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SUMMARY – The basic sets of laws with regard to water management did not change for a very long time. The laws started to be reviewed seriously only in 1990 for the water users associations and in 1994 for a more comprehensive legal framework for water use. The Administration is still largely in charge of the formulation of policies regarding water and the legislative control is not very well developed. The consultative institutions in charge of advising the various agencies and ministries regarding water and drought management do not have regulatory powers. They issue recommendations and approve plans. The regulatory functions over water utilities, in irrigation as well as in municipal water distribution, are usually mixed with operational duties such as planning, project financing and supervision, and supervision of agencies. In the current setting, stakeholders do not always have a proper say on water issues, except locally by the control over municipal water through the local collectivities, which work under the supervision of the Ministry of the Interior. However, slow change is taking place. An important shortcoming of the drought policies so far envisaged is that when the drought cycle is over, the activity of the national inter-government committee is abandoned. Should the drought recur, the same procedures are reproduced regardless of the results of the previous drought episode. There is however a renewed political will to move away from this crisis management to a more proactive drought management approach. This has been activated in 2001 by the creation of the National Drought Observatory (NDO) in the form of an institutional network of representative stakeholders working on drought issues at the national/regional/local levels. A major thrust of this newly established structure is to assist decision makers and drought managers with the design of appropriate drought policies to achieve better risk management. Such a policy should establish a clear set of principles or operating guidelines to: (i) improve drought characterization, monitoring and impact evaluation; (ii) to reflect regional differences in drought characteristics, vulnerability and impacts; and (iii) to effectively govern drought management. The Observatory should be working closely with national scientific institutions and key stakeholders; and gather practical experience through international cooperation.

Key words: Drought management, proactive responses, agriculture, legislation.

RESUME – *"Maroc". Les textes de loi fondamentaux concernant la gestion de l'eau n'ont pas changé depuis très longtemps. Ce n'est qu'en 1990 que ces lois ont commencé à être sérieusement modifiées pour les associations d'usagers de l'eau, et en 1994 a été mis au point un cadre légal plus global pour l'utilisation de l'eau. L'Administration assume toujours largement la formulation des politiques concernant l'eau et le contrôle législatif n'est pas très bien développé. Les institutions de consultation s'occupant de conseiller les différentes agences et ministères en matière d'eau et de gestion de la sécheresse n'ont pas le pouvoir de légiférer. Ils émettent des recommandations et approuvent des plans. La fonction législative en matière d'exploitation de l'eau, pour l'irrigation ainsi que pour l'approvisionnement municipal, englobe généralement aussi des tâches opérationnelles telles que la planification, le financement et la supervision de projets, ainsi que la supervision des agences. Dans le contexte actuel, les parties prenantes n'ont pas toujours leur mot à dire sur la problématique de l'eau, excepté localement par le contrôle de l'eau municipale à travers les collectivités locales, qui travaillent sous la supervision du Ministère de l'Intérieur. Cependant, des changements se produisent lentement. Une lacune importante des politiques sur la sécheresse envisagées jusqu'à présent est que lorsque le cycle de sécheresse est terminé, l'activité du comité national intergouvernemental est abandonnée. Si la sécheresse venait à se répéter, on reproduirait les mêmes procédures sans tenir compte des résultats de l'épisode précédent de sécheresse. Néanmoins il existe une volonté politique renouvelée d'avancer, de passer de la gestion de crise à une approche plus proactive de gestion de la sécheresse. Ceci s'est manifesté par la création en 2001 de l'Observatoire National de la Sécheresse, sous forme d'un réseau institutionnel d'acteurs représentatifs travaillant sur la problématique de la sécheresse à l'échelle nationale, régionale et locale. Un avancée majeure de cette structure nouvellement établie est l'aide apportée aux décideurs et gestionnaires en matière de sécheresse pour mettre au point des politiques appropriées pour une meilleure gestion des risques. Cette politique devrait établir un ensemble cohérent de principes ou de lignes directrices pour : (i) améliorer la caractérisation, le suivi et l'évaluation de l'impact de la sécheresse ; (ii) pour refléter les différences régionales concernant les caractéristiques de la sécheresse, la vulnérabilité et les impacts ; et (iii) pour diriger efficacement la gestion de la sécheresse. L'Observatoire devrait travailler en étroite collaboration avec les institutions scientifiques nationales et les acteurs clés ; et mettre à profit l'expérience pratique à travers la coopération internationale.*

Mots-clés : *Gestion de la sécheresse, réponses proactives, agriculture, législation.*

Introduction

The general objective of this report is to describe the organizations and institutions involved in water and drought management and mitigation as well as their linkages. The report has a special emphasis on irrigation water systems, drinking water supply and drought mitigation activities.

