital, there are many valuable interpretations which will be demonstrated throughout the paper in their relation to practices and methodologies used by capacity development networks. Understanding social capital not only enables to strengthen network

Session 22 Innovative approaches in water education

Capacity building programmes in the South African water sector: Are they complementing each other or getting in each other's way?

L. Jonker (University of the Western Cape, South Africa) and V. Meyer (Department of Water Affairs, South Africa)

Since 1994, a number of studies were commissioned to determine the capacity needs of the water sector in South Africa. Some of these studies focused on capacity needs in water resources management whilst other focused on capacity needs in water services provision (supply and sanitation services). With the discrepancy that seems to exist between the need for a skills development framework for the water sector and the existing skills development activities by universities and other organisations, the following question arises: Does the current capacity building environment in SA contain any examples of what a capacity building framework could look like that contribute to solving the problem of a lack of skills in the water sector? In an effort to answer the

question, this paper examines efforts to address the skills shortage through two approaches. The one an approach through needs assessments and the other through three programmes, each developed independent from each other, each with a different mode of implementation but with a common purpose, to enhance the skills availability in the water sector.

Water Education in Schools: a holistic approach based on Integrated Water Resources Management to meet Educational Goals.

Damasia Ezcurra (Universidad de San Andrés, Argentina) and Damian Indij (American Water Education & Training Network)

This paper proposes an approach to address the challenge of water education while representing an opportunity to enrich the overall education of students and strengthen school planning and integration amongst subjects, teachers, and their communities. It is based in the experience and lessons gathered by the Education for Sustainability Programme at the University of San Andres (Argentina) and LA-WETnet. Since 2008, both organizations have been collaborating in Education for Sustainability (EFS) and Integrated Water Resources Management (IWRM) capacity development with school teachers and planners. The focus is anchored in the recognition that we are all water users and all together are responsible for water use and management. The IWRM principles lead the way for a transdisciplinary and transversal incorporation of water education in schools.

A Framework for Strengthening Capacity Development in Climate Change Adaptation: Connecting science with practice

Catharien Terwisscha van Scheltinga , Fons Jaspers (both Alterra, Wageningen University and Research Centre), Caroline van Bers (seeconsult GmbH, Germany), Peter van der Keur (National Geological Survey of Denmark and Greenland (GEUS), Humaira Daniel (United Nations University, Institute for Environment and Human Security (UNU-EHS), Germany) and Matt Hare (seeconsult GmbH, Germany)

Worldwide, climate change adaptation (CCA) is part of a complex setting that also needs to take sustainable development (SD) and disaster risk reduction (DRR) into account (IPCC, 2012; O'Brien et al, 2008). The uncertainties associated with managing climate change are high as the predictive capabilities of climate models are still questioned and climate scenarios down-scaled to the local level often are not available. Developing the capacity to reduce the risk associated with disasters (e.g. floods and droughts) is a central theme in water management. Scientific insights, data and practical experience in the form of integrated knowledge when made available to practitioners at the appropriate level, and using the appropriate language and format can contribute to better solutions for DRR and CCA.

To this end, the CATALYST project (www.catalyst-project.eu), developed a framework using an innovative approach including a virtual platform together with face-to-face workshops as part of a Think Tank process to create exchange among scientists and practitioners, and identify potential means of communicating new scientific insights in and approaches to DRR and CCA. Participants in this Think Tank process have used these fora to discuss the state-of-the-art in hazard management, and identify transformative best practices that enhance capacity in DRR and CCA. This paper describes the approach, its initial results in Europe and Asia and how this contributes to capacity development in the DRR and CCA arena, particularly in the realm of water management.

Need for Recognising and Revisiting Management, Policy and Governance in Water Services Education

Tapio S. Katko (UNESCO-IHE), Pekka E. Pietilä and Joni Vihanta (both Tampere University of Technology, Finland)

This paper will explore the need of expanding conventional engineering education and curricula to cover also areas of Management, Policy and Governance (MPG) issues.

In addition to the revising demands above the paper shares experiences of a special demand-based continuing education and professional development programme called "Water Services Leadership and Development, WASLED". This programme, conducted in 10 months, has been run for three times for experts working in the field of water services between 2009 and 2013. A total of 61 persons have participated/are participating in the three courses.

