NATIONAL CAPACITY BUILDING FRAMEWORK FOR WATER SECTOR

ACEWATER phase II

ABSTRACT

The Framework was developed through a stakeho engagement from water sector of Kenya i.e. Universit Nairobi, Kenya Water Institute, and the Ministry of Water Sanitation through ICPAC coordination with support f UNESCO.

ICPAC

IGAD CLIMATE PREDICTION & APPLICATIONS CENTRE (ICPAC)

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LIST OF ABBREVIATION

ACE-WATER-2	African Networks of Centres of Excellence on Water Sciences PHASE II
AUC	African Union Commission
AU-NEPAD	African Union - NEw Partnership for Africa's Development
CoEs	Centres of Excellence
ESA	External Support Agencies
EWS	Early Warning System
GIS	Geographic Information System
HCD	Human Capacity Development
ICPAC IGAD	Climate Prediction and Applications Centre
IGAD	Inter-Governmental Authority on Development
KEWI	Kenya Water Institute
KWT	Kenya Water Towers
M&E	Monitoring and Evaluation
MWS	Ministry of Water and Sanitation
NEMA	National Environment Management Authority
RS	Remote Sensing
WASH	Water, Sanitation and Hygiene
WRA	Water Resource Authority
WRMA	Water Resource Management
WSB	Water Service Boards
WSP	Water Service Providers

EXECUTIVE SUMMARY

This National Framework is an implementation of the NEPAD African Network of Centers of Excellence on Water Sciences and Technology Phase II (ACEWATER phase II)-Human Capacity Development Component. The component is an implementation of the AMCOW declaration on junior professional and technical at regional and national levels urging AUC and NEPAD Centers of Excellence to develop a "Human Capacity Development (HCD) Program for junior professional and technician levels capacity challenges in the water sector".

The declaration involves two steps; one is to establish the common sector priority for higher education institutions at regional level in Western, Central, Southern and Eastern Africa. The second step which this framework covers is the establishment of a national human capacity development program addressing junior professionals and technician level challenges in all the NEPAD CoE in Africa-in this case, Kenya. This framework is a consolidation of the findings from the desktop study on HCD and needs identified during a stakeholder's workshop held in Naivasha, Kenya which was followed up with a one day validation workshop in Nairobi. The focal persons of various institutions involved/contacted in this process represented the University of Nairobi (Prof. Alfred Opere), Kenya Water Institute (Dr Leunita A. Sumba), and the Ministry of Water and Sanitation (Mr. Dan Mogusu), with the overall coordination from the IGAD Climate Prediction and Applications Centre – ICPAC (Mr. Jully O. Ouma and Dr. Mohammed Hassan).

INTRODUCTION

BACKGROUND

In 1963 when Kenya attained independence, the per-capita water availability was 2,399m3 per year[1]. This meant that there was almost 2.4 million liters of water available for every Kenyan per year. In 2010, the available water per person was 650m3 per year[2]. Four years later in 2014, the available water had shrunk to 461m3 per person. It is estimated that in 2025, the population will strain water resources so much that only 235m3 will be available as a result of population growth[2]. Climate change will also have impact on water availability and therefore effective adaptation measures should be put in place. Climate change causes various changes in our water supply, which sometimes leads to pollution and other problems. Changes in rainfall patterns will affect river flow levels and patterns and hence leading to water related problems such as flooding[3]. On the other hand, land use changes also have impact on water availability and quality. For instance, cutting down trees on the catchment regions for agricultural purpose will lead to water shortages for people living on the downstream. Trees play important role within the catchment regions.

The United Nations classifies Kenya as a water-scarce nation on the basis of having one of the lowest natural water replenishment rates. This observed changes in water availability can be attributed to climate variability, catchment degradation and population pressure. This requires that the available water resources to be efficiently managed and as a result this requires trained staff.

Many failures in water resource management are as a result of lack of trained staff and weak institutions[1]. For example, capacity-building has been identified as a missing link in African development. Many local and national institutions, responsible for water management and water delivery do not work efficiently or effectively. Contributing factors include; inappropriate policies for water management and unclear definition of the mandates of the institutions, lack of resources (inadequate funding and human resources), working in an environment that is not conducive to the institutions and inhibits job, inadequate education and training facilities and lack of participation and commitment from communities and customers. The inadequacy of water services as well as the intensifying competition for clean water has inspired a remarkable consensus among developing countries and external support agencies (ESA) on the need of integrated planning and management of the resource and its use. Hence, there is a need to review the existing capacity and needs under

[1] Kenya National Development Report, (2006): A case study prepared by 2nd UN World Water Development Report 'Water: A shared responsibility'

[2] Marshall (2011): The Water Crisis in Kenya: Causes, Effects and Solutions: Global Majority E-Journal, Vol. 2, No. 1 (June 2011), pp. 31-45

[3] Schewe, J., Heinke, J., Gerten, D., Haddeland, I., Arnell, N. W., Clark, D. B., ... & Gosling, S. N. (2014). Multimodel assessment of water scarcity under climate change. Proceedings of the National Academy of Sciences, 111(9), 3245-3250.

the water sector and develop an improved curriculum that can be used to train the technical and professional staff.

NEED FOR CAPACITY IN THE WATER SECTOR

Capacity development is a holistic process operating at three levels, which may be interlinked in specific measures; institutional development, organizational development and human resources development. Within this process, people, organizations and societies mobilize their capacities to shape their own sustainable development. Knowledge, competence and well-functioning organizations and institutions are important pillars in any strategy that aims at improving human well-being, public health, poverty reduction, social equity, transparency, accountability and sustainable development. Capacity building in particular is now widely regarded as a key element in ensuring sustainable water sector development. To improve water management, developing countries need comprehensive knowledge and capacities in dealing efficiently with water. Clearly, the people who use water and the organizations who manage the water sector need such capacities.

One area in the governance of water sector in Kenya that needs capacity development is the lack of an effective institutional framework for integrated water supply and sanitation, which has led to myriad of challenges across the sector such as overlapping roles and responsibilities between various institutions leading to inefficient use of human and financial resources, duplication of effort, and gaps in effective provision of services. For instance, Water Resource Authority (WRMA), Kenya Water Towers (KWT) and National Environment Management Authority (NEMA) have in recent past played overlapping roles in terms of catchment control and management in the country[4].

Coordination between various government institutions in charge of management and provision of water services such as Water Service Providers (WSP) and Water Service Boards (WSB) has been inadequate hence water service provision greatly hampered. There are inadequate communication and awareness building between these institutions and local organizations and water users; and the responsibility for regulation and performance monitoring of the provision of WSS is being vested in the same organization responsible for service delivery and investment financing, thus creating a potential conflict of interest.

Most of the water supply systems in urban and rural settings in Kenya do not cover full Operation and Maintenance costs, making water sustainability far from being achieved. The Ministry of Water and Irrigation draft report of 2014 indicates that many providers are not operating professionally enough and are not sufficiently commercially oriented, leading to low performance (low collection, high water losses, etc.) and insufficient sustainability of service provision. In addition, the insufficient economies of scale and economically-unviable tariffs hamper sustainability of systems. Many small-sized systems lead to high production costs and cannot attract and maintain the necessary qualified professionals.

[4] Kanda, E., Taragon, J., Waweru, S., & Kimokoti, S. (2013). The Water Act 2002 and The Constitution of Kenya 2010: Coherence and Conflicts Towards Implementation.

The low cost recovery and performance of the providers is resulting to high water losses, low water quality, erratic water supply, insufficient maintenance and deterioration of the assets and thus further decline in the service level. Under these conditions and with little consumer orientation on water use and obligations, it is difficult to extend services to the poor and to obtain the consent of the consumer to accept tariff adjustments. Low performance, non-transfer of assets and missing ring fencing of income results in poor perspective of sustainability, which keeps many potential donors away from the sector. This results in an investment gap for rehabilitation and extension of systems and performance enhancement measures.

Consumption metering is limited or does not exist at all promoting water wastage. The un-metered systems create distortions in consumer charges and loss of revenue. Revenue collection too is extremely low. Tariffs are out of line with costs adding to the financial difficulties. It has been estimated that only about 60% of revenue due (of the 20%-50% of the water that reaches the consumer) is actually collected[5].

The quality of training in most of the technical training institutes and universities offering water related programs is considered insufficient to meet water sector needs. Degree in Engineering education and training is offered by few accredited institutions and technical education and training is offered by more than 60 training institutions[6]. The lack of opportunities for graduates to get practical Water, Sanitation and Hygiene (WASH) related experience is a significant problem. This is compounded by inadequate support for the transition from academia to the work environment and lack of mentors to train less experienced staff. Therefore, capacity development within the water sector will be a great step towards reducing these challenges.

CAPACITY DEMAND FACTORS

There are demand factors for the development of capacity building in the water sector. These factors are interdependent and complementary to each other. These factors include individual competency within the water sector, policy instrument efficiency in the water sector, effectiveness of the water sector arrangement and sociopolitical environment in the water sector[7].

Table 1: Capacity determinant factors[8].

Capacity Factors	**Components on which the capacity is based**
Individual competency	Skills, experience, knowledge, attitude
Policy instrument efficiency	These include; regulations, laws, administrative rules, policies, standards within the water sector. Enforcement of policy instruments.

[5] Ministry of Water and Irrigation (2009): Kenya Water Sector Strategic Plan (KWSSP) Report. pp 16-23.
[6] Government of Kenya (2012), A policy framework for education and training, ministry of education and ministry of higher education, science technology session paper
[7] Kenya Hydro-Economic Briefing Note 2015: Water Resources in Kenya: Closing the Gap.
[8] Kenya Hydro-Economic Briefing Note 2015: Water Resources in Kenya: Closing the Gap.

Sociopolitical environment	Compatibility of social norms & beliefs with development goals in water sector Awareness of rights in water sector
Effectiveness of the water sector arrangement	Human resources (individual competent adequacy in organizations). Physical resources (facilities, equipment, materials, etc) and budget. Organizational structure and systems that enables efficient capacity building realize development goals.