Data and information systems

Table 1 outlines the institutions that collect, record and process data that provide a representation of natural processes and socio-economic patterns.

Table 1. Summary of institutions that collect and process data related to drought in Morocco

Category	Institutions†	Type of data
Climate	DMN, Ministry of Forestry, ORMVA, DPA, SCWC	Meteorological
Water	DGH, AGR, DPV, ONEP, SCWC, River Basin Agencies, Autonomous state-controlled companies, ME/Water	Surface water, groundwater, water quality control, water use and allowances
Land	DAF, DPV, ANCFCT, CRTS, MI, DCL, ME	Land use, topography, land census, administrative and ecological zoning
Agriculture	MARD, DPAE, DPV, DE, AGR, CGDA, DEPAP, CNCA, MAMDA, ONICL, INRA, IAV, ENA, CRTS, ME	Agricultural census, statistics (area, type of farms, labour, production, prices, export and import). Research and development activities
Forestry	CFLD, DDF, DREF, ENFI, IAV, ME	Forestry (areas, products, prices)
Socioeconomic	DPAE, MI, IAV, ENA, INRA, Universities and NGOs	Population, macroeconomic indicators, production costs
Energy & Mine	MEM, MC, ONE	Statistics by activity, energy consumption
Finance	MF	Statistics by activity, studies reports, outlook report

†See acronym list.

Legal framework

The 1995 Water Law

In Morocco, the first text concerning modern water legislation goes back to 1914 (Decree of 1 July 1914) recognizing water resources as a public good. It was completed by the Decrees of 1919 and 1925 which considered all forms of water resources in the public domain. Since then, until 1994, water could not be privatized, except for those resources where traditional rights were legally recognized. In 1995, a new legislation was voted by the Parliament and adopted by the Government.

This 1995 law called "Loi sur l'Eau – Water Law" constitutes the main water legal frame. This law recognizes that all water resources are a public good and water should be managed at a river basin level. The law is authorizing the creation of river basin agencies (RBA), which, when fully established, will result in a more decentralized and participatory water management programme.

The content of this Water Law is organized around the following points:

(i) Water as a public hydraulic domain (Articles 2, 3, 4, 5).

(ii) Water rights acquired on public hydraulic domain (Articles 6, 7, 8, 9, 10, 11).

(iii) Conservation and protection of public hydraulic domain (Article 12).

(iv) Water management planning at the river basin level, including:

- Section 1 – Superior Council for Water and Climate (SCWC; "Conseil Supérieur de l'Eau et du Climat") (Articles 13, 14).
- Section 2 – National Water Plan and Master Plan for Integrated Water Resource Management (Articles 15, 16, 17, 18, 19).
- Section 3 – River Basin Agencies (Articles 20, 21, 22, 23, 24).

(v) General conditions of water use including:

- Section 1 – Rights and obligations of the owners (Articles 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35).
- Section 2 – Licenses and concessions relative to the hydraulic public domain (Articles 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48).
- Section 3 – Protections and suspension areas (Articles 49, 50).

(vi) Fight against the water pollution (Articles 51, 52, 53, 54, 55, 56, 57).

(vii) Water for food usage (Articles 58, 59, 60, 61, 62, 63, 64, 65, 66).

(viii) Relative capacities for exploitation and sale of natural water of medical interest, water named "de source" and "de table" (Articles 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78).

(ix) Relative capacities of water management and use for agriculture (Articles 79, 80, 81, 82, 83, 84, 85).

(x) Relative capacities of water use in case of water scarcity (Articles 86, 87, 88).

(xi) Provisional capacities and others including:

- Section 1 – Searches for water. Inventory of hydraulic resources (Articles 89, 90, 91, 92, 93).
- Section 2 – Fight against flood (Articles 94, 95, 96, 97, 98, 99, 100).
- Section 3 – Transition measures (Articles 98, 99, 100).

