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A Performance Assessment and Evaluation of IWM Capacity Building Activities on Participatory Water Resource Management in Kenya

Cush Ngonzo Luwesi[1*], Nele Förch[2], Mary Nyawira Mutiso[1], Rose Adhiambo Akombo[1,3], Philip Wambua Peter[4], and Esam Badr[5]

1- Kenyatta University, Department of Geography, Integrated Watershed Management (IWM). P.O. Box 43844 00100 GPO Nairobi, Kenya
2- Universität Siegen, Center for International Capacity Development (CICD), Paul-Bonatz-Str. 9-11, 57068 Siegen, Germany
3- Kenya Forest Service (KFS), Climate Change Programme, P.O. Box 30513-00100, Nairobi, Kenya
4- Kenyatta University, School of Business, Department of Business Studies, Human Resource Management (HRM). P.O. Box 43844 00100 GPO Nairobi, Kenya
5- Mansoura University, Damietta Branch, Agricultural Economics, Egypt

Corresponding Author: Cush Ngonzo Luwesi

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ABSTRACT

Kenya was at the brink of an environmental disaster as most of its watersheds were experiencing water stresses, which resulted in deadly conflicts on ownership of the little available resources. In the main cities of Machakos, Nairobi, and Mombasa water supply was unreliable and limited in coverage. The Government was therefore unable to supply water services while managing the resources at the same time. In 1999, the government initiated a reform, which culminated with The Water Act 2002. The new legislation attributed the supply of water services to water-businesses and reserved itself the right to manage the resource in consultation with the public. A Bottom-up approach was suggested for the management of water resources through the creation of "Water Resource Users' Associations" (WRUAs). The latter needed to work closely with the "Water Resources Management Authority" (WRMA). But how was this new legislation to be implemented? Until 2005, no strategy was available. In pursuant of the Water Act 2002 and water sector reforms, the German International Cooperation (GIZ and DAAD) supported the National Water Resources Management Strategy 2007 (NWRMS) to enable the Water Resource Management Authority (WRMA) implement Integrated Watershed Management (IWM) approaches in Kenya. Universität Siegen (Germany) in partnership with Kenyatta University (Kenya) organized three DAAD Alumni Summer Schools in Meru, from 2006 to 2008, with the logistical and financial supports of the GIZ and DAAD. The latter were to strengthen local stakeholders' capacity in addressing issues and challenges pertaining to water resources management. This study used both qualitative and quantitative analytical tools to describe and examine the learning process put in place by the German International Cooperation to instill a participatory watershed management practice in Kenya. It assesses key actors and their respective roles, outlines challenges met, and anticipates the actual impact of these Summer Schools on the ground. Results show that DAAD Alumni played a major role in training local stakeholders in designing, organizing, implementing, monitoring and evaluating participatory water resources management plans. Both locals and professionals, mainly constituted by WRUA and WRMA representatives, played a key role during case studies, the interpretation of the law and governmental policies, as well as providing local expertise during fieldwork. The learning process involved a holistic and interdisciplinary approach of problem assessment and resolution. Thus some participants may have been challenged to interact freely and easily with unacquainted ones while others were monopolizing the debate. Nevertheless, the final outcome was positive and greatly contributed to the development of a sustainable and integrated watershed management approach that is being implemented at the local level in most of the watersheds of Kenya. That is why the authors of this paper recommend the concept of the DAAD Alumni Summer School as an innovative tool for facilitating sustainable exchange of knowledge and skills to local stakeholders for their participation in integrated water resources management

Keywords: *DAAD, GIZ, Integrated Watershed Management (IWM), Participatory Watershed Management, Performance Assessment and Evaluation (PAE), Summer School.*

INTRODUCTION

Background to Integrated Watershed Management

Since the mid-20th century, the world is facing unprecedented socio-economic and environmental changes, both at global, regional and local scales (Pachauri, 2004; Shisanya and Khayesi, 2007). Common phenomena such as climate variability, environmental degradation, and high population densities are becoming increasingly a burden to our ecological and biological systems (UNEP, 2000). These environmental trends are generally a direct consequence of uncontrolled human activities, and are featured by extreme events such as flooding, drought, soil erosion and mass movement, as well as massive crop yield failures (Aalst, 2006). This growing pressure on natural resources leads to loss of livelihood, food insecurity and widespread poverty (Shisanya, 1996; 2005; Earle, 2001; UNEP, 2002a; 2002b).

Given this background, sustainable management of natural resources has become ever more relevant and requires swift and integrative decision-making processes that directly address the above challenges. There is need for a response that, on the one hand, enhances the adaptive capacity of countries and communities towards change; and on the other, ensures the sustainable utilisation of resources (UNEP, 1989). Management systems at the lowest environmental level, such as a hydrological watershed, are seen as key to integrative and sustainable natural resources management. The watershed represents the smallest environmental unit that needs to be managed effectively and efficiently using a framework based on both environmental indicators and socio-political and economic parameters (Krumme, 2006). Integrated Watershed Management (IWM) therefore recognises the interdependency of social, political and economic systems with biological and ecological ones within the hydrological limits of the watershed. Any planning, monitoring and evaluation process shall be anchored within such a framework to enable sustainable use of natural resources and increase the resilience of communities living therein in the course of climate change (Obando and Shisanya, 2006).

Methods used for sustainable management of natural resources may vary, but the key to success is the integration of these different approaches to link indigenous knowledge with scientific know-how and come up with implementable and sustainable management strategies (UNEP, 1997). Thus a bottom-up approach that enables stakeholders to apply simple measures shall be promoted to increase use-efficiency and effective conservation of natural resources, and to guarantee sustainability of watershed resources. Local stakeholders also need to play a pivotal role in the collection and analysis of information, and in setting performance indicators for the monitoring and evaluation of their watershed management plans (Winnegge, 2006). Hence, a top-down approach that ignores community members' expectations, fears, and experiences is to be avoid. The latter may result in tremendous economic transaction and opportunity costs (Perret, 2006), which in turn may foster social and environmental externalities that lead to resource scarcity and inefficient productivity of natural and human resources (Shisanya, 2005; Figueres, 2003; Luwesi, 2010).

Due to its low level of resilience, Sub-Saharan Africa is one of the main regions in the world that is vulnerable to climate variability and change, and is in dire need for preventive measures for the conservation of water and land related resources. More than 70% of the population within this region depend on livelihoods directly linked to water resources, including agriculture, fishing, agri-food industry, hydropower generation and so on (Ericksen, 1998). Since the adoption in 1992 of the UN Framework on Climate Change (UNFCC) and the "Agenda 21" of the UN Conference on Environment and Development (UNCED) numerous Sub-Saharan countries have established "Strategic Action Plans" (SAP) for the efficient management of their watersheds. The 1997 Kyoto Protocol further emphasized the need for a participatory approach in environmental management with the aim of achieving equitable and sustainable utilization of water and land related resources (Förch, 2005). It is thus expected that environmental amenities could be alleviated, destructive practices discouraged, and water related conflicts addressed by stakeholders themselves. This could enforce a price elasticity of water demand that tends to encourage a sustainable use of water resources, particularly in highly vulnerable lands (Shisanya and Kwena, 2005; Förch, 2005; Luwesi, 2010; Luwesi, 2012).