RATIONALE FOR HUMAN CAPACITY BUILDING/ DEVELOPMENT

The human capacity development focuses on the junior professionals and technicians in the water sector and there are reasons for the development of human capacity and these are;

1) Have human resources with appropriate skills and competencies to perform functions assigned to them for efficient service delivery
2) Enhance water stakeholders' participation in managing the affairs within water sector
3) Have a coordinated and integrated approach in capacity building and technical assistance
4) Enhance development of water related programs from various training institutions geared towards improving human capacity development

CAPACITY BUILDING FRAMEWORK

ROLE OF THE FRAMEWORK

Development of capacity development framework for both the junior professional and technician levels in the water sector is essential since it helps water agencies as well as ministry of water and sanitation to achieve its institutional objectives and mandates. Capacity development framework will form a basis through which effective programs will be developed for the junior professionals and technicians in the water sector[9].

The Framework can be profitably applied to assess the feasibility and coherence of proposed human capacity development programs, to monitor programs during implementation, or to assess the results, of completed programs[10]. The Framework can also be used as a step-by-step guide to the planning, implementation, and evaluation of programs designed to build capacity for development at a national or subnational level. A key feature of the Framework is its focus on capacity factors that impede the achievement of development goals, and on how learning interventions can be designed to improve the "development friendliness" of capacity factors by supporting locally driven change. This will requires stakeholders and practitioners to think through

[9] Government of Nepal Ministry of Education, (2010). National Framework for Capacity Development.
[10] Government of Kenya, (2013), National Capacity Building Framework, Ministry of Devolution and Planning.

and trace out the relationship of a defined set of variables to any development goal in a given context, and to model explicitly the change process that is expected to be facilitated by learning.

The purpose of the Capacity Building Framework therefore is to provide the philosophy and systematic approach to strengthen the capacity of both, the junior professionals and technicians in the water sector to achieve the desired goals and aspirations. The framework provides not just the strategic outlook but also concrete steps for capacity building that can be used to formulate, implement, monitor and evaluate capacity building interventions[11]. The framework outlines key stakeholders and their roles and responsibilities and the 'how' to implement the goals and objectives of devolution.

Capacity building needs may vary over time in line with changing conditions and based on feedback and lessons learnt while carrying out their mandate and responsibilities. Therefore the capacity building framework will be dynamic and a living document in order to respond to real needs of different stakeholders involved in the water sector.

OBJECTIVES

The objective of the human capacity development framework in the water sector is to;

1. Offer an approach for coordinating and facilitating capacity building initiatives for both the junior professionals and technicians
2. Offer a basis for monitoring and evaluating capacity development through various programs that have been implemented
3. Build and leverage on the foundation of on-going appropriate capacity building initiatives for junior professionals and technicians
4. Provide a framework for a package of support based on government wide existing policies and local priorities

CHALLENGES IN THE AVAILABLE HCD PROGRAMS

Challenges occur during the development of human capacity development programs in the water sector. These challenges affect the delivery of services within different water related agencies such as Ministry of Water and Sanitation[12]. Some of the challenges include;

Lack of partnership: This is a major problem within the sector of water and it has direct impact on service delivery[12]. During the stakeholder workshop, lack of partnership was found to be a hindrance factor towards improved development in water sector. Partnership between the training

[11] LaFond, A., & Brown, L. (2003). A guide to monitoring and evaluation of capacity building interventions in the health sector in developing countries.

[12] Crocker, J., Shields, K. F., Venkataramanan, V., Saywell, D., & Bartram, J. (2016). Building capacity for water, sanitation, and hygiene programming: Training evaluation theory applied to CLTS management training in Kenya. Social Science & Medicine, 166, 66-76.

institutions and other relevant water stakeholders will help in bridging the gap that exist in terms of lack of required skills and experience for both junior professionals and technicians.

Fragmented and uncoordinated approach to capacity building: Generally there is lack of data on training needs as well as clear policies and guidelines on capacity building[13]. There is uncoordinated training programs; inadequate linkages between training outputs and labor market; lack of monitoring and evaluation mechanisms of measuring training outcomes and impact.

Financial Constraints: Capacity building for junior professionals and technician in water sector requires proper financial support from the government and also donors. Limitation of the financial capability is a serious problem, as capacity building in the framework of human development needs considerable ring fenced funds.

Replication of capacity building resources as well as efforts between different stakeholders: There is evident of big surge and scramble from capacity building providers to offer quick fix solutions mainly to county governments, including but not limited to public, private sector, NGOs and civil society organizations.

Lack of employee retention: Within the water sector many employees are ageing especially from the Ministry of Water and Sanitation and also many junior professionals and technicians are shifting or advancing careers. This is attributed to lack of skill retention policy within the water sector for both junior professionals and technicians. Also, career advancement within the water sector is linked with getting formal academic papers and not skills and experienced acquired.

Lack of connection between trainings and market needs: Much training from institutions offering water related courses are not in line with market needs and therefore, impacting the ability of capacity development among the professionals and technicians. Trainings are believed to be static compared to the dynamics needs of the water sector.

SCOPE OF THE CAPACITY BUILDING

In this context, capacity building focuses on junior professionals and technicians in the water sector. The junior professionals include fresh graduates, postgraduates and also those with about 2-3 years of work experience water related issues. Building the capacity of both junior professionals and technicians in the water sector will be carried out in relation to Individual capacity building, environmental capacity building and institutional capacity building.

Individual capacity building: The process that increases the capability of individuals to be functional for performing or delivering a service. It may involve enabling staff to obtain qualifications, experience and competences (knowledge, skills and attitudes) by, e.g. providing opportunities for them to make decisions and empowering them to act.

[13] Kanda, E., Taragon, J., Waweru, S., & Kimokoti, S. (2013). The Water Act 2002 and the Constitution of Kenya 2010: Coherence and Conflicts Towards Implementation.

Environmental capacity building: The process of using the energy outside direct control to favor the achievement of development objectives in a sustainable way. It can be improved, amongst others, thorough an integrated strategy aimed at providing civic education and awareness on water related issues.

Institutional capacity building: The process of creating more responsive, effective, efficient and accountable public institutions through relevant support, capacity building and training initiatives; such as induction programs, peer learning and training. This is essential for both junior professionals and technicians.

INVOLVEMENT OF STAKEHOLDERS AT A WORKSHOP

Water sector has different stakeholders that play an important role towards ensuring water related issues or problems are dealt with. The workshop had a range of stakeholders and they include the Ministry of Water and Sanitation (MWS), Water Resource Authority (WRA), University of Nairobi (UoN) Department of Meteorology, and the Kenya Water Institute (KEWI). The involvement of these stakeholders was significant towards the coming up with way forward in the development of capacity development programs for both junior professionals and technicians in the water sector.

The objectives of the stakeholders meeting were as follows;

1. Understand the current status and gaps/needs on human capacity development at the respective institutions (for Junior professional and Technicians).
2. Discuss the output of the desktop study on Human Capacity Development needs.
3. Discuss the prioritization of Human Capacity Development Needs.
4. Propose implementation plan on identified needs and recommendations.

STAKEHOLDER WORKSHOP OUTCOMES

Different stakeholders gave a presentation on the current status and needs for human capacity development and this focused on junior professionals and technicians. Presentation from the University of Nairobi, department of meteorology showed that there is need for human capacity development especially for technicians. Also, the junior professionals need proper training in order to meet the market demand. The training should be aligned with current technological advancement in the water sector.

Presentations from both Kenya Water Institute and Ministry of Water and Sanitation also showed that there is need for capacity development for both junior professionals and technicians. From the presentations by different stakeholders it as clear one of the challenges affecting technicians is career advancement. This means that many technicians in the water sector are upgrading to professionals and therefore, there are few technicians to handle technical water related problems. Table 2 up to Table 4 shows some of the needs for junior professionals and technicians that were identified by stakeholders and presented on the workshop.

Table 2: Needs for both junior professionals and technicians in water sector according to the presentation from the Ministry of Water and Sanitation.

Ministry of Water and Sanitation	
Junior Professional	**Technicians**
Skills and knowledge on Operational Hydrology. Focus should be on; ➢ Water resources modeling – EWS ➢ Ground Water exploration & management ➢ Dam Safety ➢ Isotope Hydrology ➢ Stream flow and Run off ➢ Flash floods in ASAL catchments	Skills on Instrumentation; this includes; ➢ Hydrometry ➢ Pump Technology ➢ Ground Water ➢ Water Quality
Water Resources Data & Information Management; ➢ Collection, Analysis, Processing, storage & dissemination ➢ Geo-spatial technologies	Knowledge on Catchment Management; focus should be on; ➢ Community development ➢ Resource mobilization ➢ Geospatial Technologies
Knowledge of Monitoring & Evaluation. It should take into consideration; ➢ Institutional Coordination ➢ Project Management	WASH (Water Sanitation and Hygiene); focus should be on; ➢ Water & Waste Water Management ➢ Water Quality and Water efficiency Technologies
Knowledge on Hydrological Data Processing and Management; ➢ Data Collection & Processing ➢ Data Analysis ➢ Hydrological & Time series analysis ➢ Intensity-duration–frequency relationships.	➢ Data collection and processing skills (Modern data analysis methods) ➢ GIS and remote sensing skills ➢ Skills on Surveying and cartography

Table 3: Needs for both junior professionals and technicians in water sector according to the presentation from the University of Nairobi.

University of Nairobi	
Junior Professional	**Technicians**
➢ Knowledge of climate variability and water resources. Focus on flood modeling	➢ Water and sanitation management
➢ Integrated Water Resource Management. Focus on catchment management	➢ Early Warning Systems. The focus should be data collection for use in early warning system development
➢ GIS and Remote Sensing	➢ Instrumentation and maintenance. This should focus on calibration skills

➢ Build or develop personal and interpersonal skills on area of work	➢ Build or develop personal and interpersonal skills on area of work

Table 4: Needs for both junior professionals and technicians in water sector according to Kenya Water Institute presentation.

