



ICID•CIID



REPORT

of

Training Needs Assessment (TNA)

PREPARED BY

Dr. Mohamed S. Wahba

Chairman of ENCID and AfRWG

Amali Abraham Amali

Secretary of AfRWG

International Commission on Irrigation and Drainage ICID.CIID

48 Nyaya Marg, Chanakyapuri, New Delhi - 110021, India

June 2019

African Regional Working Group of the International Commission of Irrigation and Drainage (AFRWG-ICID)

Report of Training Needs Assessment (TNA) Analysis

With reference to the minutes of the 28th meeting of the African Regional Working Group of the ICID during the 23rd International Congress on Irrigation and Drainage, Mexico City, Mexico, 8-14 October 2017, the WG with respect to implementation of the action program and strategy for Capacity Development in Africa decided to conduct a Training Needs Assessment (TNA). This was to be made accessible to all National Committees in Africa, in four different languages viz; English, French, Portuguese and Arabic. This report however comprises of only feedback from respondents in English language. The AFRWG received response from 51 individuals, representing six African Countries and with all regions represented except the Southern and Central Africa regions. The distribution of respondents across gender, age group, sectors represented in as illustrated in this report. The Analysis of the TNA is reported under selected sections where trends were identified.

1 Gender, Age Distribution, and Country

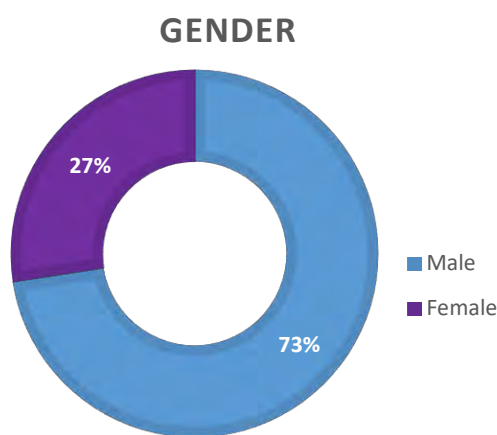


Fig 1a: Gender Distribution of Respondents

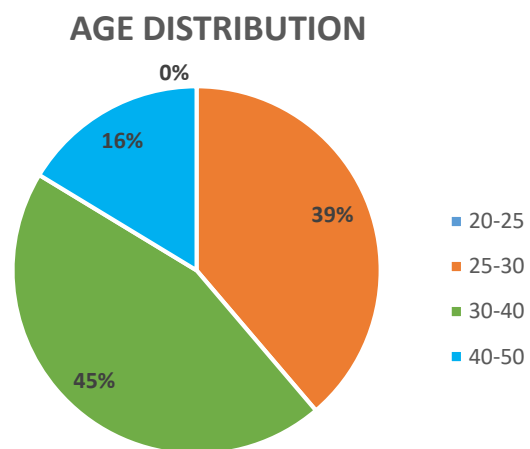
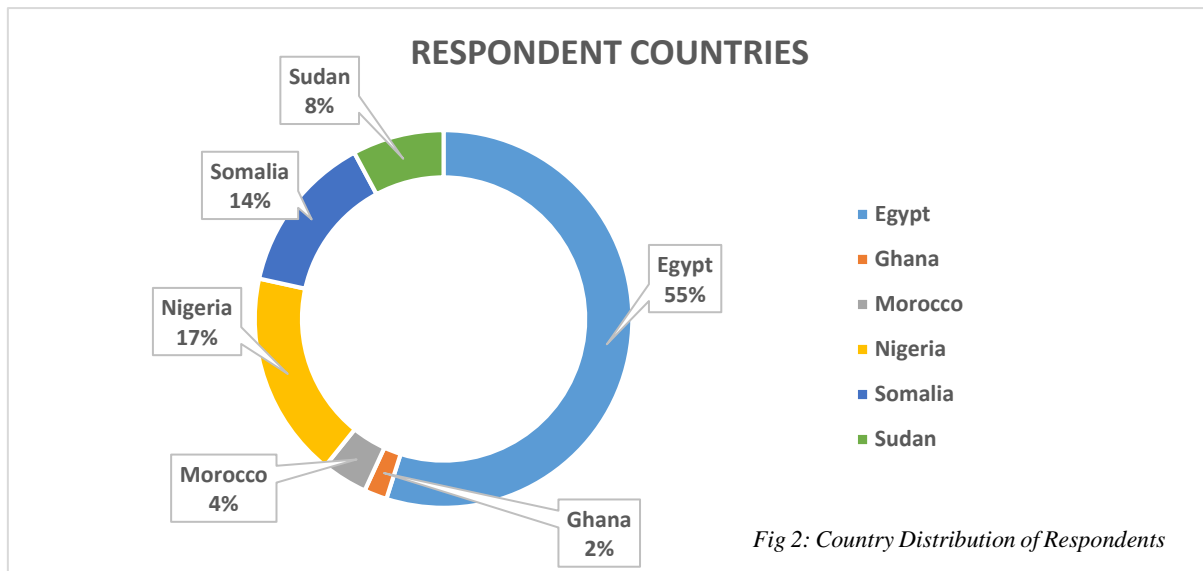