(xii) Provisional capacities for the local community and water (Articles 101, 102, 103) and for water police – Infringements and penalties. This includes:

- Section 1 – Infringement statement (Articles 104, 105, 106, 107, 108, 109).
- Section 2 – Penalties (Articles 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123).

Legal aspects and history

Due to the nature of the climate in Morocco, irrigation has been introduced very early, and rules on property, conflict resolution and ways of managing and realizing collective works for implementing irrigation networks have been defined, debated and written in the 9th century, after Islam was introduced in Morocco. The institutional setting was shaped by the laws inherited from Islam as interpreted by Moroccan Ulema (Arabic word for jurist that interprets the tenets of Islam in order to complete and explain the rules derived from the Revelation), by the customs and rules developed in pre-Islamic Morocco and by the formal and unified legislation introduced by the French Protectorate from 1912 and partially revised since Independence in 1956.

A turning point occurred in 1912, with the Protectorate and the introduction of a "modern" legal system and juridical concepts. The actual "Code de l'Eau" (Water Code), voted unanimously by the Parliament in 1994, is in the continuity of the legal framework for water introduced in 1912.

The assertion of public ownership (the first article of the Water Law asserts that "water is a public good that could not be a private property except for prior rights, duly recognized") of all water resource is the pillar of all the legislation from 1912 onward. That created a mixed system due to the prevalence of private appropriation based on the interpretation of Moroccan Ulema of Islamic Chariaa (set of laws that govern Muslims, laws pertaining to spiritual and social life in the Muslim community). The coexistence of the modern legal system, based on public property and the inheritance of Islamic law recognizing private appropriation and free transactions on water rights, forms a mixed system not yet fully solved.

Water laws

If private property rights over diverted water were recognized by Moroccan Ulema, the "large masses of water" as lakes and rivers were kept in custody by the king, due to their public good nature, in accordance with the general interpretation of the Chariaa. The French public servant, in the Protectorate, used this argument in order to assert the public ownership of all water that was not claimed as private property. The first law passed on by the Protectorate, in 1912, defined public domain over forests, water and coasts.

The legislation on water was further codified in 1925, with the adoption of the law on "Régime de l'Eau" (Water Regulations) that develops on the public ownership of water and defines the conditions of water use and water access: in order to use water for irrigation, an agreement or a concession has to be obtained from the administration which can provide financial and technical support in mobilizing water. It is completed by a decree stating the conditions for recognizing water rights. Beside the corpus on public ownership, the Protectorate issued a law regarding water users associations in order to formalize the implementation of a private irrigation network. The "Associations Syndicales Agricoles Privilégiés" (ASAP, 1924) were allowed to intervene on the public domain in order to realize irrigation infrastructure and received privileges in order to implement the network.

The revision of the Water Law in 1994 was more ambitious. It introduced a lot of new considerations about the management of water at the national, regional and local level. Its main points are:

(i) An extension of the public ownership of water and the imposition of a time limit of 5 years to any claim on private water rights.

(ii) The introduction of the "Agence de bassin" (water basin agency), as the main entity in charge of water issues at the water basin level.

(iii) The official recognition of planning by the State of mobilization and allocation as the main instrument of decision about public infrastructure, water allocation and water transfer. The water basin master plan is to be prepared by the basin agency and to be submitted to the SCWC for formal adoption. Once adopted, the master plan for an integrated management of water resource at the hydrological basin level becomes the main document to decide water allocation by sectors, abstraction agreement and concessions. It includes goals in terms of quality.

(iv) The introduction of new taxes, "redevance de bassin" (basin charge) based on water abstraction, and pollution taxes based on the contribution to the stream pollution. These taxes will cover subsidies in investment to reduce pollution, expenditures related to the network of observation in the basin, the definition of the master plan of water mobilization and allocation at the basin level and management of the agency.

(v) The introduction of new instruments to deal with pollution and drought – fees for polluters, subsidies for investment to reduce pollution and exceptional power to the administration for dealing with drought. In the case of acute drought, a decree defines the area where the administration

receives such powers that allow for reduction in abstraction, and obligation of use of underground resources.

(vi) The formal introduction of the National Hydrological Plan, to be presented to the SCWC, to solve allocation conflicts and make recommendations.