Kenya Water Institute	
Junior Professional	**Technicians**
➢ Early Warning Systems (Droughts and Floods)	➢ Instrumentation and control ➢
➢ Climate Variability ➢	➢ Non-revenue water reduction ➢
➢ ➢ Data management for water sector	➢ Desalination of sea water and ground water ➢

There was an agreement by the stakeholders that there in need to develop human capacity building programs for junior professionals and technicians in water sector. Stakeholders had a consensus on three topical issues (Table 5) that should be prioritized on during the development of human capacity development program for both junior professionals and technicians. The agreed topical issues are as follow;

Table 5: Three priority topical issues for Human Capacity Development

Junior professionals	Technicians
Early Warning Systems (Climate variability & change)	Instrumentation and maintenance
Data management (GIS/Remote Sensing technology)	Water, Sanitation & Hygiene (WASH)
Catchment management	Non-Revenue water reduction

At the end of the workshop, there was an agreement by stakeholder regarding the organization of validation workshop. The validation workshop was set to be on 22nd November, 2018.

HUMAN CAPACITY DEVELOPMENT (HCD) STRATEGY

The human capacity development program focuses on building the capacity of junior professionals and technicians in the water sector. Therefore, for the program to meet its objective, it will be implemented within the prevailing national standards and norms. The strategy for ensuring effective implementation of HCD program will based on some pillar and these include;

TRAINING AND INDUCTION

Training and induction will be carried out through participation of different water stakeholders. The training will be targeting junior professionals and technician in different water agencies or training

institutes. On the other hand, the induction process will help in introducing junior professionals such as fresh graduates and postgraduate students and technicians on what is expected of them upon getting employment after going through the capacity development program.

In order to guarantee standardized training material and content, training curricula and manuals will be developed and validated by subject matter experts from respective ministries, agencies, commissions and regulatory authorities so as to ensure that the delivery is in line with national norms and standards. All resources and materials for training will be made available for the trainers and also for the trainees.

For junior professionals, the curriculum will focus on the following areas for capacity building;

- Early Warning Systems (Climate variability & change)
- Data management (GIS/Remote Sensing technology)
- Catchment management

For technicians in the water sector, the curricula will focus on;

- Instrumentation and maintenance
- Water, Sanitation & Hygiene (WASH)
- Non-Revenue water reduction

HCD program awareness creation: creating awareness for the HCD program is essential in order to ensure that junior professionals and technicians are able to register for the course. Awareness creation will be done through collaboration with various stakeholders in the water sector so as to reach out to more professionals and technicians.

The Constitution provides an unprecedented opportunity for collaborative civic education. The fundamental reforms introduced by the Constitution calls for an integrated national approach in view of the fact that civic education is critical in facilitating fundamental national transformation, legal and institutional reforms. Awareness education is also essential in creating the necessary civic awareness, reorienting the national psyche for the new dispensation and engendering robust public engagement in the implementation process.

IMPLEMENTATION STRUCTURE

The implementation of the capacity development programs requires partnership and proper coordination of activities all stakeholders involved. The program needs to reach out to all junior professionals and technicians in the water sector. The implementation process should be geared towards ensuring that there is effective capacity development at individual level and also at the institutional level.

The capacity development framework is neither parallel nor a standalone process to current organizational improvement planning. The capacity building framework will helps in creating opportunity for partnership among different stakeholders in the water sector for the purpose of

improving service delivery[14]. Capacity building is considered necessary for the achievement of the objects and principles of human capacity development.

For effective implementation of the Human Capacity Development program, it will be essential to engage different stakeholders in the water sector. This engagement will pave way for smooth implementation of the program. The engagements include;

Engagement with stakeholders

Engagement with stakeholders is important for effective development of capacity program. This will help in coming up with different collaboration mechanisms geared towards strengthening the HCD program. The engagement will also be essential towards determining the capacity of the training institutions to offer the HCD program. Also, the engagement with stakeholders will be essential towards reaching out to trainees in water related sector both at the national level as well as sub-national level. Currently, Kenya has more than 50 Technical Training Institutes and more than 20 public universities offering different professions degree, diploma and certificate courses in hydrology, water and sanitation and water resource management. Working together with these technical institutions and universities will help in ensuring the HCD program reach out to many junior professionals and technicians.

Based on this framework, the Ministry of Water and Sanitation will in charge of the HCD program in partnership with the University of Nairobi and the Kenya Water Institute at the pilot stage and later upscale this to different identified Universities and Technical institutes in the country. Apart from the government financing, the ministry will also explore other avenues of funds in order to have a wide HCD reach in the country.

CAPACITY DEVELOPMENT NEEDS ASSESSMENT

During the workshop, it was agreed by the stakeholders that there is need to carry out need assessment for the junior professionals and technicians before the development of the curriculum. The needs assessment will focus on the three topical issues that were arrived for both junior professionals and technicians. The need assessment will help in determining the gaps that exist on each topical issue that was discussed. This could involve developing of questionnaires that will be filled by the professionals and technicians. The needs assessment will be significant during the development of draft programs since it will ensure the HCD programs addresses the needs of junior professionals and technicians.

The need assessment will also be carried out to determine the available training facilities and equipment for the implementation of the HCD program. This will be essential in understanding the available gaps or shortages on training facilities and equipment.

[14] Government of Kenya, (2013), National Capacity Building Framework, Ministry of Devolution and Planning.

To ensure that capacity building support is well coordinated, equitably distributed, relevant and sustainable, it is important to ensure the following issues are taken into consideration;

- Coordinate information on programs and activities to all stakeholders in the sector of water and also the training institutions responsible for training water related courses.
- Assess capacity building needs and revise/update programs and strategies according to the changing needs in the water sector such as changes in technologies used in water sector.
- Identify and generate databases and offer information on service providers for capacity building.
- Facilitate knowledge sharing among different stakeholders in the water sector. This will be essential towards promoting continuity and sustainability of the program.

Curriculum Development

Development of curriculum will involve organizing a workshop that will bring together, the Ministry of Water and Sanitation, the University of Nairobi, and the Kenya Water Institute to discuss the course outline for each topical issue that was agreed upon for both junior professionals and technicians. From this workshop a consensus will be reached on the final course outline for each topic. A technical group will be created from present stakeholders in workshop to proceed with further development of the curriculum based on agreed course outline. During curriculum development, assessment of training facilities and trainers' skills will also be carried out to help in determining whether the existing training facilities will accommodate the program and also whether the trainers have the required skills to conduct the program.

A validation will be organized to discuss the draft curriculum for each course. Since the University programs takes along processes for any changes to be made, this courses will be offered as modules to complement existing masters programs and a certificate issued at the end of the courses certified by the institution and the Ministry of Water and Sanitation.

Rolling out training courses

The training will be targeting 30 junior professionals and 40 technicians for each training course at the pilot stage which further be up scaled to a national level. This will be achieved by having three sessions every year separately for junior professional and technicians. These sessions will fall within the tri-semesters i.e. January – March; May – June; and September – November. Each training course will be carried for a period of two to four weeks and this will include both theoretical and practical sessions depending on the module. Junior professional training will be conducted at the University of Nairobi within a master's program with support from the Ministry of Water and Sanitation, while technician level will be done at the Kenya Water Institute with the support of the ministry. The pilot training will start on the semester following the completion of curriculum and training modules and the two institutions will certify the two levels independently in partnership with the ministry. Tentative start date depending on curriculum and module preparations is June or October.

Table 6: Proposed number of partcipants per module and training period for each module.

Module	Class size per Module	Training Weeks
Induction of junior professionals	30	4
Induction of technicians	40	4
Early warning system (climate change and variability) course	30	2 to 3
Data management (GIS/Remote Sensing technology) course	30	2 to 3
Catchment management course	30	2 to 3
Instrumentation and maintenance course	30	2 to 3
Water, Sanitation & Hygiene (WASH) course	40	2 to 3
Non-Revenue water course	40	2 to 3

The piloting of the program will take one class for each training course for both junior professional and technician level for a period of two to four weeks after launching the program. The anticipated participants for junior professional level is a maximum of thirty (30) while for that of technician level is a maximum of forty (40).

SUSTAINABILITY, MONITORING AND EVALUATION

SUSTAINABILITY

The most challenging component of the capacity development is its sustainability. Since capacity development is largely understood as iterative process rather than a one-shot exercise, sustaining harmony among different stakeholders engaged at different levels and aiming for an integrated system of capacity development is critical. The sustainability of the HCD will be led by the ministry water as its part of their mandate to build human capacity in the water sector. This will be done in partnership with the University of Nairobi for professional training and technical institute (KEWI) for technicians, trainers will come from the staff within the institutions. The two institution will be used at the pilot stage and are expected to continue with the exercise with the support from the Ministry of Water and Sanitation. Upscaling of HCD will be done by the ministry through government financing. For this to be sustainable, financial support for the trainings should come from the central government and should be considers as part of the annual budget. These trainings will be informed by the needs presented in this framework.

MONITORING AND EVALUATION

Monitoring and Evaluation (M&E) plan is a mirror which reflects all major activities of a program or project and helps to assess whether the activities are bringing value to the organization and helping

it achieve its priority results[15]. It focuses on what to monitor, how to monitor, when to monitor, how to evaluate (value) the activities (useful or not?), analysis of the data, and what actions need to be taken as a result[16], thus providing information on how far the operationalization of the capacity building program is being implemented and to provide feedback on its performance. For effective results-based monitoring and implementation of capacity building activity, logical framework is proposed.

LOG FRAME

The performance indicator and means of verification are specified in Table 7 for the outcomes and outputs of capacity building for both junior professional and technical levels. This processes will be led by the Ministry of Water and Sanitation of Kenya who will also ensure its sustainability.

[15] Government of Nepal Ministry of Education, (2010). National Framework for Capacity Development.
[16] Simister, N., & Smith, R. (2010). Monitoring and Evaluating Capacity Building: Is it really that difficult? International NGO training and research centre (INTRAC).

Table 7: Logical framework for human capacity development in Kenya water sector for Junior Professional and Technician levels.