Fig 1b: Age Distribution of Respondents

As observed in Figure 1a above, the TNA received more respondents from men. The age distribution of the 51 respondents ranged from ages from 25-50, with 45% falling within the age group of 30-40. This skewness indicates an ageing workforce most of which entered the water sector at a very late age as indicated in their work experience. This can as well be attributed to the fact that the age at which education and training is attained in Africa is higher when compared to their counterparts in Europe and America. Hence, most professionals engaged in I & D, do so at a relatively older age when compared to their counterparts in other continents. It is also not unlikely that respondents within the

age group of 40-50 still lack skills required to work and deliver upon the responsibilities in the water sector. As shown in Figure 2 below, Northern Africa with over 60% dominated the list of respondents to the TNA. Weak responses from other regions also highlights the need for effective communication and information dissemination within members of National Committees (NC) where one exists to strengthen their commitment towards achieving the objectives of the AFRWG and the ICID at large. This also underpins the call to establish more NCs un under- and un- represented regions.



2. Employment Sectors, Work Experience, and Frequency of Training

Despite a high percentage of the respondents attaining bachelor education, the analysis suggested that necessary basic skills required to function effectively in areas of engagement were still lacking, and neither did the years of engagement bridge these gaps to provide the needed skills. As can be observed in Figure 3b, 75% of the respondents were engaged in the academia either as students or as lecturers; presenting an excellent opportunity to promote capacity development early at the educational institutions. This also highlights possibilities of cooperation between the academia and public/private sector concerned with water resources management. One way of achieving this would be through institutional collaborations between and among these institutions for appraising knowledge gaps and possibility of bridging them through co-learning especially at regional levels. Also, in this category is the possibility to build organisational collaboration with the AFRWG and the ICID at large to keep updated with current trends in the sectors. Subscription to ICID weekly e-bulletin as well as monthly and quarterly updates would be recommended as viable instruments to herald this with the possibility of translating these documents to key working languages within Africa.

WORK EXPERIENCE

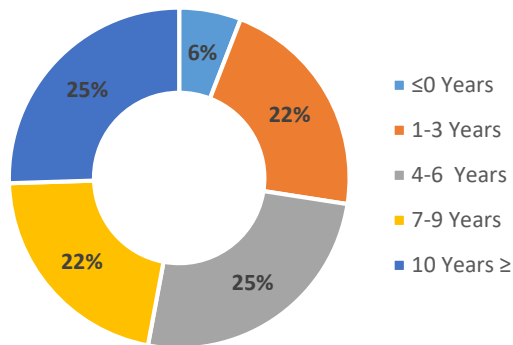


Fig 3a: Work Experience of Respondents

SECTORS

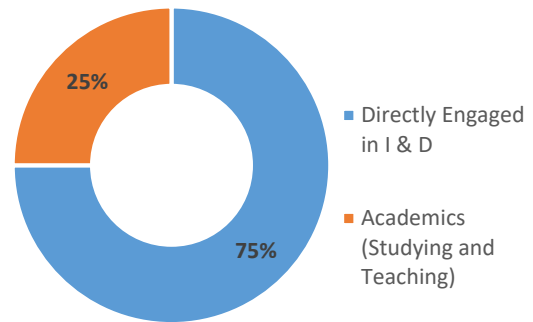


Fig 3b: Sectoral Distribution of Respondents

3. Frequency of Training

From the 51 respondents and as shown in Figure 4, 27% responded to have undergone training relevant to their areas of engagement in the year 2018. Next to this are respondents that underwent training within the last two years ago or no training at all. However, it is imperative that for active learning, there is need to continually learn and relearn new and evolving innovative technologies and principles in the water sector and hence justifies the need for frequency in training. Also noticeable that although the trainings were reported as excellent, it appears not to address the skill gap which is obvious from analysis of training areas as discussed later.

FREQUENCY OF TRAINING

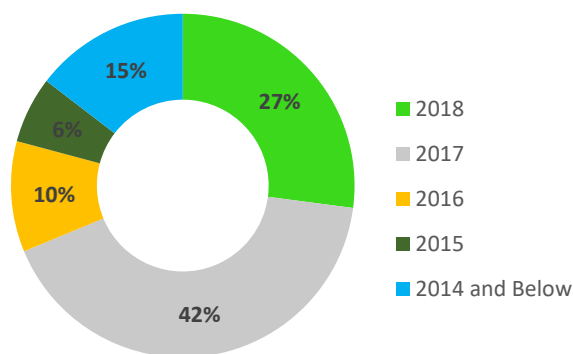


Fig 4: Frequency of Training



4. TNA Analysis and Ranking

Fifty-one (51) respondents provided feedback on 86 suggested topics outlined for the TNA. The different respondents ranked each topic with increasing preference from 1 – 5, where **1** was least preferred, and **5** was most preferred. Table 1 below represents in decreasing order the percentage responses from the array of 86 proposed training topics in the circulated TNA. A sample of the TNA can be found in the Annex.