Water Sector Reforms in Kenya

Kenya was at the brink of an environmental disaster as most of its watersheds were experiencing water stresses, which resulted in deadly conflicts on ownership of the little available resources. In the main cities of Kitui, Machakos, Nairobi, and Mombasa water supply was unreliable and limited in coverage. The Government was therefore unable to supply water services while managing the resources at the same time. In 1999, the Government of Kenya (GoK) initiated a process of water sector reforms that culminated with the release of the "*Water Act 2002*" (Republic of Kenya, 2002). All previous policies and programmes related to the conservation of water sources and water bodies (i.e. lakes, streams and rivers) were thence subject to this new Act. It provided mechanisms for complaints, public notification and consultation (Section 107). Section 15 of the Act empowered the Water Resources Management Authority (WRMA) to formulate Catchment Management Strategies (CMS) for the management, utilization, development, conservation, protection and control of water resources. This was to be done in consultation with local stakeholders gathered around an entity known as the "Water Resources Users' Association (WRUA) (Fig. 1).

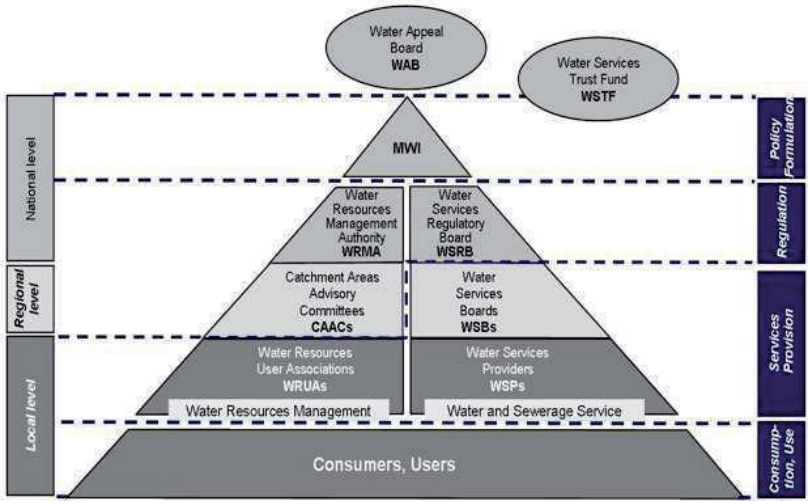

Figure 1. The institutional water sector framework of Kenya enacted in 2002 (GoK, 2002)

The National Water Resources Management Strategy (NWRMS) outlined major issues and challenges faced as well as key objectives and strategies that would address these issues (Republic of Kenya, 2007). It emphasized the application of IWM principles to support Kenya's social and economic development, and required substantial investments in the water sector (Ngigi and Macharia, 2007). The implementation of these reforms was directly supported by German International Cooperation, which in time brought on board German development organisations such as GTZ, DAAD, DED, KfW, and InWent. In cooperation with Kenyatta University, the Universität Siegen, the German Academic Exchange Service (DAAD) and GiZ, designed and implemented three (3) DAAD Alumni Summer Schools in Meru (Kenya). They brought together former German universities' Alumni (DAAD Alumni) alongside IWM practitioners and local stakeholders. These forums focused on capacity building for the implementation of IWM plans. Hence, they provided a ground for development of implementable strategies that address major challenges facing watersheds in the country. The Bwathonaro and Ngaciuma-Kinyaritha watersheds of the Tana River Basin were retained as pilot areas for implementations of the new water rules (Obando and Shisanya, 2006).

Evaluation Questions and Objectives

This evaluation answers the following question: To what extent have the DAAD Alumni Summer Schools helped WRMA to enhance the capacity of local stakeholders in participatory water resources management? The answer to that question was guided by the following queries:

a) What type of learning process did DAAD Alumni Summer Schools put in place to build the capacity of local stakeholders in planning, managing, monitoring and evaluating participatory watershed management?
b) What strengths and weaknesses can be anticipated from this learning process?
c) What outcomes of the DAAD Alumni Summer Schools can be anticipated on capacity building in participatory watershed management?

Answers to these specific questions enabled the formulation of the following objectives:

a) To examine the learning process put in place by the organizers to build local stakeholders' capacity in watershed planning, management, monitoring and evaluation.
b) To determine the opportunities and challenges arising from this process.

To predict the effects and impacts of the summer schools on capacity building in participatory watershed management

MATERIALS AND METHODS

Research Design

The study adopted a descriptive design to explore the new approach adopted by the GIZ and DAAD to build the capacity of local stakeholders in the management of their watershed resources. It enabled researchers to understand the event and its contextual situation in order to organize the findings and let them fit with explanations and tests that validate these explanations (Krathwoh, 1998). The study was also concerned with gathering narrations of facts and characterizing individual or group experiences and situational variables (Borg and Gall, 1996; Kothari, 2009). This was useful for answering the "what"

questions pertaining to the current status of the IWM capacity building activities in Kenya in order to predict their further outcomes on participatory watershed management (Mugenda and Mugenda, 2003).

Sampling and Data Collection

This study was basically an analysis of DAAD Alumni Summer Schools' documents provided by the organizers and an online participants' observation (see: http://fwu.fb10.unisiegen.de/bkd/summerschool.htm). A systematic random sampling was used in order to ascertain some of the observations made in the above reports. A survey was conducted online in 2009 with the 30 participants, who took part to the DAAD Alumni Summer School 2008, since a majority among them took part to most of the workshops organized since 2006. This online survey was based on an open-ended questionnaire that was submitted online.

Data Analysis

An analysis of the strengths and weaknesses as well as the anticipated outcomes of the summer schools on capacity building for the implementation of IWM principles in Kenya was conducted using both qualitative and quantitative descriptive techniques of data analysis. The latter assisted in comprehending expected effects and impacts of the capacity building process as well as the challenges resulting from integrating people from diverse backgrounds in a complex participatory learning process. Owing to the fact that the study used an open-ended questionnaire, pattern/ content analysis was the best analytical technique to be adopted. It aimed at categorizing participants' experiences during the summer schools and their expectations arising from these forums. Naturally, the first step for sensing the pattern or content of the discussions consisted of pre-processing data through labeling and coding of each statement provided by the participants. To narrow down the list of all possible categories, specific themes and sub-themes were adopted to record only the statements that were relevant to the topic. The following are sub-themes that were retained in this study: (1) Key actors and their roles in the participatory learning process; (2) Organization of the participatory learning process; (3) Challenges and opportunities arising from the participation to summer schools; (4) Effects of the summer schools on capacity building; and (5) Impacts of the Summer Schools on participatory watershed management in Kenya. Having checked their occurrences in the spreadsheets, further sub-categories were derived from each category, based on specific types of participants and their needs. Then, researchers were able to conduct descriptive statistics to record the frequencies or means of each sub-category and tabulate its pattern or content in the discussion.