Outcome: 30 junior professionals and 40 technicians from water sector have a received two weeks and three weeks certified training at the University of Nairobi and Kenya Water Institute respectively.				
Outputs	**Activities**	**Indicators**	**Means of Verification**	**Assumption**
Training Universities and Institutes identified.	Selection of the training institution will be conducted by the ministry of water, as well as the participants/candidates to be trained.	Training institutions has signed a letter of agreement with the Ministry of Water and Sanitation.	Copy of the letter of agreement	The institution will adopt the capacity building program as a semi-annual activity.
Curriculum outline approved	Stakeholders develops curriculum and gets approved by the Ministry of Water and Sanitation.	Training curriculum	Copy of training curriculum	All stakeholders will contribute to the process. The ministry will approve the document.
Two weeks junior professional training implemented.	Select training dates and the junior professionals to be trained; implement training at the specified institution. (The pilot done at the University of Nairobi for 30 participants).	Participants have attended training at lecture halls/rooms	Participation list and group photo.	This will complement the master's programme.
Three weeks technician training implemented.	Select training dates and the technicians to be trained; implement training at the specified institution; two weeks class work and one	Participants have attended training at lecture halls/rooms	Participation list; group photo; and field work photos of the students.	Funds will be available for field work and logistic supported by the Ministry of Water and Sanitation.

	week field work (The pilot done at the Kenya Water Institute for 40 participants).	and practical at the field		
Trainings impacts assessed and evaluated.	Request feedback from trainees both junior professional and technician levels trainings.	Participants have expressed satisfaction and confirmed adequacy of training curriculum	Summary of evaluation results; training report	This will inform the continued support by the government through the Ministry of Water and Sanitation.

DIAGNOSTIC ASSESSMENT

The assessment will be carried out at the beginning of the every coursework for both junior professionals and technicians. This assessment will gauge the understanding of every junior professionals and technicians in their respective course program. Besides, the assessment will be helpful in determining the expected outcomes for both technicians and junior professionals. This assessment will carried out through administering questionnaires with framed questions.

SUMMATIVE ASSESSMENT

At the end of the HCD program, the junior professionals and technicians will be assessed to determine whether the program met its purpose. This assessment will also help in getting the views of both junior professionals and technicians on areas they feel should be changed or amended and how they think the program should be administered. Both diagnostic and summative assessments will be significant towards monitoring and evaluation of the program.

ANNEX 1 MINUTES BASED ON THE PROGRAMS OF THE WORKSHOPS

Program of the stakeholder workshop, 8th – 9th, November. 2018. Lake Naivasha Country Club, Naivasha, Kenya.

Day 1 (8/11/2018)	Activity	Institution/Persons
9:00 am – 9:30 am	Arrival of participants	ICPAC
9:30 am – 10:00 am	Workshop objectives	Dr. Mohammed Hassan (ICPAC)
10:00 am – 10:30 am	Coffee Break	
10:30 am – 11:00 am	Current status and gaps/needs on human capacity development at MWS and WRA (for Junior professional and Technicians). *-Water trans boundary issues were raised in this session and the ministry responded that there are some work being done on water law to solve the issues.* *-Job freezing by the government was also discussed as one of the major challenge of the water sector. The ministry admitted that there are quite a number of ageing staff that should be replaced.*	Mr. Dan Mogusu (MWS)
11:00 am – 11:30 am	Current status and gaps/needs on human capacity development at UoN (for Junior professional and Technicians). *-Discussion from this presentation was majorly on placement of students after the University. This was identified as a major issue the government should consider solving.*	Prof. Alfred Opere (UoN)
11:30 am – 12:00 pm	Current status and gaps/needs on human capacity development at KEWI (for Junior professional and Technicians). *-Some of the need have existed for long and the major issue has been the financing mainly the practical aspect since most of the instruments are not operational. KEWI should also link with Water Resource Authority of Kenya when it comes to field practical.*	KEWI
12:00 pm – 12:45 pm	Discussion *-Gender mainstreaming was discussed and the number of female gender were identified to be much less compared to the male in this sector. The University of Nairobi informed the members that they have a gender policy of 2014 that they apply in their*	Facilitator Dr. Hassan

	training and could be adopted in the selection process of the HCD.	
12:45 pm - 2:00 pm	Lunch Break	
2:00 pm – 2:30 pm	Output of the desktop study on Human Capacity Development needs	Mr. Jully Ouma (ICPAC)
2:30 pm – 3:15 pm	Discussion *-It was noted from the discussion that we should also consider community development officers in future trainings.* *-Issues of sustainability were discussed and it was agreed that this will be a Ministry of Water and Sanitation activity and they will request for annual funding from the central government for it sustainability as well as explore other sources of financing.* *-There is need for seasonal training need assessment for the sector.*	Facilitator Dr. Hassan
3:15 pm – 3:45 pm	Coffee Break	
3:45 pm – 4:30 pm	Prioritization of Human Capacity Development Needs. *-Stakeholders were divided into three groups so as to prioritize the needs for both junior professional and technicians from the needs presented by the three institutions as well as those identified in the desktop study.* *-Scoring method was used to identify the top three priorities for junior professionals and technicians which are presented in Table 5 of this document.*	Facilitator Mr. Jully Ouma
	End of Day 1	
Day 2 (9/11/2018)	**Activity**	**Institution/Persons**
9:00 am – 9:30 am	Human capacity development on water sector strategic plan at UoN	Prof. Alfred Opere (UoN)
9:30 am – 10:00 am	Human capacity development on water sector strategic plan at KEWI	KEWI
10:00 am – 10:30 am	Coffee Break	
10:30 am – 11:15 am	Human capacity development on water sector strategic plan at MWS and policy guideline	Mr. Dan Mogusu (MWS)
11:15 am - 12:00 pm	Discussion	Facilitator Dr. Hassan

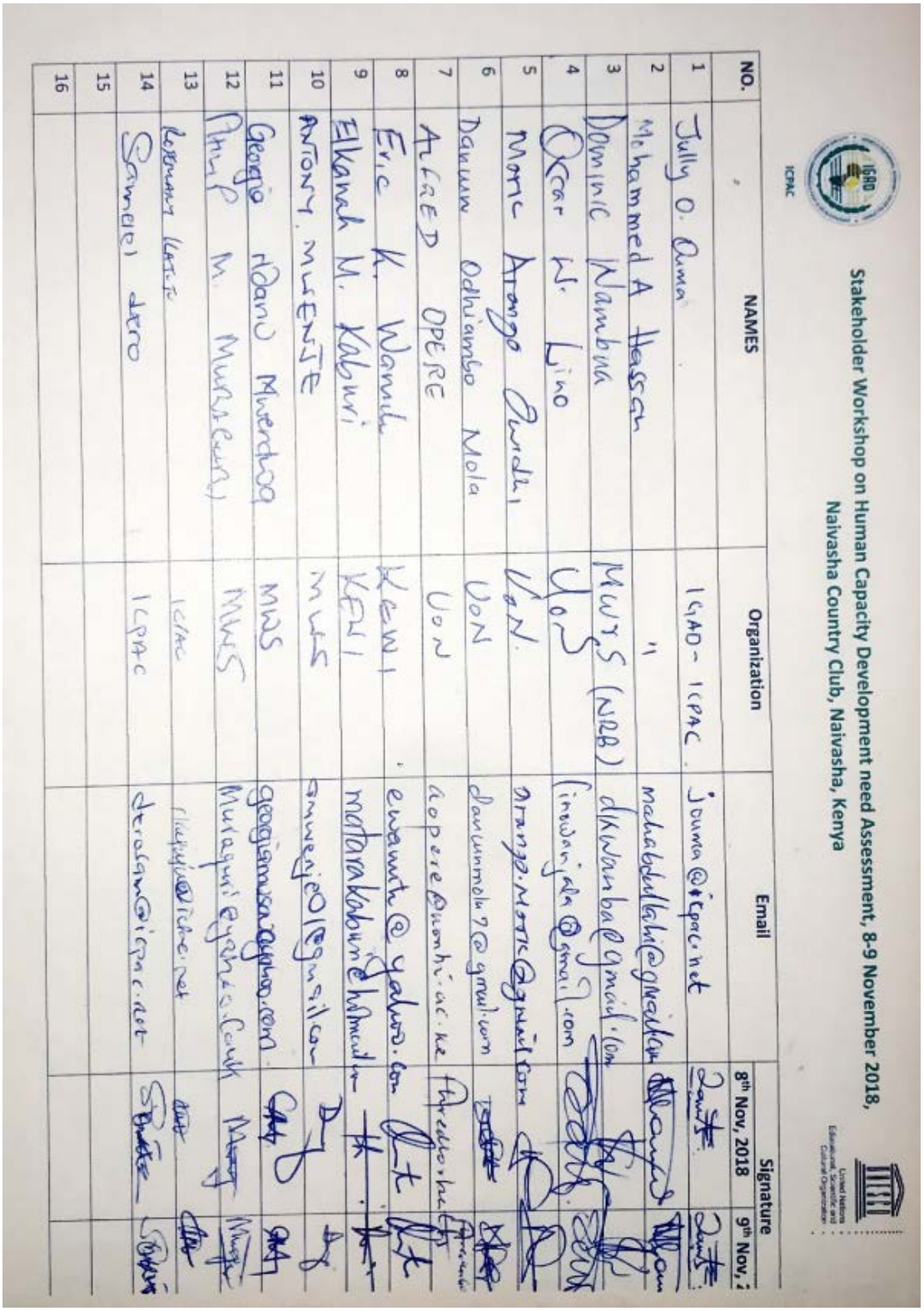
	-For HCD to be successfully implemented, the stakeholder agreed that there is need for a MoU between all the stakeholders. *-Stable source of funding to be identified to enable sustainability of the HCD short courses.* *-The certificate to be issued at the end of the training will be approved by the University of Nairobi and the ministry of water for junior professional, the technicians' certificate will be approved by KEWI and the ministry of water.* *-Instrumentation technicians are needed at the ministry as the number is very small at the moment. However, this may not be possible since the government have frozen employment.* *-There is need for awareness raising once this courses have been launched.*	
12:00 pm – 1:00 pm	Proposed implementation plan on identified needs and recommendations *-There is need to explore also the option of e-learning for the courses. This can be explored by the ministry of water in case there challenges with the lecture room based trainings. This can also contribute to sustainability of the HCD.* *-Way forward will be shared to the stakeholder after consultation with the UNESCO team.*	Facilitator Dr. Hassan
1:00 pm – 2:00 pm	Lunch Break	
2:00 pm – 2:30 pm	Closing remarks and Departure	