Table 1: Ranked TNA in Decreasing Order of Preference

No.	Topic	1	2	3	4	5
		Respondents (%)				
1	Modern Irrigation systems, planning and design	16.67	4.76	7.14	4.76	66.67
2	Projects Management & Evaluation, Feasibility Studies for Projects	11.36	6.82	6.82	15.91	59.09
3	Technical Report Writing and Presentation Skills	4.35	6.52	13.04	17.39	58.70
4	Water Crisis Management	6.67	4.44	11.11	20.00	57.78
5	Quality Management for Irrigation and Drainage systems	2.27	4.55	11.36	27.27	54.55
6	Design of Irrigation and Drainage Systems	4.35	10.87	10.87	19.57	54.35
7	Climatic Change Impacts on Water requirements	8.70	4.35	17.39	15.22	54.35
8	Water Quality	4.44	6.67	15.56	20.00	53.33
9	Climate Change Adaptation for Water, Food, and Environmental Security	13.64	4.55	13.64	15.91	52.27
10	Measuring Discharge in Open Channels	6.98	13.95	20.93	6.98	51.16
11	Languages and computer skills.	11.63	4.65	9.30	23.26	51.16
12	Basics of irrigation and drainage	13.04	2.17	21.74	13.04	50.00
13	Rainwater harvesting	20.45	4.55	18.18	6.82	50.00
14	Water Quality; Early Warning System for the Rivers	6.67	8.89	11.11	24.44	48.89
15	Rivers Protection	11.63	9.30	9.30	20.93	48.84
16	Flood and drought management	6.52	15.22	15.22	15.22	47.83
17	GIS and MIS	4.26	10.64	17.02	21.28	46.81
18	Environmental Evaluation for Irrigation & Drainage Projects	6.67	8.89	13.33	24.44	46.67
19	Group Work, Team Building and Dialogue Skills	9.30	2.33	18.60	23.26	46.51



20	Integrated Water Resources Management	4.35	2.17	8.70	39.13	45.65
21	Building skills in strategic planning and following up	11.36	6.82	20.45	15.91	45.45
22	Effective Communication and Conflict Management Skills	11.36	0.00	25.00	18.18	45.45
23	Climate Change Adaptation for African Agriculture Systems	17.78	4.44	15.56	17.78	44.44
24	Design and Analysis of Data	8.70	2.17	21.74	23.91	43.48
25	Irrigation Works, execution, operation & Maintenance	9.09	9.09	18.18	20.45	43.18
26	Design of Modern Bridges and hydraulic structures	6.82	6.82	25.00	18.18	43.18
27	Forecasting Systems, Climate Changes, and IWRM	11.36	9.09	20.45	15.91	43.18
28	Irrigation and Drainage Systems Operational and Maintenance.	6.67	17.78	6.67	26.67	42.22
29	Remote Sensing Technology	8.89	6.67	15.56	26.67	42.22
30	Group Work, Team Building and Dialogue Skills	6.67	6.67	15.56	28.89	42.22
31	Mechanization of Drainage system planning and design	9.30	11.63	23.26	13.95	41.86
32	Project Documentation	9.09	6.82	15.91	27.27	40.91
33	Soil salinity management	16.28	9.30	16.28	18.60	39.53
34	Effective Communication Conflict Management Skills	9.30	2.33	16.28	32.56	39.53
35	Strengthening Institutional Capacity Building for Water Sector in Africa	20.45	4.55	22.73	13.64	38.64
36	Cost Estimating	11.36	0.00	18.18	31.82	38.64
37	Site Supervision.	11.36	6.82	20.45	22.73	38.64
38	Irrigation water economics (value - cost recovery)	17.02	6.38	8.51	29.79	38.30
39	Distribution of Irrigation Water	4.76	14.29	19.05	23.81	38.10
40	Environmental Evaluation for Irrigation & Drainage Projects	13.33	6.67	17.78	24.44	37.78
41	Managing and planning of water courses using Mathematical models	8.89	8.89	20.00	24.44	37.78
42	Surveying and hydro graphing using GPS systems	6.98	6.98	20.93	27.91	37.21
43	Non- Conventional Water Resources in Arid and Semi-Arid Region	17.39	8.70	15.22	21.74	36.96
44	Technical Information.	7.89	5.26	26.32	23.68	36.84
45	Management and Uses of Non- Conventional Water Resources	11.11	11.11	20.00	22.22	35.56
46	Forecasting using Simulation models	17.78	15.56	20.00	11.11	35.56