Study Area

This study covers the participatory learning process initiated by the German International Cooperation in two watersheds of Kenya located in Imenti North District, namely Bwathonaro and Ngaciuma-Kinyaritha of the Meru region (Fig. 2).

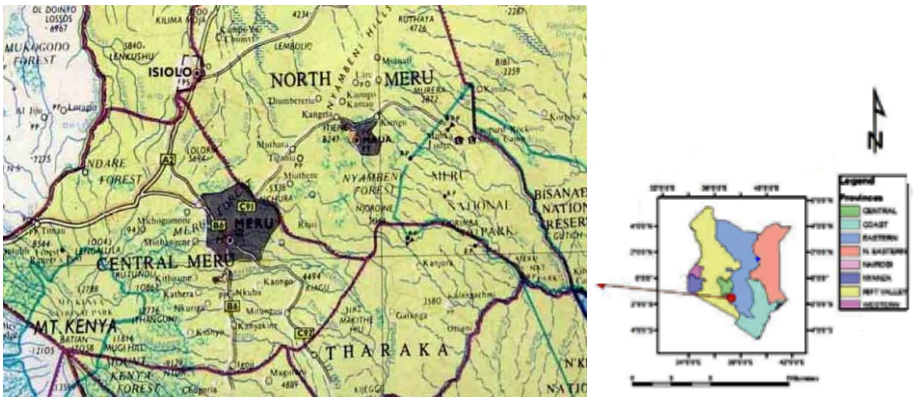

Figure 2. Location of the study area in the map of Kenya (Förch, 2008)

The Bwathonaro watershed has an approximate population of over 46,000 inhabitants that mainly depended on agriculture for livelihood (Agwata, 2006). Bwathonaro River drains into the Tana River, covering a watershed area of 149 km^2. Challenges by local stakeholders faced include pollution; human-wildlife conflicts over water resources; increasing illegal water abstractions and over-abstractions for irrigation; widespread soil erosion; springs and wetlands degradation; and the emergence of water unfriendly trees (e.g. eucalyptus). The Bwathonaro Water Resource Users' Association (BWARUA) was created in 2005 to develop a participatory watershed management plan with the support of the WRMA. To guide water resources management in this watershed, a participatory management plan was developed during the DAAD Summer School 2006. The drafted plan was to be implemented over a period of five years. The first monitoring and evaluation was done in

August 2007, the second in November 2008. Some activities pertaining to this implementation were short-termed (0-2 years) while others were medium termed (2-5 years).

Unlike Bwathonaro, the Ngaciuma-Kinyaritha watershed originates from Mount Kenya Forest and drains into the Kathita river basin, which in turn flows into the Tana River Basin. Its watershed covers an area of 167 km^2 and feeds an approximate population of 65,000 people (Republic of Kenya, 2008). Due to the challenges faced by Ngaciuma-Kinyaritha Water Resource Users' Association (Ngakinya WRUA), a participatory management plan was developed during the DAAD Alumni Summer School 2007. The drafted plan intended to address water resource conflicts, following key issues of illegal abstractions and over-abstractions, reduced streamflow, wetlands' encroachment, degraded water quality and others. The first monitoring and evaluation activity was conducted in November 2008, and covered activities of 8 months, the implementation being interrupted by the post-election violence that consumed the country from December 2007 to March 2008. Moreover, a water demand management plan was developed during the DAAD Alumni Summer School 2008, and it was to be implemented in the short-term (0-2 years) and the medium-term (2-5 years).

RESULTS AND DISCUSSION

Key Actors and their Roles in the Participatory Learning Process

The idea to implement DAAD Alumni Summer Schools in Kenya was first discussed during the DAAD Alumni Summer School 2005 held in Siegen, Germany. Fig. 3 indicates the key players and topics discussed during that summer school. The DAAD Alumni Summer School 2005 focused on "Topics of Integrated Watershed Management" and brought together professionals and academics from eight different countries, namely Cambodia, Ethiopia, Germany, Kenya, South Africa, Uganda, Tanzania, and Vietnam. This forum gathered participants with diverse backgrounds to exchange ideas on integrated methods of managing watersheds. These encompassed geographers, engineers, foresters, agriculturalists, social scientists, economists and other scientific fields. Participants agreed on enhancing scientific cooperation between Germany and East-Africa as well as building a network. The relevance of an interdisciplinary approach was recognized as a channel for linking scientists from different fields to work together in IWM. However, this cooperation was to be enhanced through the postgraduate IWM programmes established at Kenyatta University (Kenya), Makerere University (Uganda) and the University of Dar es Salaam (Tanzania) as well as the Capacity Building on Integrated Watershed Management Network for Eastern Africa (IWMNet) coordinated by the Center for International Capacity Development (CICD) of the Universität Siegen.

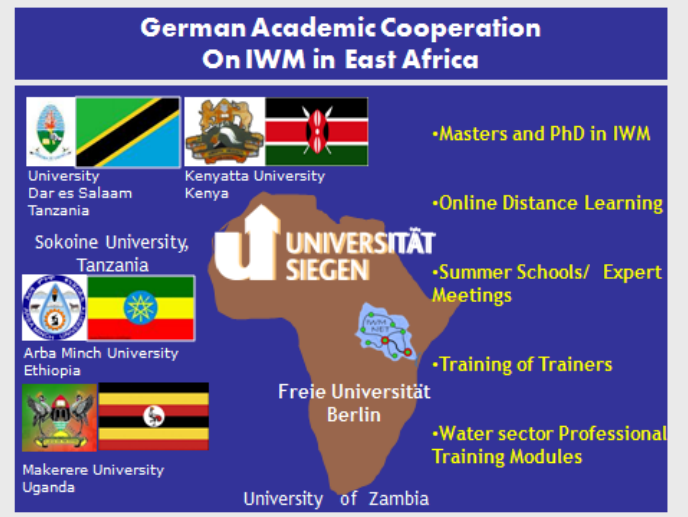

Figure 3. key players and subjects of discussed during the summer school 2005

The DAAD Alumni Summer School 2006 focused on the development of a "Participatory Watershed Management Plan" for the Bwathonaro watershed. The watershed management plan was guided by several policies on environmental protection, water resources management and development, and poverty reduction. It was built on the recently formulated "Catchment Management Strategy" (CMS) for the Tana Basin. The third Summer School (2007) focused on "Participatory Monitoring of Sub-Catchment Management Planning" for the Bwathonaro watershed as well as 'Participatory Sub-Catchment Management Planning" for the Ngaciuma-Kinyaritha watershed. After a quick evaluation, new interventions, performance indicators, timeframe and budget were formulated for Bwathonaro watershed as well as Ngaciuma-Kinyaritha. The fourth and final Summer School (2008) focused on the development of a "Participatory Water Demand Management Plan" for Ngaciuma-

Kinyaritha watershed. Participants also assessed activities reported by Ngakinya WRUA and BWARUA on their own implementation of the "Sub-catchment Management Plans" (SCMP), which were formulated during the previous summer schools.