Program of the validation workshop, 22 Nov. 2018. Four Points, Nairobi, Kenya

22/11/2018	**Activity**
9:00 am – 9:30 am	Arrival of participants
9:30 am – 10:00 am	Workshop objectives *-Was presented by Jully which was followed by the presentation of the entire draft framework by Dr. Hassan.*
10:00 am – 10:30 am	Coffee Break
10:30 am – 11:00 am	Draft Framework Presentation
11:00 am – 11:30 am	Implementation Plan of the Framework
11:30 am – 12:00 pm	Financial Structure and Sustainability
12:00 pm – 12:45 pm	Discussion *-It was agree that the ministry will have a signed agreement with all the institutions.*

	-More details are required for the top three priorities that were identified. It was agree that more details will be available within the curriculum developed. *-Overage unit cost of KShs. 25, 000 need to be factored in the budgeting for this trainings.* *-Curriculum should take one week to cover both junior professional and technician levels. Validation workshop of the same should take one week.*
12:45 pm - 2:00 pm	Lunch Break
2:00 pm – 2:30 pm	Additional inputs and departure *-Water quality and hydrometry labs are need both for University of Nairobi and KEWI. This should be considered by the Ministry in future.* *-GIS computer lab need at KEWI with relevant software's (e.g. ESRI ArcGIS), and this proposal is to be taken by the ministry of water and Sanitation in their future budgeting.* *-MoU between the institutions should run parallel with the curriculum development process.* *-A small team to be constituted assess the capacity of available labs.* *-Follow up on the impact at work should also be considered.*
	End of Day 1

ANNEX 2: LIST OF PARTICIPANTS



Stakeholder Workshop on Human Capacity Development need Assessment, 8-9 November 2018, Naivasha Country Club, Naivasha, Kenya

NO.	NAMES	Organization	Email	Signature 8th Nov, 2018	Signature 9th Nov, 2
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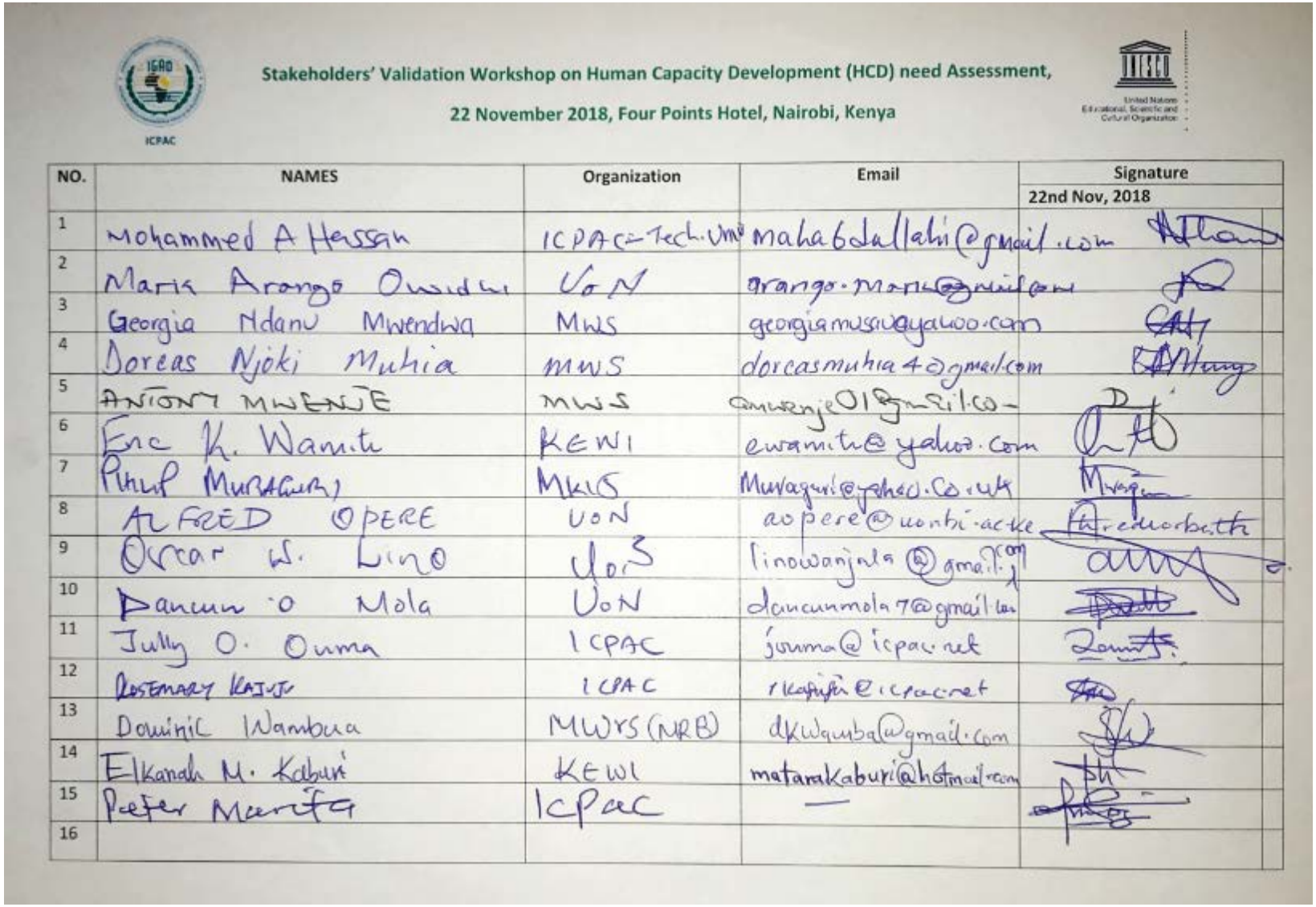
6	Damian Odhiambo Mola	UON			
7	ALFRED OPERE	UON			
8	Eric K. Wanuki	KEWI			
9	Elkanah M. Kabuni	KEWI			
10	ANTONY MUENJE	MWS			
11	George Adano Mwachoo	MWS			
12	Philip M. Mutisya	MWS			
13	[illegible]	ICPAC			
14	Samuel Otto	ICPAC			
15					
16					



Stakeholders' Validation Workshop on Human Capacity Development (HCD) need Assessment,

22 November 2018, Four Points Hotel, Nairobi, Kenya

ICPAC

NO.	NAMES	Organization	Email	Signature 22nd Nov, 2018
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15	Peter Mercy	ICPAC	—	
16				

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ICPAC

IGAD Climate Prediction
& Applications Centre

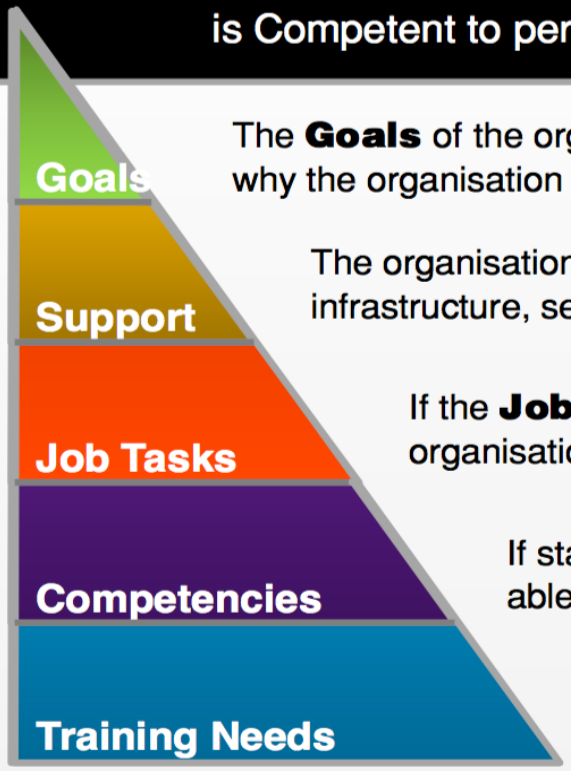
Current status and needs on Human Capacity Development at UoN

Workshop on Human Capacity Development needs
8-9 November, Naivasha Country Club, Kenya

By
Alfred Opere
Department of Meteorology, UoN
Email: aopere@uonbi.ac.ke

Objectives of HCD

The **Objective** of the training is to ensure each staff member is Competent to perform their Job Tasks



The **Goals** of the organisation or program are primary. They are why the organisation exists

The organisation **Supports** the goals through trained staff, infrastructure, services, policies, data, etc.

If the **Job Tasks** are completed the Goals of the organisation should be met

If staff have the **Competencies** they will be able to perform the Job Tasks

The **Training Needs** are what each individual requires to be Competent

The **Training Objectives** are to make each individual Competent to perform their job tasks.

Training is to achieve the **Objectives.**

The **Learning outcomes** are the effect of the training – learners become competent.

