

Water Quality Capacity Building in Sudan: Present Situation and Challenges

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Background:

Capacity building is a diverse term which has different meanings to different people, depending on their targets and future plans to achieve certain objectives. Specifically capacity building encompasses the country's human, scientific, technological, organizational, institutional and resource capacities. The UNDP recognizes that capacity building is a long term continuing process in which all stakeholders (ministries, local authorities, non-governmental organizations "NGOS", water user groups, professional associations, academicians and others) participate. Briefly capacity building is much more than training and it includes the following:

1. Human resource development, for example, equipping individuals with:
 - a. The know - how
 - b. The understanding
 - c. The skills
 - d. Access to the relevant information
 - e. Training
2. Organizational development.
3. Institutional and legal framework development.

Why is capacity building needed?

1. In spite of the fact that the scale of need is enormous, the appreciation of problem is low or neglected.
2. The link or the gap between need (demand) and supply is weak.
3. There is a lack of realistic and objective funding.
4. The training institutions are isolated and communications among them are poor.
5. The development of teaching material is both inefficient and non-sufficient.

Building capacity to monitor water quality:

It is the first and crucial step to sustain cleaner water in developing countries. One of the key challenges to ensuring adequate supplies of fresh water and sanitary systems is to build the capacity of various stakeholders and deliver water and sanitation services. One tool of such capacity building is technological and includes the wide deployment (wide spread) of water quality monitoring and analysis equipment combined with indigenous implementation.

Hereunder is a partial list of some of the agencies providing capacity building:

- World Bank (WB)
- International Monetary Fund (IMF)
- United Nations Development Programme (UNDP)
- Food and Agriculture Organization of the United Nations (FAO)
- Non-governmental organizations (NGOs)
- International Services Trade Information Agency (ISTIA)
- Development Gateway (Jointly sponsored by UNDP and the World Bank)
- Capacity Building International
- Asian Development Bank (ADB)
- Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ)

Current Situation in Sudan:

In this country efficient and sufficient research in the water sector (especially water quantity and quality) is hindered by many constraints, some of them may be summarized hereunder:

1. Lack of a clear national water policy

2. Financial support to establish and sustain equipped laboratories.
3. Lack and failure to rehabilitate the existing laboratories.
4. Lack of funds to secure research in all institutions indiscriminately (Universities, Ministries, Research centers ... etc).
5. Lack of certification, assurance and accreditation.
6. Related to the above (No. 5) is the lack of identifying and pinpointing the official laboratories (reference laboratories) that are authorized to issue water analysis certificates pertaining to water quality.
7. Lack of communication, co-ordination and co-operation among the various water researchers.
8. Lack of teamwork approach to solve the exiting water quantity and quality problems.
9. Lack of scheduled and target - aiming training programs at all levels (Diploma, M.Sc. and Ph.D) in the field of water quantity and quality (except for few instances supported by external sources or universities or both).
10. Lack for job opportunities for the trained personnel (e.g. graduates) – this may hinder the advancement of water technology.
11. Lack of co-operation and co-ordination among the day by day increasing number of "water societies", "environment societies" and the like as presented and advertised in the daily press.
12. Above all, the most important issue is the lack of:
Openness to criticism and transparency concerning the several drinking water quantity and quality deterioration issues that appear in the daily press almost every day.

I. Misconception And Overlooking Of The Water Quality Capacity Building Concept:

Recently several conferences, symposia, seminars and workshops were held. The research and review papers presented in these gatherings investigated most of the aspects of water research (e.g. water quality in particular), capacity building and training sessions (e.g. training of trainers). However, the recommendations of these conferences did not find their way for execution and stayed on shelves for history and decoration. This may be, primarily, attributed to:

1. Water research projects are not given priority in financing.
2. Appreciation and conceptualization of the water related problems is low or even neglected. Accordingly, I may suggest that:

■ We must call emphatically for fundamental new approaches to the assessment and management of fresh water resources which can be achieved through:

"Political commitment and involvement from the highest levels of government to the smallest communities.

This commitment will need to be backed by:

a. Substantial and immediate investment in water project.

b. Starting public awareness campaigns:

■ Extension bulletins

Media activities: daily press, television and radio interviews ... etc).

c. Legislative and institutional changes.

d. Technological development

e. Efficient and objective capacity building programmes,

f. Local and transboundary interdependence.

g. Rivers and Nile lack monitoring. The number of monitoring stations is small and, therefore, there is a need for more stations (Nile laboratories) to be established.

h. Regional and cross border exchange of information is (of paramount needed) lacking.