These Summer Schools of Kenya gathered a total of 100 participants from six countries, namely Egypt, Germany, Kenya, Tanzania, Uganda and Zambia, and nine nationalities (the above six listed countries plus China, DR Congo and France). Table 1 shows that about five out of seven (5/7) participants came from Kenya, one out of seven (1/7) from Germany, and one out of seven (1/7) from Tanzania and Uganda put together. These participants were grouped in five principal categories: DAAD Alumni, WRUA members, WRMA representatives, students and others stakeholders (Fig. 4).

The alumni were invited to train other participants in watershed planning, management, monitoring and evaluation processes, as well as in methodological approaches in IWM. WRMA officials were called in order to provide a keen interpretation of the law and of governmental policies. WRUA members were the major beneficiaries of the summer schools. They were also regarded as major representatives for community interests, awareness creation on the water sector reform, and summer schools participants' guidance on key issues occurring on the ground. Students and other stakeholders were invited to insure the sustainability of the summer schools' impact through further awareness creation, scientific research, etc.

Table 1. Distribution of participants based on their country of residence

No	Country	2005	2006	2007	2008	TOTAL	Percent
1	Cambodia	1				1	0.78
2	Egypt			1		1	0.78
3	Ethiopia	2				2	1.56
4	Germany	4	2	4	7	17	13.28
5	Kenya	12	19	28	26	85	66.41
6	Tanzania	6	2		2	10	7.81
7	Uganda	1		2	4	7	5.47
8	Vietnam	1				1	0.78
9	South-Africa	1				1	0.78
10	Zambia		1	2		3	2.34
	TOTAL	28	24	37	39	128	99.99

Source: Tabulated from Förch et al. (2005; 2006; 2007; 2008)

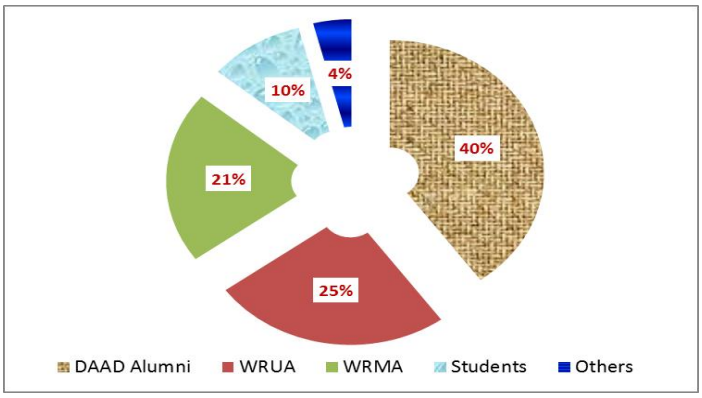

Figure 4. Participants' distribution by affiliation (compiled from Förch et al., 2006; 2007; 2008)

During the 2009 survey, three key actors were pointed out in the participatory learning process introduced by German International Cooperation, namely DAAD Alumni (including students), WRMA officials and WRUA members (including other professionals and stakeholders). Fig. 5 displays the key roles played by DAAD Alumni in building other participants' capacity during the participatory learning process.

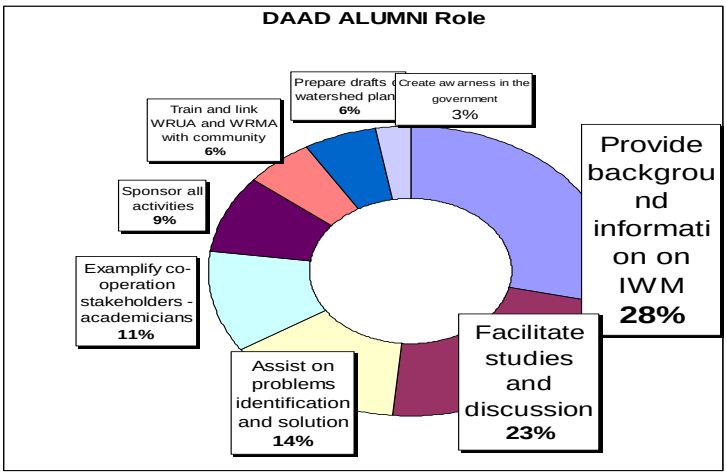

Figure 5. DAAD Alumni roles in the participatory learning process (Förch & Ngonzo, 2009)

These survey results emphasize on the Alumni input on providing background information and relevant materials, evaluating and monitoring them based on their professional know-how (28.57%). They also show that the academics displayed leadership during studies and investigations as well as facilitation of discussions among participants (22.86%). They were most likely good in linking theory to practice in order to identify problems and solve them (14.29%). They have thus set an example of educated peoples, who can relate different stakeholders in the management of a their watershed resources (11.43%). Some participants believed that Alumni have sponsored all activities pertaining to the summer schools, both financially, materially and personally (with their human resources) (8.57%). They also played a key role in the development and improvement of watershed management plans (5.71%), as well as building linkages between local watershed institutions (WRUA and WRMA) and the communities living in the watershed during the training (5.71%). At the same time, they created awareness among WRMA officials and the government on vital issues pertaining to watershed management in Kenya (2.86%).

When asked "what was the role of WRMA officials during the learning process?" the majority of participants responded that they provided technical advices on the interpretation of the law and subsequent regulations and policies underlying its enforcement (40%). Moreover, using their professional know-how they facilitated case studies by providing factual data on water resources used by stakeholders, as well as pertinent information on the implementation of the water sector reforms on the ground (34.29%). A proportion of participants thought that WRMA officials acted as a control group between the Alumni and WRUA members, thus discouraging a strong cooperation between the two groups. Nonetheless, some praised WRMA officials for building a connection between communities on the ground and the Government of Kenya (5.71%). They also shaded light on WRMA core business of protecting, conserving and preserving water resources (5.71%). Only 2.86% among the respondents abstained themselves from commenting on the role of WRMA officials during the summer schools. Fig. 6 summarizes the contribution of WRMA representatives to the participatory learning process.

