

Current and proposed Future of Management Practices for the Water Resources of Al Jabal Al Akhdar Region, North East Libya

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Abstract: The aim of this research is to review of the current management practices in terms of policies, legislative and organizational framework and analyze existing gaps, constraints and challenges of the water resources of Al Jabal Al Akhdar (Green Mountain) area, North East Libya. The statuses of water resources management was investigated according to the available relevant literatures from water institutions. The review proves the existence of many challenges and constraints such as; Institutional, human, technical and legislative faced and still facing water resources management and the main solution in term of reform were introduced to overcome these challenges and constraints.

Key words: Water Resources • Libya • Al Jabal Al Khdar

INTRODUCTION

Al Jabal Al Akhdar (Green Mountain) area is a highland along the northern eastern Libya as shown in figure (1). It is a crescent-shaped ridge attaining a height of more than 850 m a.s.l. in its central part. The northern flank consists of step-like plateaus bordered by escarpments. The southern flank dips gently towards a depression extending from Ajdabiya to Al Jaghub, which is marked by several large sabkhas. To the east and mostly to the west, a coastal plain is well developed between the foot of the first escarpment and the sea [1].

There are six main cities in the area; Al Abyar, Al Bayda, Al Marj, Al Qubbah, Darnah and Shahat and about 54 villages, in addition to scattered populations. The census made in the year (2006) by the Libyan National Authority of Documentation and Information indicated that the total population of these populated areas as 530,503 inhabitants. The expected population in 2025 is estimated at 769,487 inhabitants, which considered as a pressure on the groundwater resources of Al Jabal Al Akhdar area.

Water Legislation: There are numerous legislations related to water in Libya and also numbers of decisions, both issued by the Previous Ministerial Council, known as The General Peoples Committees.

Laws: In Libya, five water related laws can be considered, which are discussed below:

Law no 106 [2]: Consists of 6 chapters, 141 articles and implementation regulations governing public health, preventive medicine, pharmaceuticals materials and medical professions. Water was mentioned in different articles regarding health protection in relation to such as; water standards, water sampling and water pollution.

Law no 112 [2]: This law consisted of 25 articles governing the regulations of the practice of drilling water wells.

Law no 3 [2]: Consists of 17 articles and implementation regulations where it declares the water as a partnership between the people and that all people are responsible for its protection and maintaining it from overuse. The main concerns and components of the law can be summarized as:

- Governing all of natural water resources.
- Divided the country into water regions.
- Regulate the uses of water.
- Prohibits the discharge of waste and pollutants to the water resources.
- Prohibits drilling water wells without permits.

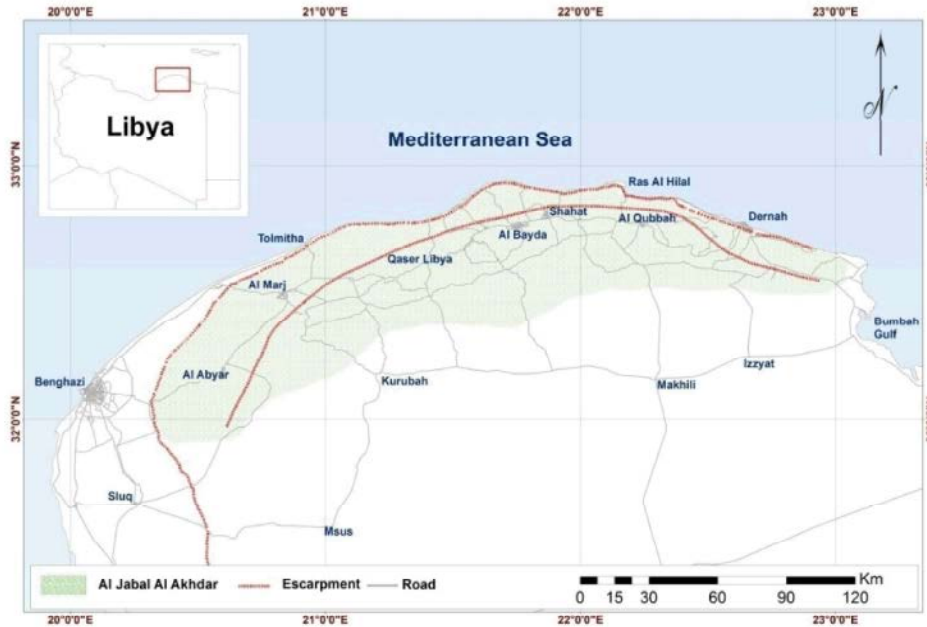


Fig. 1: Location Map (Hamad,2012)

Table 1: Decisions concerning water in Libya (GWA, 2009)