Water rights

Due to the heterogeneous sources of rights regarding water, derived from customs, from the application of the modern laws or from Chariaa rulings, the water rights in Morocco are very diverse. There are modern and registered water rights, the rights associated with ASAP, the rights conceded to the autonomous water distribution State-controlled companies, ancient water rights recognized and registered, and ancient water rights recognized but not registered, particularly the water rights prevalent prior to the construction of a dam on a river.

Political aspects

Political aspects regarding water issues in Morocco relate to water law approval, stakeholders and their participation, and reforms and changes.

Water Law approval

The Law of 1994 was adopted unanimously by the Parliament after a ten year discussion process to attain a unified position by the stakeholders involved. The issue of water rights, and the provision that all unregistered rights would be cancelled if not declared in the five years following the promulgation of the law did not provoke reactions from representatives. Very clearly, the Administration is still largely in charge of the formulation of policies regarding water and the legislative control is not very well developed.

Stakeholders and their participation

In the board of the river basin agencies, a third is composed of the administrations, a quarter from public enterprises and the rest (42%) represents users. In conducting irrigation projects, it is very recently within the framework of Water Users Associations (WUA) Law in 1990 ("Association des Usagers de l'Eau Agricole", AUEA) that users have a say on the project.

Reforms and changes

In the current setting, stakeholders do not always have a proper say on water issues, except locally by the control over municipal water through the local collectivities, which work under the supervision of the Ministry of the Interior. However, slow change is taking place. This change will be supported because NGOs and civil society are more active in this field, and water user associations are gaining more autonomy in their dialogue with the administration.

Map of relevant institutions and organizations for water and drought management

Water resources management overview

The institutional organization of water management includes the main institutional stakeholders in the water sector. These are represented by the key ministerial departments including Agriculture, Water and Environment, Local Collectivities (Ministry of the Interior), Health, Energy and Mines, and Finance Departments (Fig. 1). NGOs such as water user associations, and natural

resources/environment protection associations are also actively operating in the country in response to civil society's needs although they do not deal only with water and environmental issues.

Fig. 1. Main stakeholders in water sectors in Morocco.

The current institutional setting does not clearly define the scope of intervention of each ministerial department. However, it addresses the issue of coordination through consultative institutions at the national, regional river basin and local levels, and through the executive central administration authorities. The overall coordination is the role of the Directorate General of Hydraulics [(DGH, ("Direction Générale de l'Hydraulique"), State Secretary for Water] with a strong involvement of the Water and Ag-Engineering Administration (AGR, "Administration du Génie Rural", Ministry of Agriculture). Decisions related to water resources management are implemented by the public offices and agencies which operate under the supervision of their respective ministries: National Water Drinking Office (ONEP, "Office National de l'Eau Potable") for drinking water, Regional Office for Agricultural Development (ORMVA, "Office Regional de Mise en Valeur Agricole") for irrigation and National Office of Electricity (ONE, "Office National de l'Electricité") for hydropower. The general model for water management in terms of decision making, coordination and implementation at the national, regional and local levels includes advisory bodies and the executive authorities at the different levels (Fig. 2).