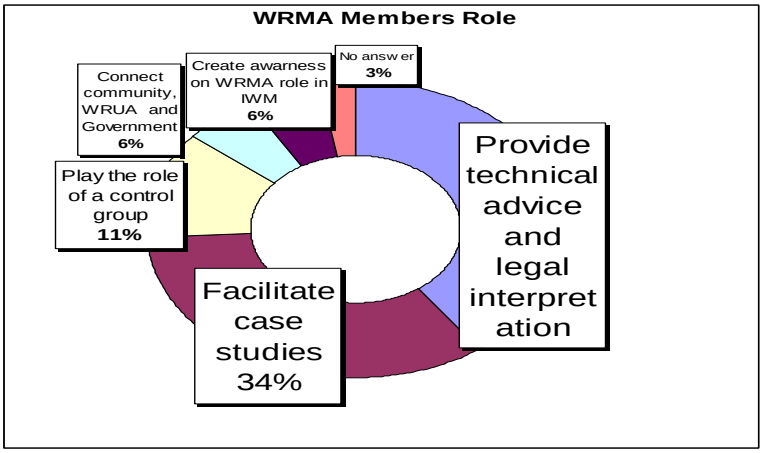

Figure 6. WRMA officials' roles in the participatory learning process (Förch & Ngonzo, 2009)

To the question "what role did WRUA members play during the learning process?" participants evoked several interventions of WRUA members during the summer schools (Fig. 7).

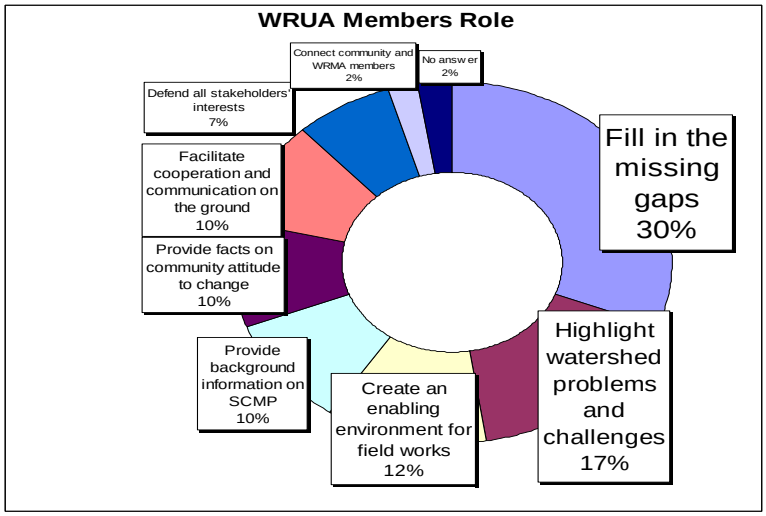

Figure 7. WRUA members' roles in the participatory learning process (Förch & Ngonzo, 2009)

Some among the participants felt that they filled the missing gaps on watershed problems and practices on the ground based on their strong professional experience (30.95%). They also highlighted key issues leading to resource conflicts and challenges that need to be solved by their management (16.67%). Some others evoked the enabling environment that they created and the guidance they provided during fieldworks (11.91%). WRUA members could thence facilitate communication and cooperation between Alumni and local stakeholders (9.52%). Similarly, they set a connection between the government (through WRMA) and local communities (2.38%). Meanwhile, another group of participants asserted that WRUA members participated actively in the development and the implementation of the watershed management plans (9.52%). Also, they provided food for thought for changing the attitudes of community members towards the water sector reforms, and explained challenges facing the implementation of governmental policies and programmes on the ground (9.52%). Nevertheless, they acted as defenders of all local stakeholders and their interests for equitable distribution of watershed resources (7.14%). Only a few among the participants did not provide any answer on the role of WRUA members during the summer schools (2.38%).

Organization of the Participatory Learning Process

DAAD Alumni summer schools involved a direct and interdisciplinary learning process involving community members and other key stakeholders. The latter were trained by Alumni and outside consultants on concepts and field techniques pertaining to Integrated Watershed Management (IWM). They had at the same time the opportunity to share their experiences in the field during workshops and fieldworks. The summer schools aimed at building their capacity to gather information from the ground, to analyze the problems, to plan and solve them, based on their own understanding. WRUA members had a chance to monitor and evaluate watershed management by assessing their achievements and measuring the success of their former plans. They also set measurable indicators for the work they had to perform in the following periods (financial years). At the end of the process, they made recommendations for optimizing the implementation of their plans on the basis of their findings in the field. WRMA officials were able to explain more adequately principal regulations on water resources and their implementation in the watershed. Participating Alumni and outside consultants therefore played the role of facilitators in the learning process. They restrained themselves from checking and judging the outcomes of local stakeholders' decisions based on their personal opinions.

The fact that these summer schools offered a good environment for acquiring and sharing knowledge was attested by long discussions, case studies and explanations evoked by the participants. However, Alumni may have dominated those discussions using their strong theoretical backgrounds. This is substantiated by interminable debates during which representatives of WRUAs and WRMA, and other key beneficiaries of the summer schools were out of track. Also, their participation to the planning, monitoring and evaluation processes could have been factual. It may have been more interesting for Alumni to go straight to the business by showing the practicality of the theories on the ground through problems identification and resolution. This would have avoided miscommunications among participants. WRMA officials were praised for being defenders of the law and of governmental policies. Their input during case studies was also well appreciated by the participants. Yet, they may have fallen in a wall pit characterized by self-defence, hiding some weaknesses that needed to be

addressed during the summer schools. Also, being the main providers of funds to WRUAs, their defensive attitudes would have threatened WRUA members, discouraging to interact and express themselves freely on those weaknesses. This might have been one of the reasons why some participants felt that the summer schools were not such environments enabling free cooperation and easy interaction among participants, despite the fact that a majority among them rejected such a statement. Concerning WRUA members, their guidance in the field, reports from the previous summer schools, and the lack of clear records on achievements and financial matters are key highlights of their involvement in the participatory learning process. WRUA members usually targeted some sites were there was apparent achievements from the planned activities, even though these activities may have been achieved by other social groups. Such self-defensive attitude may have distorted the results of the monitoring and evaluation process. Therefore, more exposure is needed in the future, to allow thorough investigations and acquaintances with the WRUA management tools, methods and realizations.

To come up with a management plan for monitoring and evaluation purposes, several approaches were used during the summer schools. This study retained ten of them. First of all, DAAD Alumni and representatives of the Universität Siegen and Kenyatta University introduced the conceptual background of the Summer Schools through various presentations. An introduction was given on IWM, on the Tana River Basin, and Bwathonaro and Ngaciuma-Kinyaritha watersheds.

Secondly, watershed delineation and organization were outlined, as most participants were unfamiliar with the watersheds. These included the topography, geology, vegetation cover, protected areas, land use and others. Hydrological processes were introduced (including surface, ground and vadose water storages). Before any field research, Alumni provided photographic images often merged with other data into layers of a Geographic Information System (GIS). Other data containing analytical information on the watershed were also acquired in situ and presented. This information was used for delineating the watershed area and organizing it into three functional hydrological management zones, namely the upper, middle and lower zones.