47	Development of Ground Water resources	10.42	10.42	20.83	22.92	35.42
48	Irrigation Scheduling	13.64	20.45	22.73	9.09	34.09
49	Design, Construction and Rehabilitation of Small Dams	18.18	13.64	20.45	13.64	34.09
50	Dam-Safety	22.73	15.91	11.36	15.91	34.09
51	Modern Survey Theory	15.91	2.27	13.64	34.09	34.09
52	Monitoring & Analysis of Hydrologic Data of Ground Water and Wadies	13.33	11.11	28.89	13.33	33.33
53	Capacity Development for Water Management for Africans	8.89	11.11	26.67	20.00	33.33
54	Groundwater Management	8.70	6.52	28.26	23.91	32.61
55	Canal Lining & Maintenance	11.63	13.95	16.28	25.58	32.56
56	Irrigation systems improvement in old lands	15.91	11.36	20.45	20.45	31.82
57	Design of Pump Stations	25.00	15.91	18.18	9.09	31.82
58	On Farm Irrigation Water Management	11.36	9.09	31.82	15.91	31.82
59	Preparing Budget Estimates	6.82	18.18	20.45	22.73	31.82
60	Agricultural Drainage (design – execution)	8.89	22.22	24.44	13.33	31.11
61	Crop water requirements	13.33	13.33	20.00	22.22	31.11
62	Project Networking (scheduling).	13.33	2.22	31.11	22.22	31.11
63	Methods of Ground Water Pollution, Protection & Management	12.77	12.77	23.40	21.28	29.79
64	Developing Efficient Operating System	13.64	13.64	15.91	27.27	29.55
65	Ground Water Wells – Design & Management	10.87	8.70	36.96	15.22	28.26
66	Multi-Skill Capabilities	13.64	4.55	27.27	27.27	27.27
67	Modern & Advanced Survey Equipment	11.90	7.14	26.19	28.57	26.19
68	Groundwater and Artificial Recharge	19.57	19.57	19.57	15.22	26.09
69	Irrigation Systems and it's applications in Desert soils	20.93	6.98	20.93	25.58	25.58
70	Maintenance of Open Channels & Aquatic Weeds Control	9.09	20.45	13.64	31.82	25.00
71	Irrigation Advisory Service	27.27	20.45	9.09	18.18	25.00
72	Flash Flood Conservation	20.45	6.82	22.73	25.00	25.00
73	Using laser Equipment for land levelling	20.45	6.82	25.00	22.73	25.00
74	Developing Efficiency for Procurements	18.18	20.45	22.73	13.64	25.00
75	Calibration of Instrument & Equipment	13.64	9.09	43.18	11.36	22.73



76	Managing locations and human resources for district engineer	17.78	20.00	15.56	24.44	22.22
77	Developing Efficiency Skills for Storage Employees	20.45	13.64	25.00	20.45	20.45
78	Harvesting Equipment Design, Operation and Maintenance	18.92	13.51	32.43	16.22	18.92
79	Developing Efficiency Financial Personal Administration Works	22.73	9.09	29.55	20.45	18.18
80	Funding Irrigation and Drainage Stations Rehabilitation	6.98	23.26	25.58	27.91	16.28
81	Navigation in River Branches	36.36	13.64	11.36	22.73	15.91
82	Managing Emergency units in pump stations	34.09	9.09	29.55	11.36	15.91
83	Night Storage of Irrigation Water	25.00	15.91	22.73	20.45	15.91
84	Costal Shore Protection	30.23	20.93	20.93	13.95	13.95
85	Industrial security in stations, labs & workshops	35.56	11.11	26.67	15.56	11.11
86	Steel & Timber Farm	34.09	31.82	27.27	0.00	6.82

* 1 – 13 with response of 50% and above from TNA analysis.

5. Suggestions and call for action

For future assessments, an online template has been designed using goggle form which would provide real time analysis of the TNA as opposed to laborious tabulation of data from respondents. This is available in both English and French and the link can be share to the different concerned NCs when the need arises. For consistency, a re-evaluation period of five years is herewith proposed as necessary to identify trends if any between new labour requirements and available skills necessary to address rising challenges in water resources management.

Analysed TNA can be downloaded when requested from the links and the output interpreted to provide an indication of areas that requires re-emphasis. The forms can be accessed via

English Version of TNA: <https://forms.gle/Tq4vr53x8EwS7fMr6>

French Version of TNA: <https://forms.gle/mfNM6EbFTQjXgSfu5>

The AFRWG will using the TNA draft a five-year strategic capacity development plan to be co-implemented in cooperation with NCs in Africa and the ICID Central Office. The five-year plan would target aspects as age group, gender as well as rising areas of training need as identified in the TNA.



6. Conclusion

A Training Needs Assessment (TNA) was considered as a valid tool for assessing the skill gap in the African continent and to help tailor trainings and capacity development towards bridging the gap between available and desired skills in the African water sector. Analysis of the responses received for the TNA foremost highlighted the rising need for capacity development in modern water saving infrastructures paralleled with the global call for a sustainable agriculture with environmental concerns. This can be inferred from the TNA ranking wherein topics such as Modern Irrigation systems, planning and design, Water crisis management, as well as Project management and evaluation are ranked as most preferred by more than 55% of respondents. Following this up closely was reflective of deficiencies in reporting and presenting innovative and tangible achievements recorded across the continent in agricultural water management. Herein also as can be inferred from the TNA, Technical Report Writing and Presentation Skills was ranked as most preferred by 59% of respondents. It is therefore not just sufficient to make tangible progress in the sector, but these strides must be complemented by an excellent ability to carefully report and present success stories or challenges in the sector to concerned stakeholders. Conversely, topics as Steel & Timber Farm, Night Storage of Irrigation Water, Coastal Shore Protection and Industrial security in stations, labs & workshops ranked among the least preferred topics by the respondents. Although these are evolving concepts in other parts of the globe, it is yet to be fully embraced across the continent and again emphasises the need for localised hydrological objectives.