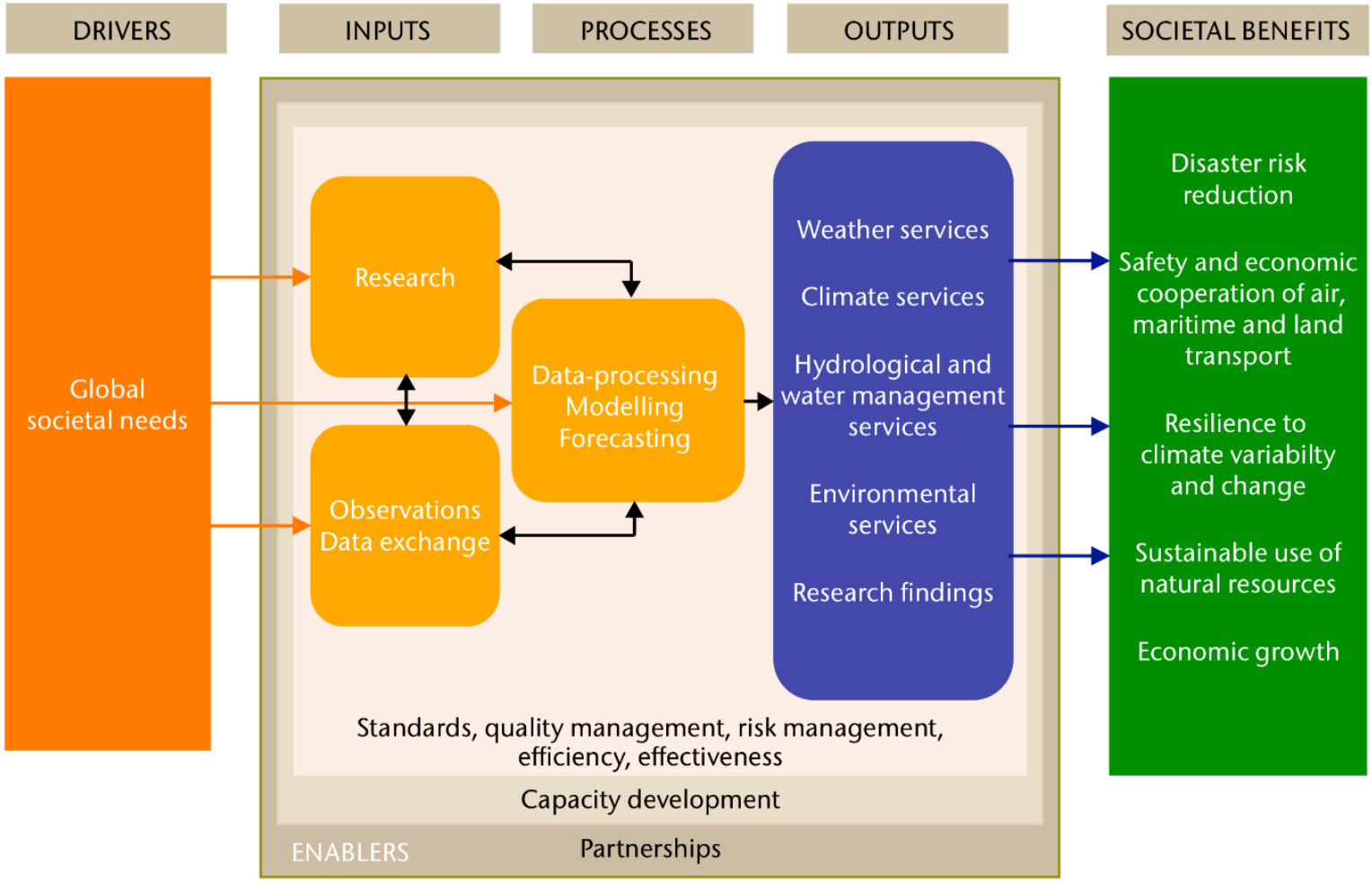
Assessment is against the **competencies.**

HCD for NMHs

- Education and training offered to NMHS is to assist them develop and deliver weather, climate and water-related services.
- Only about half of the NHMS have the requisite educational infrastructure that can address some of the specialised education and training needs of the services.
- It is a constant challenge to increase the capacity of WMO (E&T) community to meet E&T needs as well as cater for continuous professional development (CPD).
- To be able to offer Education and Training as well as CPD opportunities to personnel working in the NMHS, countries will be required to explore more innovative approaches in resource mobilization initiatives and partnerships amongst themselves and with potential funding/donor agencies.

Process for Effective Service Delivery

(from WMO 2016-2019 Strategic Plan)



Reasons for training providers to respond to the changing needs

1. Competencies for

- Using and maintaining traditional and new instruments
- Data management
- Using new metadata cataloging observations
- Data quality management techniques

2. Competencies for

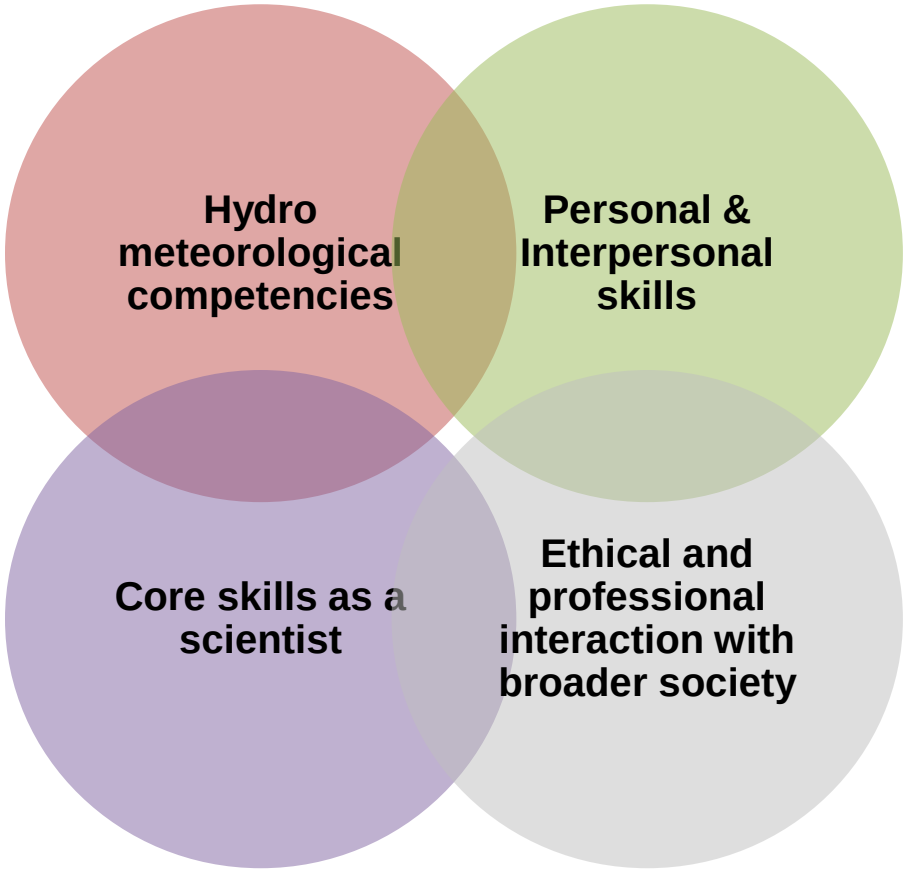
- Better identifying and addressing **user needs**
- Developing new and improved products and services, **customizing** products
- **Coordinated warning delivery** for consistent messages to multiple audiences through multiple media (e.g., Common Alert Protocol)
- **Communicating** uncertainty such that users can use it in their decision making
- Working with users for better preparation and preventative strategies, including risk analysis