Thirdly, field surveys were conducted in order to gain an overview of the watershed. A checklist was developed to guide quick data collection in the field. Participants used five participatory field techniques to collect information: direct observation, semi-structured interviews and photo documentation during random walks and participatory transect walks. Data collected was pre-processed and analyzed with participation of all respective group members.

Fourthly, a watershed situation analysis was conducted. Participants produced path records of relevant information to watershed planning. Major issues were identified; progress made and pitfalls during the process assessed; activities to be implemented by local stakeholders as well as communities and institutions involved in the process (policies, laws, organizations, programmes, projects, etc.) well defined.

Fifthly, a mapping and ranking of major issues were conducted. Using map data often merged with other data in GIS layers, WRUAs members were asked to locate key issues and problems identified during the field trip, using pins of various colours. A legend was defined for labelling each issue. Afterwards, using coloured stickers, these issues and problems were ranked based on their urgency, according to their occurrences during the last twelve months, and in relation with the importance attributed to them by community members.

Sixthly, quick checks were made after the presentation of achievements and challenges by WRUAs. The other participants had to confirm these assertions by linking them to field observations using a monitoring data collection matrix. They were thus able to develop a monitoring plan for the coming period (financial year). WRUAs had to develop watershed monitoring maps for the same purposes.

Seventhly, comparability and attribution analysis: The schedule and methodology used did not allow a thorough evaluation of the watershed activities during the September 2006 to August 2008 financial years. This was justified, among other factors, by the very limited time given for monitoring and evaluation field trips, disturbances due to political disruptions, unrepresentative sample sites, and poor methods used by WRUAs to record streamflow data. Moreover, insufficient financial skills, lack of clear reporting of financial indicators for equipments, operational costs and other quantitative records contributed to this opacity, hence lack of attribution of achievements assessed in the field.

Eighthly, strategic management and planning: during each summer school a new framework was developed to accommodate regular monitoring and evaluation of the management plan for each watershed's subdivision (upper, middle and lower zone). The formulation of performance indicators and corrective measures often raised interesting debates. However, after discussion with the WRUA members on the general framework to be used by them in the participatory watershed management, the following format was retained: (1) Problems identified in the year X; (2) Interventions proposed for the year X+1 and onward; (3) Activities predicted for the year X+1 and onward; (4) Timeframe of activities for the year X+1 and onward; (5) Indicators for monitoring and evaluation for the year X+1 and onward; (6) Results to be recorded, monitored and evaluated in the year X+1 (including achievements and non-achievements); (7) Data required for the year X+1 and onward; (8) Means of verification of results for the year X+1 and onward; (9) Responsible institutions and other actors interested in the implementation of the plan; and (10) Financial and technical assumptions.

Ninthly, operational management planning: on the basis of the CMPs, one budgeting commission has been constituted for each zone (upper, middle and lower zones) in order to set financial provisions. WRUAs developed a GANTT diagram

indicating the timeframe for each activity, the allocated budget for each activity and period, and the persons responsible for the achievement of each activity. Also, a VENN diagram or Stakeholder map was designed in order to map relations between different stakeholders and actors relevant to IWM within the watershed. The diagram indicated whether there is a strong, normal or stressed relationship or even an open-conflict between the WRUA members and other institutions or actors. WRUAs also identified strategies to address weak relationships.

Finally, participants to the summer schools learnt a pertinent approach of formulating monitoring and evaluation remarks, taking into consideration other participants status, namely Alumni, community members, WRUA members and WRMA officials. They came up with some practical observations based on the key challenges assessed and proposed outcomes. The plenary was to approve some of these recommendations and reject others**.**

Opportunities and Challenges Arising from Participation to the Summer Schools

Major Challenges and Weaknesses of the Participatory Learning Process

Mixing up people of different backgrounds in a learning process is always prone to tough challenges. The organizers of the summer schools probably knew that DAAD Alumni would dominate the debate, using their powerful scientific backgrounds. According to 35.9% of the participants, there was sometimes a communication breakdown during the learning process. Also, longer scientific discussions and explanations of scientific materials to local stakeholders were somehow time-consuming (30.8%). It was always difficult to keep local stakeholders and new participants on the track, especially during scientific debates (18.0%), just as it was tough to get consensus from various groups (12.8%). Few among the participants felt that the summer schools did not create a conducive environment for free cooperation and easy interaction among participants (2.6%).

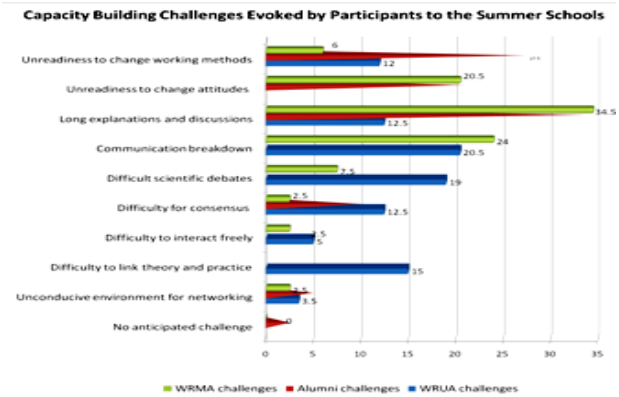

Figure 8. Major challenges encountered by participants ((Förch & Luwesi, 2010)

Some Opportunities Offered to Participants During the Summer Schools

Though mixing people of different backgrounds in the participatory learning process was a challenge for the organizers, the selection of key players in the process has proved to be the key to success. About half of the participants (40%) believed that the summer schools built a participatory learning process that was workable, well documented and harmonized (Fig. 9).

Figure 9. Opportunities offered to participants during the summer schools (Förch & Luwesi, 2010)

Many participants (13.3%) thought that the summer schools offered them an opportunity to watershed professionals to network, cooperate and exchange their experiences. They also opened a route to WRMA, WRUA and community members to change their attitudes toward water sector reforms, and the use of natural resources and innovative methods for managing them (13.3%). Quite a number of participants witnessed such a conducive environment for free cooperation and easy interaction despite their different backgrounds (10.0%). The summer schools also enabled common understanding of concepts and issues involved in Integrated Watershed Management (10%). Likewise, they presented tangible ways of managing efficiently and effectively watershed resources (10%). A few among the participants (3.3%) said that the linkage between theories and practicals on the ground was the major merit of the summer schools.