Decision	Year	Decision subject
85	1976	Conditions of exploitation of water resources form Al Marj basin
183	1976	Conditions of exploitation of water resources form Jafarah plain and surrounded mountain
452	1976	Conditions of exploitation of water resources form Komas and Musrtah first Aquifer
814	1979	Prohibits water drilling in Jafarah plain and surrounded mountain
798	1982	Implementation regulation of the Law no 3 1982
791	1982	Implementation regulation of the Law no 3 1982
94	1984	Modification regarding decision for drilling water wells permits and regulation of the Law no 3 1982
95	1984	Modification regarding decision791 for appointment of the Department of Water and Soil for drilling water wells permits and supervision
757	1990	Regulate tgeneral water authority
431	1994	Regulate the exploitation of water
82	2002	Detached the drilling water wells permits and supervision from General Water Authority to local departments of agricultural
625	2007	Cancellation of the Decision625 and prohibits water drilling in some regions in Libya

- Prohibition of over-exploitation of water areas, which reflected the deterioration in the aquifers.
- Regulate the exploitation of groundwater in oil industry.

Law no 7 [2]: Consists of eleven chapters and implementation regulations, where its main concerns are about environmental protection. Water is concerned in Chapter Four that deals with water resources protection from pollution.

Law no 9 [2]: Consists of three articles and it is removing the constraints on groundwater exploitation by cancellation of all prohibits for drilling water wells without permits.

Decisions: In Libya during the previous regime, decisions were made in a sudden manner and with no prior planning, they were executed fast. This can be considered to be a general phenomenon resulting from the instability of the former regime, although some of these decisions are considered crucial. The main decisions related to water in Libya are listed in Table 1.

Enforcement of water legislation is undertaken primarily by General Water Authority (GWA) and General Environmental Authority (GEA), public health departments at the municipalities and General Company for Water and Wastewater (GCWW) through the agricultural police, municipal utilities police and courts. However, regulations or by-laws to follow up the laws do not always existp [3]. While all of the previous laws

(except Law number 9) determine in precision and comprehensiveness the standards and procedures, they lack modernization in accordance with the standards of relevant international organizations and their implementation is not properly made. Furthermore, some of these laws and decisions are conflicting; for example, The decision no (82 /2002) which detached the drilling water wells permits and supervision from General Water Authority and gave its responsibility to local departments of agricultural is in clear conflict with law number (9/2003), leading to loss of control over water resources development and management and overlapping between water-related institutions. A consequence of this is ineffective water resources management.

Water Pricing: Water is still considered as a free commodity in Libya. The farmers are not charged for water for irrigation, where they are only billed for the consumption of energy. City dwellers supplied with municipal water through public networks are charged for the water consumed based on a poorly operating metering system. The billing system is not in operation in most urban centers. Public utility departments, locally established in each district are still estimating the consumption as most water meters are not properly functioning and need to be replaced [3].

Water Institutions: The water institutions in Libya are established through decisions from the Ex-Ministerial Council and in a very centralized approach. Operations are regulated through several laws including Water Law (3/1982), Public Health Law and Law (15/2003). Complimentary laws and resolutions include those on land use management, agriculture, urban planning, infrastructures and utilities. National drinking water standards and effluent reuse/disposal criteria are also applied [4]. These water institutions were characterized by less administrative stability and overlaps in responsibilities always occurs. The main responsibilities and tasks of these institutions can be discussed according to [5-8] as in the following:

The General Water Authority (GWA), formed in 1972 and is entrusted with:

- Conducting studies and research to ensure optimum utilization of available resources;
- Design and supervision of dam construction and follow up of their operation and maintenance;

- Providing advice in connection with exploitation of water resources to general secretariats organizations and authorities;
- Preparation of technical specification for drilling, completion and maintaining water wells and supervising their implementation;
- Proposing the general water policy; and
- Proposing water legislations.

Additional tasks were later added to GWA to cover the fields of irrigation, drainage and soil. In 2006, GWA became under the general supervision of the General People's Committee of Agriculture.

The General Company for Water and Wastewater (GCWW) was formed in 1996 and was initially entrusted with the following main responsibilities:

- Operation and maintenance of transmission and distribution networks and water pumping stations and control centers and control the list, to ensure the provision of better services to the users of them;
- Operation and maintenance of drainage systems and related treatment plants, filtration, pumping and monitoring, control and so as to ensure provision of better services to users of it;
- Carry out installation and connections for sanitation services to consumers;
- Carry out water supply for consumers and conducting studies on the development of consumer services, leading to the development of water services in all areas;
- Tax for the services of water and sanitation, according to the rules of the organization;
- Develop training plans for the development and human resource the relevant authorities and take action to implement the support of those programs and plans;
- The studies and technical and economic research relevant to transportation systems, water distribution and maintenance projects and construction of sanitation systems;
- Propose policies for water and sanitation and the rules necessary to regulate the activities including designed to develop and expand;
- Propose specifications and standards in the field of water and sanitation; and
- Propose Strategic plans long, medium and short term water and sanitation and transmit them to the relevant authorities for approval.