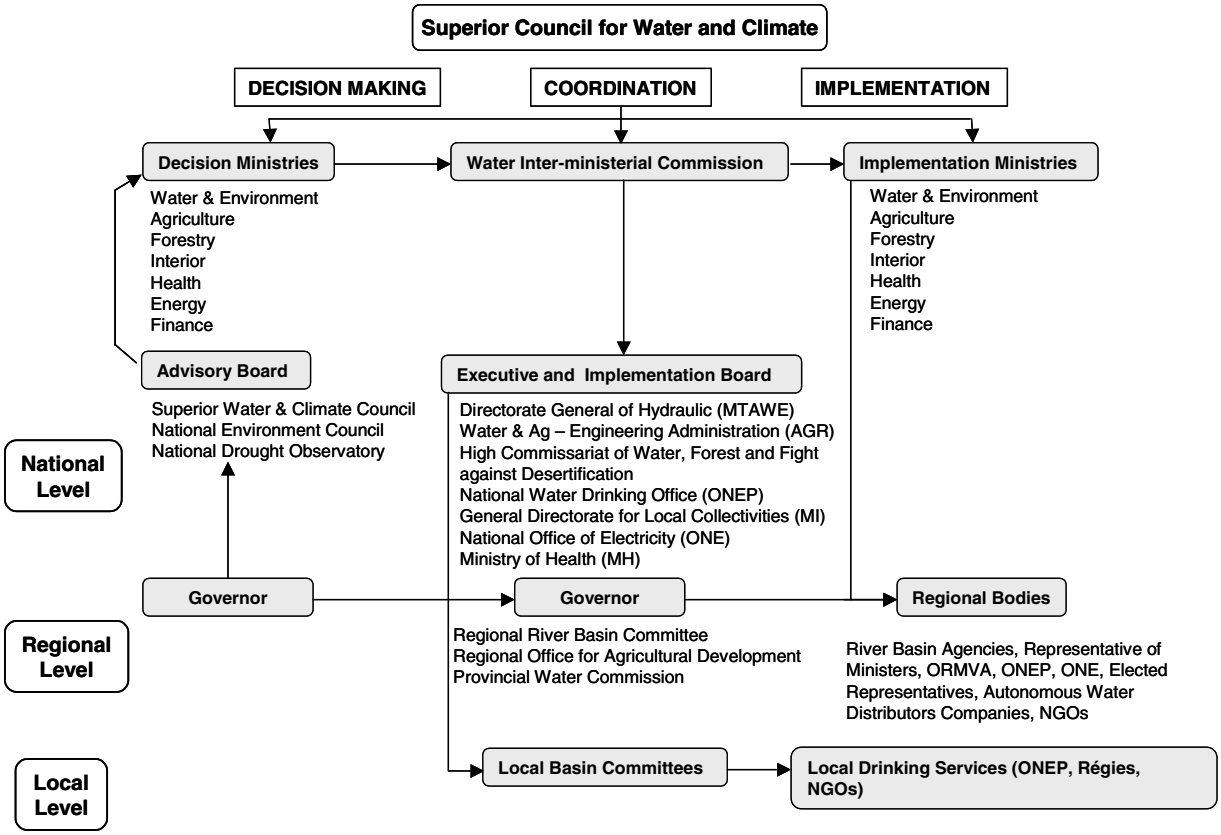


Fig. 2. Water resources management in Morocco.

Consultative institutions and bodies

The consultative institutions in charge of advising the various line agencia and ministries do not have regulatory powers. They issue recommendations and approve plans. These institutions are the following.

The Superior Council for Water and Climate

The main consultative body, the SCWC includes all administrations involved in the water sector, representatives of the parliament, representation of users and nominated experts that have competencies on the water issues. The SCWC convenes to address issues of national importance and formulate recommendations on the options of planning, mobilization and management of water resources. The DGH within Ministry of Territorial Administration, Water and Environment (MTAWE) is responsible for the technical Secretariat of the SCWC. According to the 1994 Water Law, the Council is in charge of adopting the water master plans drafted by the relevant water management directorates within MTAWE and Ministry of Agriculture and Rural Development (MARD). These authorities are in charge of preparing the National Water Plan which will be operational after recommendations of the SCWC which is headed by the King.

The National Council for Environment

The National Council for Environment (NCE; "Conseil National de l'Environnement, CNE") was created in 1981 but has been reactivated only in 1995 in order to advise the government on all environmental issues. The main task is to orient and adopt the National Environment Plan. On water issues, the NCE contributes to define guidelines that limit conflicts between institutions and promote environmental awareness and education.

The Permanent Interministerial Council for Rural Development

The Permanent Interministerial Council for Rural Development (PICRD, "Conseil Interministérial Permanent du Développement Rural, CIPDR") was created in 1999 following the severe drought episodes in Morocco. This Council is headed by the Prime Minister and the MARD is responsible for its technical secretariat. The main activities of the Council relate to the declaration of drought onset, the preparation of the National Drought Plan, the supervision of the planned drought actions and the elaboration of rural development strategies for Morocco.

The National Drought Observatory

The National Drought Observatory (NDO) was created in 2001 as an entity attached to the General Secretary of MARD and based at the Institut Agronomique et Vétérinaire Hassan II (IAV), as a result of a ministerial decision to locate it physically in an academic institution allowing multidisciplinary collaboration, and giving it certain neutrality with regard to policy pressures. It has an organizational structure involving regional centers in research institutions in Settat, Meknès and Salé, and a framework of working groups that can include and be led by a number of partner institutions. The main mission of the Observatory is to provide decision makers with decision support tools for drought management and to advise on strategic drought planning, preparedness, mitigation and response.