Direct Effects of the Summer Schools on Capacity Building

Effects of the Summer Schools on Participants

The organizers of the summer schools expected many positive results on stakeholders' capacity building, following the learning process put in place. Likely, most of the participants to the DAAD Alumni Summer School 2008 did not have any reservations to acknowledge that, after having done a quick check on the pertinence of the results obtained in their daily life. For instance, when asked, "what was the effect of the summer schools on you?" most of participants responded that they had an opportunity to share their experience on management and build their own capacity (27.5%). Others recognized that the summer schools enhanced their knowledge and ability to manage watershed resources (22.5%). Some declared that the summer schools gave them an opportunity for networking and fostering local, regional and international cooperations in watershed management (12.5%). Some participants confessed that it was their first time to use participatory and interdisciplinary approaches in field research and during participatory watershed planning, monitoring and evaluation (12.5%). Another category revealed that the summer schools were a good initiative for working with communities on the ground (10%). A few among participants noticed that the summer schools made them more aware of issues pertaining to water scarcity and its inequitable distribution as well as inefficient use (5%). Others confessed that they had a good exposure for future management and career development (5%). Some others found new avenues for further researches in IWM (2.5%). The remaining 2.5% did not anticipate any impact of the summer schools on their professional life.

Effects of the Summer Schools on Local Watershed Management Institutions

To the question "what was the impact of the summer schools on local institutions managing the watershed?" a number of participants believed that they have improved the knowledge and skills of WRUA managers and WRMA officials in the management of their water resources (29.1%). Others thought that they created awareness on positive and negative impacts of activities carried out in the watershed (16.1%). Another group pointed out to the effectiveness of methods used in evaluating watersheds (12.9%), and the opportunity offered to public managers for self evaluation (12.9%). Some evoked new avenues offered to them for networking with other knowledgeable professionals (9.7%), and improving communities' living standards (6.5%). A few number among participants (3.2%) talked of effective ways of working with communities in natural resources management for successful implementation of the water sector reforms (3.2%), and for conflicts resolution on resources use (3.2%). The remaining 3.2% did not anticipate any effect of the summer schools on the capacity building of water sector management institutions.

Yes, WRMA officials particularly learnt how to measure the actual impact of their Catchment Management Strategy (CMS) on the ground using continuous assessment tools of the environment and, monitoring and evaluation of the management process. Therefore, local communities were empowered with capabilities to manage effectively their vulnerable water resources and related resources using their financial and material means as well as their manpower. They were offered opportunities to network with all stakeholders living in the watershed, to cooperate and to share relevant information on the new water laws, policies and regulations. Interrelations between different stakeholders were known through a logical design defining the functions of some and roles of others, and the type of relation or cooperation existing among them. They were encouraged to support the enforcement of the IWM principles in their respective watersheds. An emphasis was put on rules related to equitable allocation and use of the resources among homogenous hydrological units and different groups of stakeholders and interests to sustain water balance and gender equity. An agreement was to be made with all stakeholders on the future quantity and quality of water resources to be conserved. For that purpose, WRMA was to set measurable standards of water protection and storage, good land husbandry and conservation.

Effects of the Summer Schools on Local Communities

Responding to the question "what was the effect of the summer schools on local communities?" the majority of participants said that they had a better understanding of physical processes occurring in their watershed, and of their role in the conservation of their natural resources (30%). Some 16.7% asserted that awareness was created among them on sustainable watershed management, while another 16.7% stated that they opened a highway for dialogue and communication on proper

resources distribution and management with other stakeholders in order to avoid conflicts in the watershed. Likewise, they offered an opportunity for networking and cooperating locally, regionally and internationally in watershed management (10%). Some scattered groups echoed that awareness was created on the existence and activities of WRMA and WRUA, and the opportunity given to communities for evaluating them (13.3%). Others anticipated a change of attitude among community members towards the water sector reforms (3.3%), and a rise of income generating activities in the watershed (3.3%). Only 6.7% among the participants did not find any possible effect of the summer schools on the communities.

Local stakeholders were expected to use their technical know-how for identifying the issues on the stake, setting agenda and developing plans for addressing the issues of water scarcity and conflicts on resource use. The summer schools provided them with an enabling environment for training on water policies implementation, strategic and operational management, institutional coordination of efforts made by local stakeholders, and monitoring and evaluation of watershed management. Political and technical strategic issues were articulated into management tools and merging organizational tools such as water sector reform legislations, policies, programmes, tactical projects, budget lines and schedules, functional and relational designs.

Impact of the Summer Schools on Participatory Watershed Management in Kenya

The summer schools really offered a good environment for learning and building capacity. However, whatever materials learnt and abilities acquired, their impacts will not be felt if local stakeholders do not change their perceptions and attitudes toward water scarcity and its efficient use. Therefore, DAAD Alumni were expected to transfer their academic competence, professional expertise and know-how in IWM to local stakeholders during the workshops and fieldworks. Then, a progressive change of attitudes and behaviours from water users would follow, while watershed managers would be using new working methods. There was also a need to assess the degree to which WRUA and WRMA officials were applying the methodological approaches learnt for planning, monitoring and evaluating water resources to raise funds and address major issues and challenges facing their watersheds. Participatory approaches for a good husbandry, management and governance of water resources were as well to be emphasized during the implementation of the water sector reforms. Finally, awareness raised on negative impacts of community activities on the physical environment needed to be assessed for further guidance. These issues were tackled during a training workshop organized by the Water Resources Management Authority (WRMA) in Meru in January 2010, with facilitation of the CICD/ Universität Siegen and Kenyatta University. Several challenges and outcomes of this IWM capacity building process were once more revealed by the participants. The following are considered as key impacts of IWM capacity building activities on the implemntation of the whole water sector reforms in Kenya (WRMA, 2010). One, in less than two years, 292 WRUAs were busy creating awareness on the Kenya water sector reforms, and 80 among them had well developed plans for the management of their water resources, following capacity building activities in Bwathonaro and Ngaciuma Kinayaritha Catchments. Two, WRMA had for over two years adopted participatory approaches in implementing water rules, water use charges and effluent discharge control plans, for monitoring illegal water abstractions and watershed protection with support of the WRUAs in the six large basins of the country, namely: Athi, Ewaso-Ngiro, Lake Victoria North, Lake Victoria South, Rift-Valley, and Tana. Three, illegal water abstractions had been reduced by approximately 30% in the upper parts of most watersheds, and 70% in the middle and lower zones. Four, KES 126,104,300 (about US$ 1,801,490) were raised from water users in 2009. Five, about 21.9% of large scale water users and 78.1% small scale ones were complying with the new regulations. Finally, only 7 cases of gross offenses were filed to Water Appeal Boards (WABs), decision was made and parties complied with the ruling of the WABs.