Table 2: The organizational framework and infrastructure of GWA in east Libya.

Eastern branch		No of Employee	Labs	Offices	Information center
Headquarter	Benghazi main office				
Tripoli	-----	42	1	Two floors building	1
	Al Jabal Al Akhdar	6	-	-	-
	Al Marj	-	-	-	-
	Al Abyar	-	-	-	-
	Al Baydah	2	-	-	-
	Shahat	-	-	-	-
	Al Qubbah	-	-	-	-
	Dernah	3	-	Small office	-
	Tobrock	-	-	-	-

The General Environmental Authority: Is responsible for water quality monitoring and assessment.

The Man Made River Authority: Was established by law (11/ 1983) for water extraction from aquifers of the south, to be transported to the coastal strip in the best economical and operational means for agricultural, domestic and industrial purposes.

In addition to these main water institutions, a number of institutions with minor responsibilities in water resources are:

- Agriculture Research center (ARC)
- The National Center for Standards (NCS)
- The General People's Committee for Utilities (GPCU)
- The Housing and Infrastructures Board (HIB)
- The Secretariat of Energy

Most of the previously discussed water institutions have their activities in Al Jabal Al Akhdar, mainly the GWA, GCWW, which are currently planned and financed centrally in the headquarters at Tripoli and the branches at Benghazi, where the participation of the local stakeholders is very strict and with limited tasks. Table (2) illustrates the organizational framework and infrastructure of GWA in East Libya. The structure results in the following water management issues:

- Inability to control water resources for the entire area.
- Loss of water resources information, which is the bases of water resources assessment.
- All the information and technical studies existed at the branch in Benghazi.

Logistical problems in overseeing the implementation of the facilities of water resources which led to deficiencies in performance.

- A centralized licensing and transactions on water resources has resulted in violations.

The GCWW manages the day-to-day operation and maintenance activities according to an approved "central" national plan (and budget). The company delegates its mandates to its eight administrative units serving the different regions of Libya. In so doing, a reasonable degree of decentralization is practiced. Past experience with dissolution of the GCWW and total decentralization was only partially successful as the new regional "sub-authorities" lacked both the capacities to undertake their tasks and the experience to address problems with no central body to turn to for assistance and advice [5].

Future Management

Challenges and Constraints: According to [5] and [2] there is increasing water scarcity due to escalating demand driven by population growth and urbanization and uneven distribution of water resources and quality degradation, water resources management in the area faces many challenges and constraints, which are as follows:

Institutional:

- Centralization in planning and financing
- Limited budget and financial resources
- The overlap of water institutions
- The lack of coordination between the water institutions
- Organizational instability
- Limited structuring between the functional levels
- Inadequate institutional capacity at regional and local levels
- Limited experience in integrated management
- Less participations of the stakeholders

Human:

- Socio-economic dimensions are insufficiently reflected
- Less in capacities in water management
- Limitation in skilled labor and insufficiently prepared for coping with future challenges
- Absence of an organized long-term approach to awareness raising activities
- Lack of financial incentives to workers in water institutions

Legislative:

- Some laws conflicting with water resources conservations
- The adoption of laws governing the protection of some water resources not associated with implementation procedures and no supplementary economic opportunities
- Some of the decisions those made disposing of legal prerogatives to intervene in the scope of water.
- The enforcement of water laws made by different parties in less integrated manner

Technical and Environmental:

- Lack of Monitoring water resources
- Lack and quality of data
- Absence of proper specifications and technical procedures

Water Legislation Reform: Water laws and legislative instruments are essential and powerful tools for formulation and implementation of integrated water resources management IWRM plans. The legislation and regulation systems (e.g. laws, by-laws, rules, decrees, agreements, etc.) should deal with all water uses, monitoring of water quantity and quality, water allocation for various functions and sectors, water rights, etc.) [8].

The following key legal amendments should be considered to carry out the process of water legislation reform:

- The current water resources laws and legislative instruments for water resources in Al Jabal Al Akhdar area considered as part of the Libyan national laws and legislative instruments and cannot be separated with consideration of some subdivisions form water laws should be customized based up on environmental situation of Al Jabal Al Khdar.