In general, 77% of the TNA topics was ranked as most preferred by the respondents. This highlights the need for capacity building of personnel engaged in the irrigation and Drainage sector right from the tertiary institutions and the need for continuous training tangential to developmental paradigms in the water sector as localised to the African continent. **Capacity development may therefore be directed towards the topics as ranked in Table 1 above when the need arises to do so, and resources are available.**

The TNA also identified Skills required for work in the African Water Sector and other training areas as suggested by the respondents as contained in Annex 1 below.

ANNEXES

**ANNEX I: ASSESSMENT OF SKILL SETS.****A. Skills required for your job.**

As skills required to for working in the water sector, respondents provided the following list of skills that has enabled them deliver on their responsibilities during their period of engagement.

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. A very good Knowing of Hydraulics principles. 2. A well knowing of physical and mathematical modelling requirements. 3. Ability to balance workloads efficiently. 4. Ability to coordinate projects simultaneously. 5. Ability to detect and solve problems and work overtime if work needed. 6. Ability to devote time necessary to complete deadlines. 7. Ability to learn programs (such as Q2k & HEC-RAS) and processes quickly. 8. Ability to meet deadlines under stringent time constraints. 9. Ability to multitask and work under pressure. 10. Ability to work as a part of a team and unsupervised. 11. Ability to work in a constantly changing environment. 12. Assessing outcomes 13. AutoCAD – MS. Office. 14. Being in high awareness about all design applications to improve my skills to achieve the most benefit in M.W.R.I projects. 15. Being in high awareness about all development in irrigation systems 16. Commitment 17. Construction design and building 18. Contracting laws 19. Creating clean computer programs in the latest languages 20. Creating compelling presentation slides 21. Creativity, team building and delegating. 22. Design of Irrigation and Drainage Systems and Water Crisis Management | <ol style="list-style-type: none"> 23. Designing irrigation systems and English language 24. Diplomatic personality with ability to deal with multiple problems at one time without showing confusion or anger 25. Efficiency and attention to detail. 26. Fast learner with the ability to grasp all new information quickly and implement it effectively 27. Feedback, flexibility and willingness to take on more responsibility. 28. Fluency in Arabic, English and French 29. Full awareness of Water management and distribution systems. 30. Geographic Information Systems 31. Good communications & guidance skills 32. Good listener to orders & instructions 33. Good managing 34. Group work, team building and dialogues skills 35. How to clarify our vision 36. Keeping up with the latest technologies and water consumption systems as we're facing some serious problems about water in the near future. 37. Knowing the low of irrigation that controlling the whole process 38. Languages and computer skills. 39. Laws that we need in the field of work 40. Leadership skills and ability to influence others. 41. Management skills development 42. Modern Irrigation systems, planning and design 43. Motivation and a positive attitude 44. Multi skills techniques. 45. Presentation and communication skills, leadership, problem solving, |
|---|--|



- | | |
|--|--|
| <ul style="list-style-type: none"> productivity, responsibility, teamwork, creativity. 46. Problems solving. 47. Process and creativity at work. 48. Projects Management & Evaluation 49. Ready to contribute and commitment to process safety requirements 50. Remote Sensing. 51. Responsibility and Reporting skills 52. Resources for ideas, suggestions, and possible solutions to problems. 53. SAP, Etabs, Safe, CSI Columns 54. Solid organizational skills. 55. Solution oriented 56. Streamlining processes 57. Strength of personality, activity and gaining experiences in how to projects management 58. Tact and diplomacy | <ul style="list-style-type: none"> 59. Taking the right decisions 60. Technical and Execution skills 61. Technical report writing and presentation skills. 62. Technical Skills (GIS, GPS, AutoCAD) 63. The ability of solving problems in field 64. The ability to identify, analyse and solve problems. 65. Time management & Organizational skills 66. Trustworthiness 67. Using the different survey systems and equipment. 68. Water Distribution and Hydrologic Science 69. Working under pressures. 70. Writing press releases which resulted in media coverage |
|--|--|

B. Skills Required to Function Effectively

In response to skill sets required for effectiveness on the job, the need for geospatial and analytical tools dominated the list and with few emphasis on managerial skills as well as technical skills. This can be inferred from the list as provided below.

- | | |
|---|---|
| <ul style="list-style-type: none"> 1. Analytical and problem-solving skills 2. Applicable Techniques of Irrigation Scheduling and modern Distribution of Irrigation Water which constitutes the basics of irrigation and drainage, 3. Application of GIS, GPS, and MIS. 4. Basics of irrigation and drainage - Design of Modern Bridges and hydraulic structures. 5. Budgeting and project fund management skills 6. Building skills in strategic planning and following up 7. Climate Change Adaptation for African Agriculture Systems 8. Climate Change Adaptation for Water, Food, and Environmental Security 9. Climatic Change Impacts on Water requirements | <ul style="list-style-type: none"> 10. Climatic Change Impacts on Water resources management 11. Communication skills 12. Competitive research proposal writing skills 13. Computer/technical literacy 14. Cost Estimating 15. Costal Shore Protection 16. Crop water requirements techniques 17. Data analysis with statistical tools 18. Data collection, analysis and survey skills 19. Design and analysis of Data 20. Design of Irrigation and Drainage Systems - Modern Irrigation systems, planning and design. 21. Design of Pump Stations and their maintenance, 22. Develop cooperation with research teams from other countries. 23. Development of Ground Water resources |
|---|---|