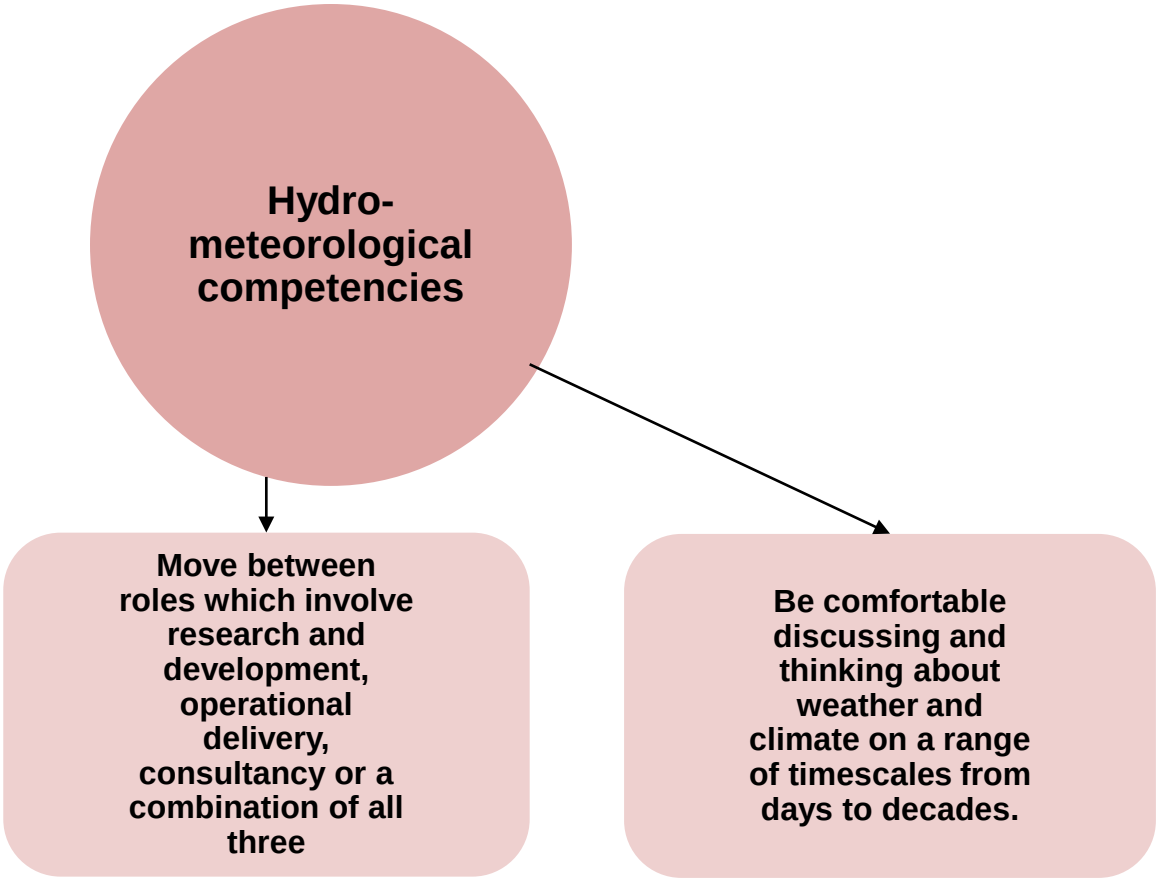
3. Competencies for

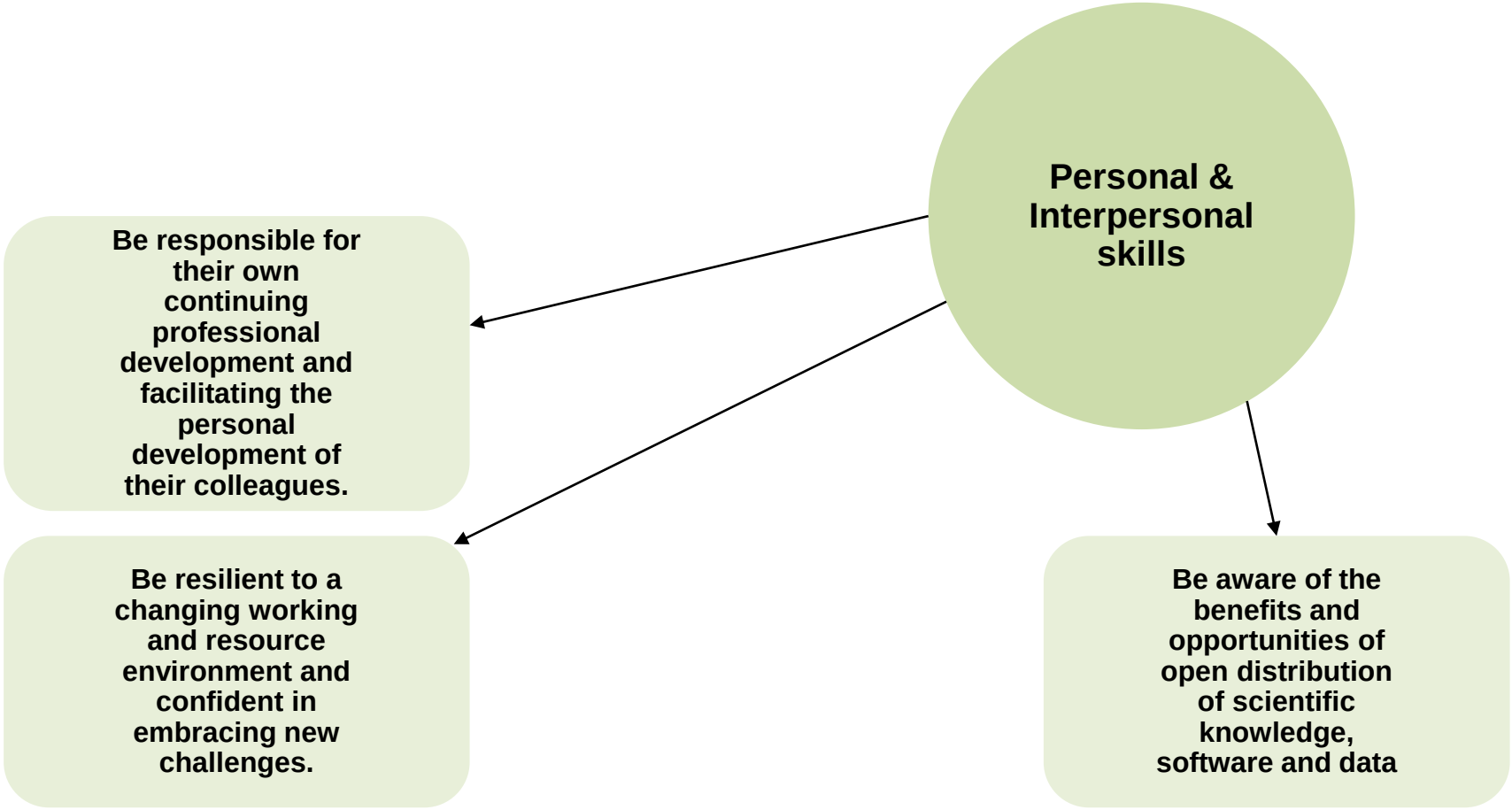
- Utilization of the **global prediction system**, including Global and Regional Centres, both NWP (including ensembles) and remote sensing products
- Assimilation of global and regional NWP data for local modeling only **where value is added**
- Applying impacts-based approaches for **seamless integration of products** (weather and climate)
- Seamless translation of weather and climate extremes to **predicted impacts and mitigation** strategies

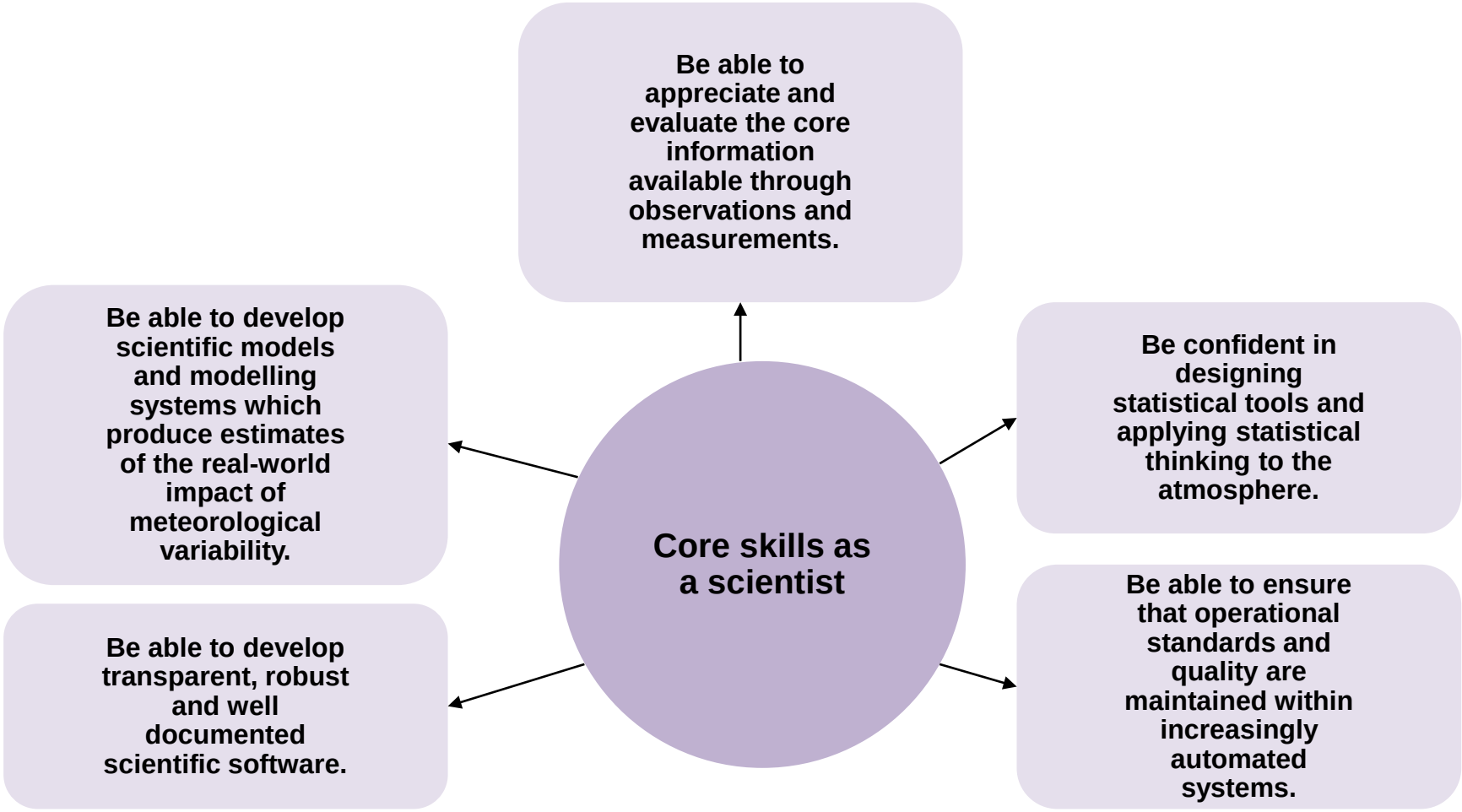
4. Competencies for addressing new service areas, such as

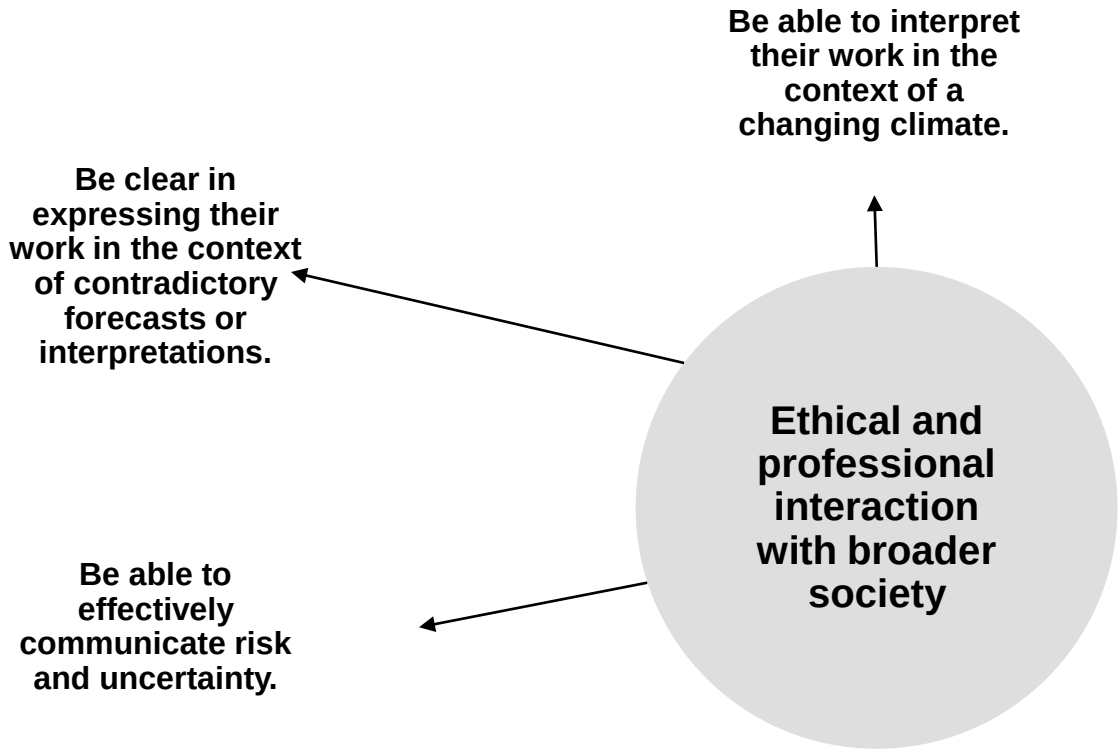
- Climate Services
- Urban hydro-meteorological and climatological services
- Critical hydrological services including water resource management, flash flood and low water flow forecasts, etc.
- Sand and Dust Storms warnings
- Cryosphere monitoring
- New customer sectors