- Current water laws and regulations need to be updated for adoption IWRM policies and plans.
- Enabling the authority and empowerment to all the Water stakeholders by define their rights and responsibilities in the water laws.
- Activating the role of financial institutions, banks and economic organizations to support programs of sustainable development, with the active participation of the private sector and investors through a partnership between the public and private.
- Decentralization and monopoly removal in the field of water resources studies
- Initiate activation of economic instruments and effectiveness in the laws of water to provide the legal framework and support for policies such as cost recovery and water pricing
- Enable the provision of power to the inspectors and enforcement personnel in the institutions of water, health and the environment to play an active role and to ensure compliance with the standards and regulation in the water laws in coordination with other enforcement authorities such as the Ministry of the Interior and agencies of the national security and the water police.
- The involvement of lawyers and parliamentarians from the beginning of the process of developing policies and strategies to raise the water level of awareness and knowledge about the legal aspects and the necessary reforms to improve the management of the water sector.

Water Institution Reform: For many reasons, developing country governments consider water resources planning and management to be a central part of government responsibility. This view is consistent with the international consensus that promotes the concept of government as a facilitator and regulator, rather than an implementer of projects. The challenge is to reach mutual agreement about the level at which, in any specific instance, government responsibility should cease, or be partnered by autonomous water services management bodies and/or community-based organizations [9]. To establish a new implementation framework that includes a clear description of roles and functions of the organizations involved in the implementation process, time schedule, level of responsibilities and relation to other stakeholders, communication channels and the reform for water institutions for Al Jabal Al Khdar should be carried with respect to previous key legal amendments.

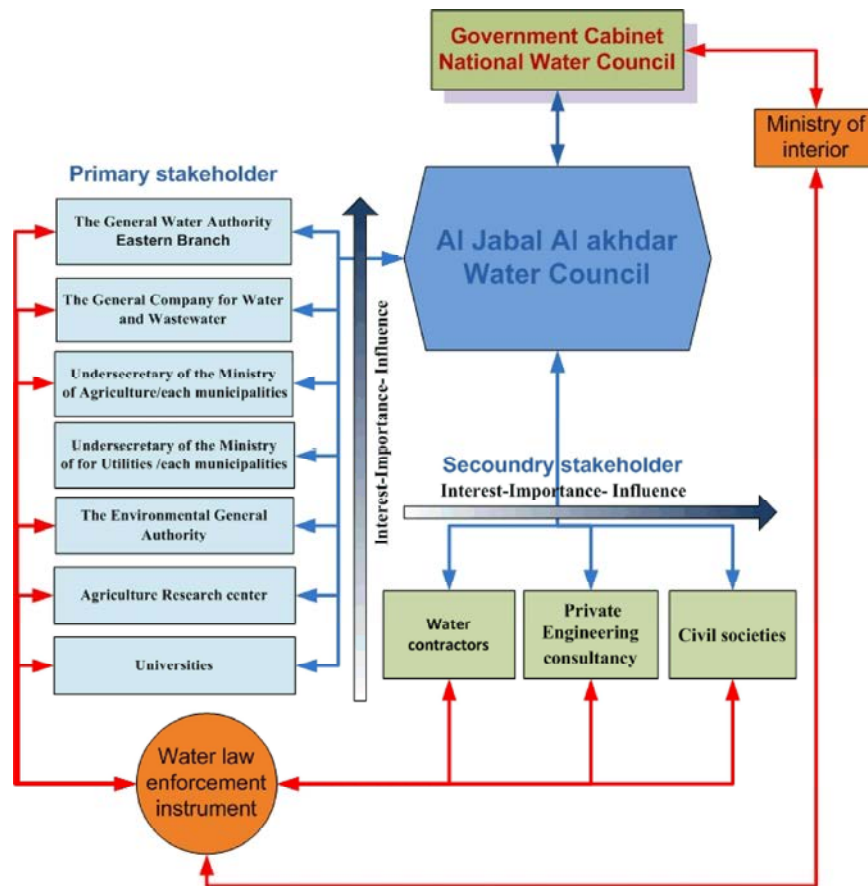


Fig. 2: Proposed organizational framework

The proposed organizational framework as in the figure (2) that illustrates all the stakeholders within the proposed framework where new proposed institution to function as a water law enforcement instrument and the second proposed institution is Al Jabal Al Akhdar water council, aimed to:

- Secure financial budgets regarding water resources investment and conservation
- Act on the lowest provincial/local level
- Monitor and follow up the implementation of local action plans on the operational levels,
- Carry responsibilities of operation and maintenance of water resources infrastructure,
- Identify local issues and priorities that should be incorporated in regional and national plans,
- Resolve conflicts among water users at local level,
- Ensure decentralization
- Ensure water information system integrity and quality

CONCLUSIONS

Water resources management system in Al Jabal Al Akhdar Area is very traditional and weak and that is clear from the gaps, constraints and challenges that have been reviewed in this research, which mostly due to the noninvolvement of local stakeholders and fluidity of laws and decisions on water resources and administrative structure for water institutions. Therefore need a comprehensive reform for water sector with applicable laws and regulations necessary for sustainability of the water resources of Al Al Jabal Al Akhdar and applying the principles of integrated water resources management principles.

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