24. Effective communication and conflict management skills
25. Effective project negotiation skills.
26. Effective time management skills (The 80/20 principle (80% of the value comes from 20% of the effort)
27. Enhancing the capacity of sector land and soil management
28. Feasibility Studies for Projects
29. Forecasting Systems, Climate Changes, and IWRM
30. Forecasting using simulation models.
31. Google Earth for water and land information management
32. Groundwater and Artificial Recharge
33. Group Work, Team Building and Dialogue Skills.
34. Integrated Water Resources Management
35. Interpersonal effectiveness.
36. Irrigation and Drainage Systems Operational and Maintenance
37. Irrigation Works, execution, operation & Maintenance,
38. Land and soil management especially for Somali experts
39. Languages and computer skills
40. Laws that we need in the field of work
41. Leadership skills & how a good leader uses all three styles of leadership — authoritarian (autocratic), participative (democratic), and delegative (free reign)
42. Leadership/management skills
43. Learning skills.
44. Management skills development
45. Managing and planning of water
46. Managing and planning of water courses using mathematical models.
47. Mastering statistical software.
48. Measuring water level and its flow
49. Mechanization of Drainage system planning and design
50. Microbubble technique
51. Modern Design of Irrigation and Drainage Systems,
52. Modern Irrigation systems, planning and design
53. Modern Survey Theory
54. Modern Techniques of Canal Lining & Maintenance
55. More training about land management
56. Multi-Skill Capabilities - Group Work, Team Building and Dialogue Skills.
57. On-Farm Irrigation Water Management techniques,
58. Preparing budget estimates.
59. Project Networking (scheduling).
60. Projects Management & Evaluation Visibility Studies for Projects
61. Public speaking and training skills
62. Quality Management for Irrigation and Drainage systems
63. Rain gauge handling
64. Rainfall forecasting
65. Realize the training and internships in other countries.
66. Rivers Protection - Navigation in River Branches - Managing and planning of water courses using Mathematical models - GIS and MIS - Modern Survey Theory - Surveying and hydro graphing using GPS systems
67. Salinity control management
68. Scientific writing skills
69. Skill on soil fertility improvement
70. Skills on development policy and strategic plans on agriculture farmlands
71. Skills on land dispute management and law enforcement
72. Soil salinity management
73. Strong work values
74. Surveying and hydro graphing using GPS systems.
75. Teamwork
76. Technical Report Writing and Presentation Skills
77. Time management.
78. Ultra-filtration technique
79. Water quality remote monitoring and sensor stability
80. Weather station handling



C. Other Training Areas Suggested by Respondents

From areas of engagement in the irrigation and drainage sector, respondents also suggested areas which also require training both to function effectively in their various units of engagement and for delivering the objectives with regards to the prospects of their jobs. This includes viz;

- | | |
|--|--|
| 1. Ability to plan and conduct research | 28. Hydraulic modelling |
| 2. Application of GIS and GPS in conservation of Natural resources. | 29. Integration between the state bodies in water management. |
| 3. Basic training of water management | 30. Interdisciplinary, multidisciplinary and transdisciplinary research |
| 4. Basin and furrow irrigation | 31. International laws and international water conventions. |
| 5. Building and using multi-scale models on water and nutrients flows. | 32. IRR LAWS |
| 6. Calibration of telemetry sensor and maintainable | 33. Irrigation and drainage design |
| 7. Capacity building for flood management | 34. Irrigation management |
| 8. Classification of soil in East Africa | 35. Irrigation systems improvement in old lands. |
| 9. Computational mathematics | 36. Land policy and agreements |
| 10. Co-operative Groups for water quality control | 37. Languages and computer skills |
| 11. Courses on Modern Irrigation systems, planning and design | 38. Languages courses like TOEFL and IELTS to have good language and other languages: French and German for easy reading and interaction in debates and conferences. |
| 12. Data mining analysis | 39. Law 89/1998 on tenders |
| 13. Design of Modern Bridges and hydraulic structures | 40. Management of irrigation and drainage system |
| 14. Development of National Irrigation plan | 41. Mathematical model to assess water quality after mixing drainage water with canal water |
| 15. Drip irrigation system | 42. Mathematical model to predict water quality along the water way |
| 16. Early warning practice and rainfall forecasting | 43. Modelling Groundwater. |
| 17. Effective project management | 44. Modern methods in water treatment. |
| 18. Environmental science, modelling and management | 45. Monitoring and Evaluation of Development projects. |
| 19. Extension training | 46. Negotiation for Sustainable Development. |
| 20. Feasibility Studies for Projects | 47. Negotiation skills |
| 21. Food Quality control | 48. Professional trainings under soil and water Engineering |
| 22. Sensing Technology | 49. Programming skills |
| 23. Giving courses in engineering programs for the management of engineering works | 50. Proposal writing |
| 24. Giving courses on the design of irrigation and drainage networks | |
| 25. How to handle politicians during execution of projects | |
| 26. How to minimize the influence of donors on research/project outcome | |
| 27. How to secure funds for projects | |