The General Council for Agricultural Development

The General Council for Agricultural Development (GCAD, "Conseil Général du Developpement Agricole, CGDA") is an advisory body of the MARD. Its main role is to make studies and recommendations pertinent to policies for agriculture development including contributions to policies on sustainable use of water and other natural resources, economic policies and social development issues. Presently, the Council is responsible for the technical aspects of the accord of free exchange negotiations on economic and commercial activities with the USA.

National executive institutions

Ministry of Water (State Secretary for Water, within MTAWE)

The ministry has an organization related to water, as follows:

The DGH is in charge of policy formulation and implementation in planning, mobilizing, managing and protecting quality of water resources. It is also responsible for all the large infrastructure projects, in terms of implementation, management and maintenance. Its current attributions will be partly shared with the river basin agencies when they are implemented.

The National Office for Drinking Water (ONEP) is an autonomous institution which has more operational duties. It is in charge of planning all operations related to potable water and to implement the investments needed. It builds water treatment stations, wells and spring infrastructures and the main distribution network. ONEP also operates some of the municipal water utilities and sells in bulk treated water to the autonomous State-controlled conceded companies, known as "Régies de l'Eau". It is sole operator for small scale water distribution (in small cities and rural areas). In terms of pricing, ONEP and the "régies" submits their proposals to the Commission of Prices, an administrative body under the authority of the Prime Minister. The Commission decides on the rates to be adopted for each "régie" and ONEP-managed center.

Ministry of Environment (as State Secretary for Environment within MTAWE)

The main attribution of the State Secretary for Environment is to prepare a strategy for the preservation of the natural environment. The Ministry contributes to the master plans on water resources and is in charge of water quality issues. It formulates and enforces the legislation and regulations regarding pollution. It manages an observation network to monitor the quality of water.

Ministry of Agriculture and Rural Development

The MARD has two main duties in terms of water management: irrigation and watershed management. Two administrations define and implement its policies in the water sector:

The AGR plans and realizes all projects related to irrigation and drainage. The AGR contributes in concertation with DGH to the planning of water resources and to the general policy in the water sector. It supervises the ministry regional structures for water management, the ORMVA which implement, operate and manage the Large Scale Irrigated (LSI) projects and all the Small and Medium Scale Irrigated (SMSI) projects.

The Water and Forest Administration ("Administration des Eaux et Forêts de la Conservation des Sols, AEFCS") prepares watershed management plans and projects and regulates access to continental fishing. Due to the huge cost of dams siltation, it cooperates closely with the DGH and AGR in order to protect the hydraulic infrastructures (dams and main canals). Late in 2003, this Administration was transformed into the High Commissariat of Water, Forest and Fight against Desertification (HCFWFD, "Haut Commissariat aux Eaux et Forêts et pour la Lutte contre la Desertification, HCEF-LCD"). The new missions and organizational structure of this autonomous institution are being worked out.

Ministry of the Interior

The Ministry of the Interior is involved in the water sector as the tutor of local collectivities (communes, provinces and regions). According to the "Charte Communale" (Commune Charter), the Ministry supervises and approves all budget allocations of the local collectivities. As municipal water distribution and sewage is operated either by the "régies" (under the Local Collectivities Directorate's control), or by a public/private company that has received a concession of service from the Local Collectivities Directorate, the Ministry of the Interior is directly involved in the management and supervision of municipal water distribution and sewage. The "Direction Générale des Collectivités Locales, DGCL" (Local Collectivities Directorate), the "Direction de l'Eau et de l'Assainissement, DEA" (Water and Sewage Directorate", and the "Direction des Régies et des Services Concédés, DRSC" are all involved in supervising the water and sewage policies utilities. They approve the budget, the investment plans and prepare the concession contracts. They are in charge of pricing policies and management selection. Beside these functions, the Ministry is responsible for water police in the urban areas.

Ministry of Health

The Ministry of Health is responsible for mineral water agreement and control, and is also in charge of all health issues related to water projects and water quality.

Ministry of Energy and Mines

The Ministry, through the ONE, is in charge of all hydropower projects and operations. As a user, it has a say on the planning of water resources, and water management especially during drought periods.