Hydro meteorological competencies
Personal & Interpersonal skills
Core skills as a scientist
Ethical and professional interaction with broader society


Hydro-meteorological competencies
Move between roles which involve research and development, operational delivery, consultancy or a combination of all three
Be comfortable discussing and thinking about weather and climate on a range of timescales from days to decades.


Personal & Interpersonal skills
Be responsible for their own continuing professional development and facilitating the personal development of their colleagues.
Be resilient to a changing working and resource environment and confident in embracing new challenges.
Be aware of the benefits and opportunities of open distribution of scientific knowledge, software and data


Be able to appreciate and evaluate the core information available through observations and measurements.
Be able to develop scientific models and modelling systems which produce estimates of the real-world impact of meteorological variability.
Be confident in designing statistical tools and applying statistical thinking to the atmosphere.
Core skills as a scientist
Be able to develop transparent, robust and well documented scientific software.
Be able to ensure that operational standards and quality are maintained within increasingly automated systems.


Be able to interpret their work in the context of a changing climate.
Be clear in expressing their work in the context of contradictory forecasts or interpretations.
Ethical and professional interaction with broader society
Be able to effectively communicate risk and uncertainty.

Meteorological competency	Personal and interpersonal skills	Core skills as a scientist	Ethical and professional interaction
• Transfer between roles • Weather and climate; days to decades	• Responsible for their own CPD and facilitating the development of others • Resilient to changes within the work environment • Critically evaluate scientific literature • Awareness of benefits and opportunities of open distribution	• Develop robust and well documented software • Develop scientific models and systems • Appreciate and evaluate core information • Design statistical tools and apply statistical thinking • Ensure operational standards and quality are maintained within automation	• Communicate risk and uncertainty • Express work in the context of contradictory forecasts or interpretations • Interpret their work in the context of a changing climate

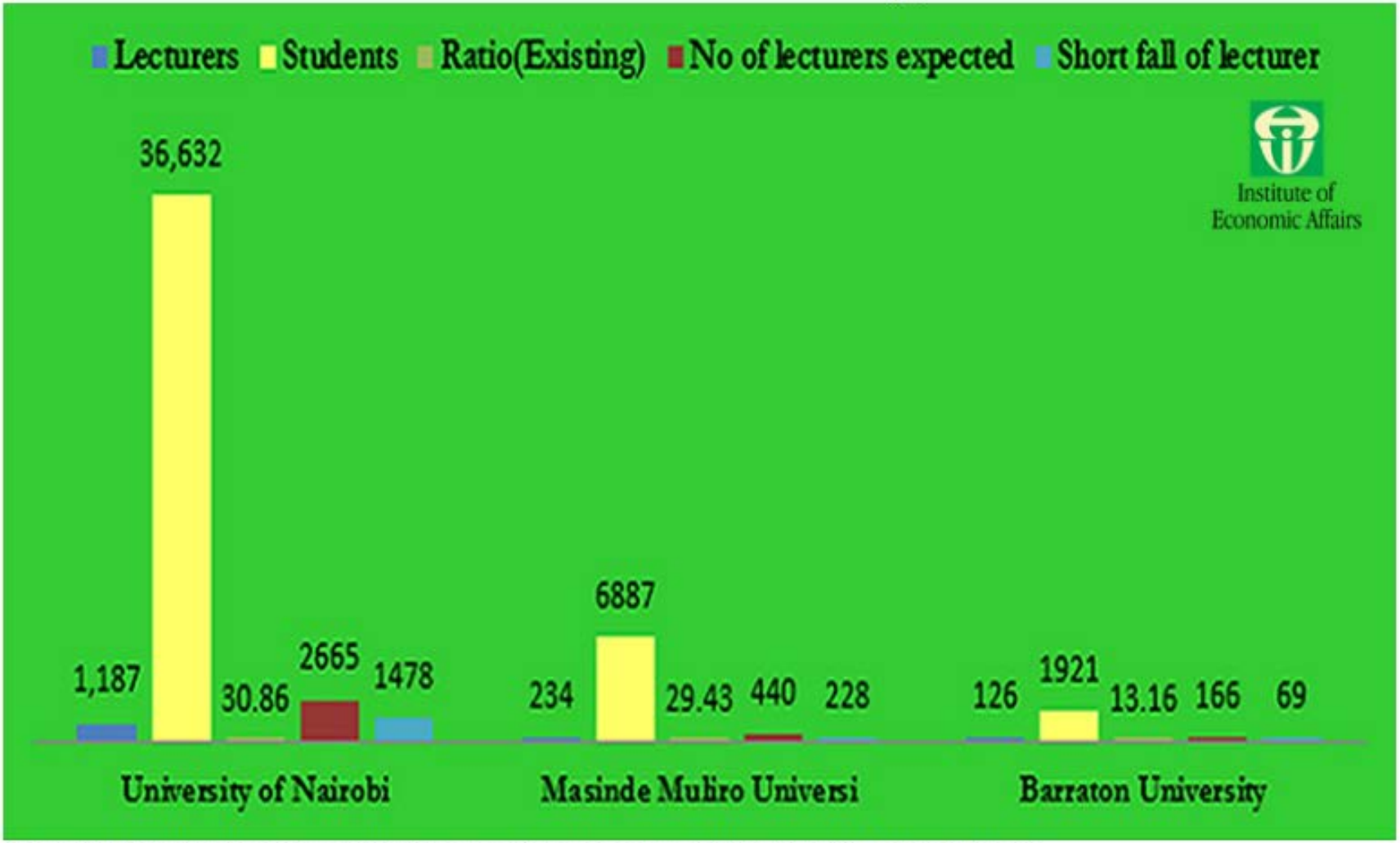
Educators, students and employers
think differently about
subject of expectations from and demands to
education

E.g. Hydrology/other sciences, along with computational and observational technologies develop faster than university courses and syllabi

Employers value capability to combat difficulties more than good knowledge of subject areas

Status of Human Capacity at the University

Chart 1: Lecturer/students ratio of each of the selected universities in Kenya, 2011.



Source: International Journal of Business and Social Science (November 2011) Vol. 2 No. 20

- In 2011, the University of Nairobi (UoN) had the highest number of full time lecturers per student ratio at 30.86 followed by Masinde Muliro at 29.43 and Baraton University at 13.16.
- The number of lecturers expected at Baraton University was 166 yet the university had 97(58%) lecturers indicating a short fall of 69 lecturers.

- In Masinde Muliro University, the number of lecturers expected was 440 yet the University had 112(48%) lecturers hence a shortfall of 228 lecturers.
- The number of lecturers expected in the University of Nairobi was 2665 yet the university had 1187 lecturers.
- This represent 55% shortage of lecturers.
- The huge shortfall of lecturers could mean that lecturers are taking on more responsibility and work which may compromise quality of education in the Kenyan Universities.

Training needs at UoN

- ✓People are specialised in their field of study
- ✓90% of staff will retire within next 5-15 years

?? E&T needs:

- ✓new staff needs to be recruited & trained to replace aging staff
- ✓Acquisition of new skills by junior staff and technicians, with rapid change in technology, should be continous
- ✓Fellowships for junior staff, technicians and students' training are limited

UoN Draft HR policy (2014)

Objectives

- To ensure a standard approach to human resource management
- To enhance efficiency and effectiveness in service delivery
- To institutionalize best practices in human resource management
- To enhance compliance with the Constitution of Kenya (2010) and other relevant laws e) To enhance compliance with the University's strategic plan and Quality Management System.

Training and Development

- Training and Development is geared towards promoting institutional performance.
- This is achieved through appropriate and progressive training and development as provided for in the Training and Development Policy whose aims are to:
  - Establish clear procedures for identifying, prioritizing, planning, monitoring and evaluation of staff training and development.
  - Ensure that employees of the University have equal access to training and development, according to their assessed training and development needs.

- Prioritization of training needs will be based on:
  - Training that enables the University to fulfill its strategic objectives
  - Training that pertains to any organizational statutory or mandatory obligation
  - Training to address gaps in the skills/knowledge identified in the Training Needs Survey and necessary for the individual to perform their job effectively
  - Training to further improve the individual's standard of work performance.
  - Members of staff who qualify, shall be from time to time and on request be granted study or sabbatical leave or time off to pursue further studies or research.

Recommendations for Training Institutions/Training needs

1. Regularly review competency frameworks, update existing curricula as required (CUE guidelines)
2. For each service area, share learning resources with other training providers (CoE)
3. Indicate your expertise and willingness to contribute to the training of others (networking of pool of experts)
4. Develop and share learning pathways for developing the expertise required in each service area.
5. Develop tailor made short courses for skill development
6. Adhere to curriculum review plan (CUE requirement)
7. Encourage partnerships of key institutions/agencies with local/regional universities.

THANK YOU