- | | |
|---|---|
| 51. Quality Control for Corrugated poly vinyl chloride pipe manufacture which used in Subsurface drainage | 71. Technical skills and Execution skills |
| 52. Quality Control for High density polyethylene | 72. The impact of climate change on sea water intrusion and coastal erosion |
| 53. Rain gauge and weather station handling | 73. The impact of climate change on the Nile River and water resources |
| 54. Rehabilitation of Irrigation schemes | 74. the mechanical application in design such as solid works |
| 55. Reuse of Agricultural Drainage Water | 75. To see how they manage the land the developing countries |
| 56. Reuse of drainage water from irrigated areas. | 76. Training for assessment Somali regions mostly for floods and droughts |
| 57. Risk management and assessment. | 77. Training for historical flood and drought records |
| 58. River Structure | 78. Types of pipe envelope in order to carbonate blocking overcoming |
| 59. River water management and flood control | 79. Using monitoring systems for water measurement. |
| 60. Scientific papers technical writing. | 80. Using multi-beam echo-sounder for bathymetry. |
| 61. several mechanical courses such as (hydraulics - internal combustion engines- | 81. Water accounting |
| 62. Short courses on Hydrology | 82. Water amendment |
| 63. Soil analyses | 83. Water awareness |
| 64. Soil and water conservation | 84. Water Harvesting |
| 65. Soil Association | 85. Water economics and management |
| 66. Soil sampling and salinity control | 86. Water management modelling programs. |
| 67. Specific safety management courses | 87. Water treatment |
| 68. Sprinkler irrigation systems | 88. Water velocity control |
| 69. Sustainable Management of Soil and Water Resources | 89. Watershed modelling |
| 70. SWOT Analysis: Strengths, Weaknesses, Opportunities, and Threats | 90. Working in an inter-cultural team |



D. Personalised Comments

Respondents also took time to provide personalised comments among which are;

“As we are in the early stage of recovery, the ministry of agriculture and Irrigation needs more capacity building training on various aspects of agriculture so that we shall fight poverty and unemployment” (From Somalia)

“The courses mentioned above (TNA topics) should be practical not theoretical training that kind of training will be more helpfull to my current jobs and will bring excellence in my organizations” (From Somalia)

“My work as an engineer requires me to work in a team spirit, be familiar with the employee, whole knowledge of how successful management, quick decision, good thinking and patience to interact with all citizens. My work as an operations engineer requires me full knowledge of how to implement, design engineering programs from AutoCAD and SAP and using all Survey equipment’s like total station, GPS.” (From Egypt)



ANNEX II: SAMPLE TNA

Training Needs Assessment (TNA) Questionnaire

Personal data

1. Full name (Ms/Mr.).....
2. Current position:
3. Institution.....
4. Country/NC.....
5. North/South/West/East/Middle Africa (.....)
5. Tel..... Mobile..... E-mail:

7. Age group:

20–25

25–30

30–40

40–50

8. Education (Please specify)

University:

Faculty:

Department:

9. How many years of working experience?

__ Years __ Months



10- Details of training Undergone (last three you attended):

* 'A' Highly satisfactory 'B'-Satisfactory 'C'-Unsatisfactory

n	Area of training undergone	Duration of the training	Year	Institution which Imparted the training	Effectiveness of the training in Enhancing your competencies	Level of satisfaction*
1						
2						
3						

JOB ANALYSIS

Q.1.What are your current duties and responsibilities?

.....

.....

.....

.....

.....

.....

.....

.....

Q.2. What are the skills required for your job?

.....

.....

.....

.....

.....

.....

.....

.....

.....

TRAINING NEEDS

1- Please indicate your training needs in the context of job responsibilities on a scale of 1-5 (1- least preferred, 5 - Most preferred)

No	Topic					
1	Basics of irrigation and drainage	1	2	3	4	5
2	Design of Irrigation and Drainage Systems	1	2	3	4	5
3	Agricultural Drainage (design – execution)	1	2	3	4	5
4	Irrigation and Drainage Systems Operational and Maintenance.	1	2	3	4	5
5	Irrigation systems improvement in old lands	1	2	3	4	5
6	Modern Irrigation systems, planning and design	1	2	3	4	5
7	Crop water requirements	1	2	3	4	5
8	Irrigation Scheduling	1	2	3	4	5
9	Distribution of Irrigation Water	1	2	3	4	5
10	Design of Pump Stations	1	2	3	4	5
11	Managing Emergency units in pump stations	1	2	3	4	5
12	On Farm Irrigation Water Management	1	2	3	4	5
13	Environmental Evaluation for Irrigation & Drainage Projects	1	2	3	4	5
14	Irrigation Works, execution, operation & Maintenance	1	2	3	4	5
15	Mechanization of Drainage system planning and design	1	2	3	4	5
16	Design of Modern Bridges and hydraulic structures	1	2	3	4	5
17	Steel & Timber Farm	1	2	3	4	5
18	Canal Lining & Maintenance	1	2	3	4	5
19	Quality Management for Irrigation and Drainage systems	1	2	3	4	5
20	Irrigation Systems and it's applications in Desert soils	1	2	3	4	5
21	Rivers Protection	1	2	3	4	5
22	Navigation in River Branches	1	2	3	4	5