The emphasis of the WASLED programme is on learning-based, interactive and participatory methods. The experiences gained are quite positive and encouraging. Yet, it is obvious that the educational need for MPG should not be left on the continuing education only, but to some extent they should be included also in the BSc and MSc programmes.

Session 23 Virtual and global campus

Let's train local practitioners better: World Water Academy: an innovative approach for sustainable capacity building

Agnes Maenhout and Johan Oost (both World Water Academy)

Water has proven to be a knowledge intense sector. Water professionals, practitioners have to stay up to date with their knowledge, knowhow and skills. Life-long learning describes the learning history of a professional during his working life. The length of the life-long learning exceeds three times the duration of the initial education. This length added to the fast changing technologies and ICT underline the importance of life time development. Worldwide a scream for well-educated and/or well-trained water practitioners can be heard, especially for technical matters. Water training centres focus on the applied knowledge in the water sector and mainly on a vocational level. Wateropleidingen / World Water Academy has developed an innovative and sustainable method of training practitioners: The concept 'for and by professionals'. Passionate experienced water professionals share their know how, knowledge and skills to train and to inspire their peers. Key issue is the combination of water content and didactics. A good professional is not a good trainer per se. A water professional needs didactical skills and tools to become a professional trainer, who trains and shares his knowledge and experiences to his colleagues adequately. Thus the local capacity can be strengthening by the local practitioners themselves.

Session 26 **Serious gaming – innovative capacity development?**

An interactive capacity building experience – an approach with serious games

Chengzi Chew (DHI, Denmark), Gareth J. Lloyd (UNEP-DHI, Denmark) and Eske Knudsen (Serious games Interactive, Denmark)

Aqua Republica is an online serious game currently being developed by a consortium consisting of DHI, UNEP, and UNEP-DHI Centre, as well as other interested partners. Inspired by Integrated Water Resources Management, the game helps to raise awareness and educate stakeholders about the importance and challenges of managing limited water resources in the face of multiple and often competing demands in the drive towards sustainable development and climate change adaptation. This web-based game is designed to impart knowledge to players; knowledge such as an understanding of the strong links that water has with many sectors of society, the valuable services that ecosystems render to our society, the trade-offs that occur when water is allocated between competing water use sectors, and also the potential impact that climate change can have on the well-being of societies. Aqua Republica combines a game layer with a water allocation model, MIKE BASIN, to create an interactive, realistic virtual environment where players play the role of a catchment manager of an undeveloped river catchment. The main objective is to develop the river catchment to be as prosperous as it can be. To achieve that, players need to develop the catchment's economy to provide the funds needed for development; have a steady food supply for a growing population and enough energy and water to maintain environmental services. Players are engaged and educated about the complex relationships between developmental actions in a river basin and the natural environment - as well as their consequences. The game layer also consists of a reward system to encourage learning through competition and more positive actions. For example, a player who takes care of the ecosystem while developing the catchment gets a bonus score and gets a rewarding event. While a player who does not, will encounter pollution events, will need to spend more resources on cleaning up and will ultimately receive a lower score. Such game mechanics are designed to engage people and increase their interest in sustainable water resources management.

Session 27 **Joint sector monitoring, a tool for capacity development?**

Monitoring for learning and developing capacities in the WASH sector

René van Lieshout, Erma Uytewaal and Carmen da Silva Wells (all three IRC International Water and Sanitation Centre, The Netherlands)