II. Conclusions And Recommendations:

Scarcity, misuse and pollution of water pose a serious and growing threat to sustainable development and protection of the environment. Sanitation, human health and welfare, food security, industrial development and the ecosystems which depend on water are **all at risk**, unless water and land resources are managed more effectively. Concerted efforts are crucially needed to reverse the present trends of water pollution and sanitation.

Recommendations

The following guiding principles are recommended for adoption to help tackling the water resources' problems on a wide range of fronts:

1. Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment.
2. Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels.
3. Women play a central part in the provision, management and safeguarding of water.
4. Water has an economic value in all its competing uses and should be recognized as an economic good.

5. Development and implementation of programmes to overcome limited technical know - how, financial and institutional capacities.
6. Promotion of commitment, support and participation of all stakeholders to improve the performance of water utilities.
7. Encouraging politicians and government to consider providing due autonomy or attention to public water utilities and implementation of strategies leading to efficiency, effectiveness transparency, sustainability and accountability.
8. It may be suggested that an annual national water forum should be adopted to address the water quality and quantity issue.
9. Increasing finance to improve and extend safe and adequate water and sanitation for all.
10. Establishing a central reference laboratory.
11. Establishing a national water quality and quantity information center.
12. Development of efficient follow-up mechanisms.

Some examples of published research work on water quality and quantity(Either singly authored , co-authored or else) by the staff and graduate students of the Faculty of Agriculture, University of Khartoum, Sudan , during the period (1972 – 2017):

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- 2- Hammad,Z.H. and Dirar, H.A.(1982). Microbiological examination of Sebeel water. Applied and Environmental Microbiology 43(6), 1238 – 1243.
- 3 - Abdel Magid, H.M., I.S. Ibrahim. and H.A. Dirar 1984. Chemical and microbiological examination of well and Nile water. Environment International 10, 259-263 (U.S.A.).
- 4 - El Hassan, B.M, M.A. Awad El Karim, H.M. Abdel Magid. I.S. Ibrahim and H.A. Dirar 1984. On water quantity and quality and their impact on health in Khartoum province, Sudan. Water Quality Bulletin 9 (No. 4), 225-230 (Canada).
- 5 - Dirar,H.A. (1986). Coliform bacterial counts in the Nile water. Environment Internaternational 12, 571 – 576.
- 6 - Abdel Magid, H.M. 1997. Assessment of drinking water quality in the Al-Gassim Region of Saudi Arabia. Environment International Journal 23(2), 247-251 (U.S.A.)
- 7 - Al-Redhaiman.K.N. and H.M. Abdel Magid 2002. The applicability of the local and international water quality guidelines to Al-Gassim region of central Saudi Arabia. Water, Air and Soil Pollution Journal 137, 235-246 (The Netherlands).
- 8 - AL-Turki, A.I., A.H.. El-Nadi, K.N. Al-Redhaiman, H.M. Abdel Magid 2002. Adsorption of some heavy metals and bacteria by activated charcoal made from date palm leaves. J. of Advances in Agric. Res. Alexandria Univ , Vol 7 (4) : pp 895 – 900 . (Egypt) .
- 9 - Abdelmagid , H. M. (2010). Situation Analysis of Bottled Drinking Water Quality in Sudan . J. Soil Sci. and Agric . Engineering , Mansoor Univ., Vol. 1 (9) : 949 – 956 .
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- 13- Abdellah, A. M., Abdel-Magid, H. M. , and Yahia , N. A. (2012). Assessment of Drinking Water Microbial Contamination in the Al- Butana Region of Sudan. Journal of Applied Sciences, 12(9): 856-862.
- 14 -Abdellah, A. M., Abdel-Magid, H. M. , and Yahia , N. A. (2012). Effect of Long-term Pumping on Fluoride Concentration Levels in Groundwater: A Case Study from East of Blue Nile Communities of Sudan. Journal of Applied Sciences, 12(13): 1345-1354.
- 15 -Abdellah, A. M., Abdel-Magid, H. M. , and Yahia , N. A. (2012). Prediction of Groundwater Nitrate Contamination trends in Al-Butana Region of Sudan. Journal of Environmental Science and Water Resources, Vol. 1(6), pp. 133-143.
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