23	Night Storage of Irrigation Water	1	2	3	4	5
24	Irrigation Advisory Service	1	2	3	4	5
25	Environmental Evaluation for Irrigation & Drainage Projects	1	2	3	4	5
26	Maintenance of Open Channels & Aquatic Weeds Control	1	2	3	4	5
27	Measuring Discharge in Open Channels	1	2	3	4	5
28	Calibration of Instrument & Equipment	1	2	3	4	5
29	Water Quality	1	2	3	4	5
30	Water Quality; Early Warning System for the Rivers	1	2	3	4	5
31	Integrated Water Resources Management	1	2	3	4	5
32	Non- Conventional Water Resources in Arid and Semi-Arid Region	1	2	3	4	5
33	Flash Flood Conservation	1	2	3	4	5
34	Rainwater harvesting	1	2	3	4	5
35	Management and Uses of Non- Conventional Water Resources	1	2	3	4	5
36	Irrigation water economics (value – cost recovery)	1	2	3	4	5
37	Groundwater and Artificial Recharge	1	2	3	4	5
38	Development of Ground Water resources	1	2	3	4	5
39	Methods of Ground Water Pollution, Protection & Management	1	2	3	4	5
40	Ground Water Wells – Design & Management	1	2	3	4	5
41	Monitoring & Analysis of Hydrologic Data of Ground Water and Wadies	1	2	3	4	5
42	Groundwater Management	1	2	3	4	5
43	Flood and drought management	1	2	3	4	5
44	Water Crisis Management	1	2	3	4	5
45	Managing and planning of water courses using Mathematical models	1	2	3	4	5
46	Design and Analysis of Data	1	2	3	4	5
47	Forecasting using Simulation models	1	2	3	4	5
48	Climate Change Adaptation for African Agriculture Systems	1	2	3	4	5
49	Climate Change Adaptation for Water, Food, and Environmental Security	1	2	3	4	5

50	Climatic Change Impacts on Water requirements	1	2	3	4	5
51	Soil salinity management	1	2	3	4	5
52	Harvesting Equipment Design, Operation and Maintenance	1	2	3	4	5
53	Costal Shore Protection	1	2	3	4	5
54	Capacity Development for Water Management for Africans	1	2	3	4	5
55	Strengthening Institutional Capacity Building for Water Sector in Africa	1	2	3	4	5
56	Design, Construction and Rehabilitation of Small Dams	1	2	3	4	5
57	Dam-Safety	1	2	3	4	5
58	Forecasting Systems, Climate Changes, and IWRM	1	2	3	4	5
59	Funding Irrigation and Drainage Stations Rehabilitation	1	2	3	4	5
60	GIS and MIS	1	2	3	4	5
61	Remote Sensing Technology	1	2	3	4	5
62	Modern Survey Theory	1	2	3	4	5
63	Using laser Equipment for land levelling	1	2	3	4	5
64	Modern & Advanced Survey Equipment	1	2	3	4	5
65	Surveying and hydro graphing using GPS systems	1	2	3	4	5
66	Cost Estimating	1	2	3	4	5
67	Project Networking (scheduling).	1	2	3	4	5
68	Site Supervision.	1	2	3	4	5
69	Preparing Budget Estimates	1	2	3	4	5
70	Developing Efficient Operating System	1	2	3	4	5
71	Projects Management & Evaluation Visibility Studies for Projects	1	2	3	4	5
72	Languages and computer skills.	1	2	3	4	5
73	Industrial security in stations, labs & workshops	1	2	3	4	5
74	Managing locations and human resources for district engineer	1	2	3	4	5
75	Group Work, Team Building and Dialogue Skills	1	2	3	4	5
76	Effective Communication Conflict Management Skills	1	2	3	4	5



**International Commission on Irrigation and Drainage (ICID)
African Regional Working Group (AFRWG)**

77	Technical Report Writing and Presentation Skills	1	2	3	4	5
78	Building skills in strategic planning and following up	1	2	3	4	5
79	Developing Efficiency for Procurements	1	2	3	4	5
80	Developing Efficiency Skills for Storage Employees	1	2	3	4	5
81	Multi-Skill Capabilities	1	2	3	4	5
82	Developing Efficiency Financial Personal Administration Works	1	2	3	4	5
83	Group Work, Team Building and Dialogue Skills	1	2	3	4	5
84	Effective Communication and Conflict Management Skills	1	2	3	4	5
85	Project Documentation	1	2	3	4	5
86	Technical Information.	1	2	3	4	5

2- Your suggestion for additional training course to perform your current job completely so as to bring excellence in your organisation

- 1.....
- 2.....
- 3.....
- 4.....
- 5.....
- 6.....
- 7.....
- 8.....
- 9.....
- 10.....



ICID•CID

**International Commission on Irrigation and Drainage (ICID)
African Regional Working Group (AFRWG)**

3- What training do you think would be relevant to help you achieve proficiency in your future role?

- 1.....
- 2.....
- 3.....
- 4.....
- 5.....

4- Appropriate time for training

.....

.....

.....

.....

.....

Sign.....

Date.....

Kindly fill the form and submit by email to mswahba@hotmail.com