Conclusions and Recommendations

Conclusion

Organizing a participatory learning process in IWM requires a holistic vision of the realities of the watershed. Many financial and material resources are involved as well as human resources. It also necessitates the participation of professionals from different research fields in an interdisciplinary team. Thus some participants may be challenged to easily interact while others may monopolize the debate, inhibiting free communication flow among them. The German International Cooperation (GiZ and DAAD) faced such kind of challenges when organizing the DAAD Alumni Summer Schools 2006-2008 in Kenya. These forums aimed at building capacity on the objectives and strategies that address major issues and challenges facing watersheds in Kenya. Nonetheless, the final outcome of this participatory learning process was that watershed stakeholders' capacity was built on sustainable and effective management of their natural resources. Stakeholders from Imenti North District of Kenya (Bwathonaro and Ngaciuma-Kinyaritha watersheds) had the opportunity to host such gatherings thrice (in 2006, 2007 and 2008). They have learnt new concepts, innovative methods of approaching problems in a watershed and solving them. Local water institutions (WRUAs and WRMA) have enhanced their understanding of critical issues threatening their watersheds through participatory discussions, field visits and comparative case studies. Other local stakeholders were more enlightened on positive and negative impacts of their activities on the physical environment of their watershed. They are now aware of methods of water resources protection, conservation and preservation, as well of effective ways of solving conflicts on natural resources. In a nutshells, all the participants witnessed an enhanced knowledge and ability to manage water

resources. They declared having had the opportunity to evaluate themselves, and build linkages with other professionals locally, regionally and internationally. These may be accounted as valuable outcomes of the DAAD Summer Schools of Kenya.

Lessons Learned

Kenya was at the brink of a water disaster when the German International Cooperation (GiZ and DAD) offered its assistance for enhancing public participation in the implementation of the national water sector reforms in the whole country. DAAD Alumni Summer Schools 2006-2008 were the first landmarks of a process that led to participatory water resources management in Kenya using holistic and interdisciplinary approaches. Nonetheless, having dealt with a multidisciplinary team, participants needed at least be conversant with the theme and its main concepts prior embarking to their journey. Some may have even not look at the materials to be examined; so they were out of tract in the learning process. To avoid a total breakdown of the audience, the moderator needed much time for explanations. It would have been desirable that Alumni (along with other academicians and IWM students) discuss first the materials and methods in private workshops prior the plenaries. Then a pre-conference could have dealt with theoretical training of all the local participants and other non academic ones. And, lastly all participants could have gone to the field, collect data, analyze them and present the results harmoniously during the main sessions. A lot of time would have been saved.

Other lessons learned during this process included: (1) Stakeholders' sensitization is the starting point for a progressive change of attitudes toward a reform; (2) Sustainable management of natural resources requires stakeholders' participation in the planning, implementation, monitoring and evaluation stages; (3) Stakeholder involvement in the management of the water sector shall be perceived as a value added to good governance and sustainable development; (4) The cost of water shall be understood as a key to water security and as a response to Sustainable Development Goals (SDGs); and (5) A good evaluation of the success of the water sector reform is done where both bio-physical and socio-economic data are collected and availed.

Recommendations

Recommendations to the German International Cooperation

German development organizations were urged to initiate supplementary trainings and further researches for capacity building for the benefit of local water institutions (WRUAs and WRMA) on managerial and other relevant skills such as water governance, accounting, conflict management, and proposals writing. For that reason, they needed to enhance the criteria of selection of participants to avoid large differences in understanding and endless discussions. A smooth learning process was to be introduced through incorporation of alumni methodological sessions to prepare plenary discussions followed by participants' training pre-conferences. After the summer school, the organizers shall conduct an evaluation on the change of attitudes toward the water sector reforms by WRUA and WRMA officials, and the application of methods learnt during the summer school in their daily professional life. Finally, exportation of the summer schools' model in other watersheds was recommended for the rehabilitation and management of their natural resources. Hence, the dissemination the summer schools' results through publications, the Masters and PhD programmes in IWM, Online Distance Learning (ODel), expert meetings, Institutional Based Programmes (IBP) for Training of Trainers (ToT) and water sector professionals' refreshment were encouraged.

Recommendations to the DAAD Alumni

Scholars working in the IWM field need to conduct further researches in the pilot watersheds retained during the summer schools to disseminate the results to a large audience, including development and governmental agencies. Practical case studies are needed as ways of simplifying the explanation of scientific theories to professionals and other no-academicians. Academics also need to play advocacy roles to keep local stakeholders and professionals on the task of implementing of various materials and methods learnt during the summer schools and other regulations of the water sector reforms in Kenya. Finally, DAAD Alumni need to keep networking to cooperate and share their knowledge and experiences with the scientific community in large.

Recommendations to the WRMA Officials

To enable consistent enforcement of the provisions of the Water Act 2002, representatives of the Water Resource Management Authority (WRMA) need to coordinate activities pertaining to the implementation of the water sector reforms in the watersheds with members of the by the Water Resource Users' Associations (WRUAs). They shall ensure that tools and approaches learnt during the summer schools be implemented at the grassroots' level by WRUA officials and their members. They need thus to keep offering technical backstopping to the WRUAs for the full implementation of the participatory watershed management plans. Also, an inventory of all groups that can play a role in the management water resources (local

opinion leaders, professionals, academics, CBOs, NGOs, donors and development agencies) is to be done within each watershed to ease linkages and information flow among all stakeholders for a truly participatory watershed management.

Recommendations to the WRUA Members

WRUA members are the actual implementers of the tools and approaches learnt during the summer schools. They must use them to increase the awareness of community members on the requirements of the water sector reforms, with emphasis put on the change of attitudes and behaviours towards the new rules. They shall encourage voluntary involvement of all community members in public services through support of WRUAs' activities. They also need to enhance transparency and accountability in the use of WRUA's financial resources for the better governance of the watershed resources. Finally, WRUA officials shall at all time seek assistance from WRMA whenever the design and implementation of watershed management plan is concerned. This is applicable both during proposal writing and fund raising as well as development of watershed infrastructures**.**

Recommendations to Community Opinion Leaders

Local opinion leaders need to play a key role in compliance to the new water sector reforms, particularly with regard to acquisition of water use permits and meters. They shall cooperate with WRMA and WRUA in the dissemination of all information pertaining to IWM during cultural gatherings, religious meetings, and other community forums. Encouraging community members to accord their financial, material and moral supports to water institutions (WRUAs and WRMA) would make them more accountable to the community and enhance community participation in the development of water resources. They shall ensure that democratic practices and equitable distribution of resources are implemented within WRUAs' activities. They shall finally pledge fellow community members to restrain themselves from widening up the gap between upstream and downstream users, present and future generations, rather apply precautionary measures to contribute to sustainability in the management of water resources.

Recommendations to other Stakeholders and Participants

It is imperative that a thorough assessment of stakeholder's feedback be established to apprehend further impacts of the summer schools on the watershed. Case studies and pilot projects are thus to be initiated and disseminated to address key challenges evoked during the summer schools. Any feedback given by the participants shall reflect stakeholders' understanding of watershed processes, of the need for changing their attitudes toward the water sector reforms, and of the application of methods learnt in their daily professional life. Each stakeholder and participant to the watershed management planning shall also resource supplementary funding to support WRMA and WRUAs' activities and other pilot projects existing in the watershed, with a special emphasis put on microfinance projects. The creation of further awareness among community members, local water institutions, donors and development agencies is also a key for successful financing and implementation of participatory watershed management plans

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