For sustainable Water, Sanitation and Hygiene services it is important that the sector constantly adapts to a changing environment and is able to respond to emerging challenges. This capacity to adapt and evolve in a dynamic way requires a capacity to learn continuously at individual, organisational and institutional levels. To create a sector with the capacity to learn, sector mechanisms are needed to collect and interpret data, encourage information sharing, facilitate continuous reflection and analysis, identify and implement potential innovations, support stakeholder consultation and manage information and networks for dialogue. These mechanisms are linked to and fed by sector monitoring and evaluation (M&E) processes. Monitoring information can be used for checking and control, as well as for problem solving planning, learning and adaptive management. To use monitoring for improvement, a learning approach is needed. This implies answering the questions

the questions why has there been success or failure, so what are the implications for our work, and now what will be done about the situation. Learning-oriented monitoring and evaluation is an area for further improvement in the sector. For this paper, two trends in monitoring processes are discussed that contribute in one way or the other to increased sector capacities to reflect and analyse and act upon lessons learned. Firstly, the interest of national governments and donors in monitoring and evaluation was fuelled initially by the MDGs, which placed a heavy emphasis on coverage statistics catalysed efforts to count infrastructure built. But, attention is now going beyond coverage to examine a wider range of service parameters. There are a range of collaborative sector-wide review processes being undertaken by governments of developing countries together with other stakeholders. The second trend is that innovative monitoring methods and tools are developed and increasingly used to increase transparency and accountability among stakeholders, but also to facilitate a participatory in-depth analyse of why certain elements or processes of the service provision are not functioning as well as planned. They often use a mix of survey techniques and participatory exercises as focus group discussions. Increasingly, the data collection and storage benefits from the use of digital tools and platforms. And lastly they have in common that all methods are used to create a dialogue between users, service provider and service authority in order to create a better understanding of the issues the different stakeholders face and to agree on follow up action to improve service delivery. A range of multi-stakeholder mechanisms can support the process of turning monitoring information and sector experience into actionable lessons for the sector. Effectively linking monitoring and learning processes also requires a variety of capacities. In short, to make monitoring and evaluation a more effective tool for WASH sector improvement, requires both building demand using monitoring results for evidence based learning and improving the supply side (mechanisms, tools and capacities for monitoring). It also requires shifting the perspective from indicator- and data- driven monitoring systems to learning-oriented systems.

Developing Capacity for Country-led Monitoring of Rural Water Supplies: Experiences from Uganda

Kerstin Danert (Skat Foundation, Switzerland) and Disan Ssozi (Ministry of Water and Environment, Uganda)

Uganda's Water and Sanitation Sector Performance Monitoring is held up as a shining example. It brings together all the work that is taking place in the country and enable promising approaches and as well as gaps to be identified. The annual sector performance report consolidates the status, investment, progress and challenges. The Government achieved this over a ten-year period, starting with the gradual withdrawal of various donor-funded projects in favour of a single national programme and Sector Wider Approach. The performance measurement system is fully integrated with standard reporting by local authorities and the water utility. Each year, a Sector Performance Report captures data on practically all sector investments, geographic inequity, per-capita costs and community management for the entire country. It is used for decision-making, policy formulation and planning. In seeking ways to develop similar capacity in other countries the main lessons are in relation to inclusiveness, integration, an incremental approach and noting that performance measurement is a process rather than an event. Remarkable achievements have been made but recent with corruption scandals, the country stands at a cusp. Only time will tell if the capacity which has been developed can withstand the challenges of the countries wider operating environment.

Session 28 Fostering the adoption and adaptation of innovative solutions for water challenges

Eight years of e-learning experience on water and sanitation at UNESCO-IHE

N. Trifunović , C. M. Lopez-Vazquez and C.M. Hooijmans (all UNESCO-IHE)

The online courses in water and sanitation, run currently at the Department of Environmental Engineering and Water Technology of UNESCO-IHE, were attended by almost 500 participants in the past eight years. In principle, the curricula of these courses were geared towards low- and middle-income countries, with the didactical approaches and materials specifically designed bearing in mind limited access to the Internet, as well as focusing on a student centred approach. Somewhat surprisingly, the courses attracted large number of participants from high-income countries. Apparently, the tuition fee played a role in this case. Moreover, the number of applicants varied significantly, depending on the topic of the course; the courses with more general contents reached larger target groups, than those with specialized topics. The participation ranged from highly proactive to passive, while some participants abandoned the courses. The reasons for variable completion rate per course are not clear and need further study. Nevertheless, the course evaluations showed generally a high degree of satisfaction, implying that e-learning education is a viable option for low and middle-income countries. Several participants expressed their desire to continue studying in the online format, suggesting an alternative to obtain a professional degree through this mode of education.