Regional and local institutions

The national executive institutions formulate policies and supervise line agencies that have the implementation and management capabilities at the regional level. In order to deal locally with the issues of implementation, management and coordination, a set of line agencies and consultative bodies were progressively set up. This policy has led to the creation of the regional river basin agencies as autonomous public institutions which group all the water stakeholders and users in the region. Figure 3 shows the hydrological basins of Morocco. The regional river basin agencies ("agences de bassin") are the most important institutions at the regional level; they are charged to manage the water resources at the basin level and monitor quantity and quality of surface and underground water. They also contribute to the management of drought and adjust water allocation according to the resource available. Their effective implementation is, however, yet to come.

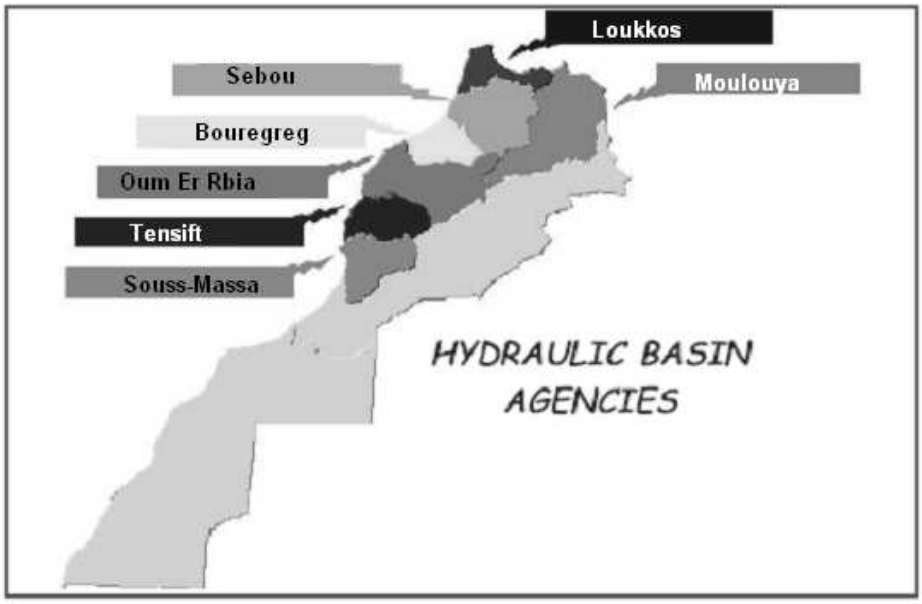


Fig. 3. Hydrological basins of Morocco.

The local collectivities are fully responsible for water distribution and sewage system in their commune, under the supervision of the Ministry of the Interior, since the adoption of the "Charte Communale" in 1976 (recently revised), the cornerstone of the Moroccan decentralization policy. As such, they can manage directly their water by setting up "régies", or concede to ONEP or to a private operator the management of the water system. Through the river basin agency, they will participate in the implementation of the polluter/payer principle and be in charge of promoting investment aiming at reducing discharges.

The ORMVA are the line agencies of the AGR. They implement the irrigation projects, manage the network, enforce the water police and promote good agricultural practice through extension. Their board includes representatives from the administration and from the agricultural chambers.

The Regional Environment Councils (Conseils Régionaux de l'Environnement, CRE) are to inventory regional environmental issues, including those related to regulation and to implement recommendations of the National Environment Council. They group representatives from the local administration, the local authorities and elected members of the local collectivities.

Water users associations

The WUA or AUEA constitute a very important institution in dealing with coordination problems at the perimeter level. Traditional water user association, informal with regard to the current legislation, played an important role in coordinating efforts to realize collective infrastructure and irrigation water management particularly at the canal level ("seguia"). Informal water user associations still manage the operations of drought and the newly created legal status of AUEA is largely used by AGR in order to promote SMSI perimeters or to realize new projects with more flexibility than in the past.

Drought management overview

This section describes the overall model for drought management in terms of decision making, coordination and implementation processes (Fig. 4). Most ministerial departments dealing with water management including Agriculture, Water and Environment, Forestry, Interior, Health, Energy and Mines, and Finance, are also concerned with drought management. Overall coordination of drought management issues is the responsibility of the PICRD, which is headed by the Prime Minister and has

ability to officially declare the onset of drought. The technical secretariat of this Council is under MARD which heads the weekly meetings of the Interministerial Technical Commission (ITC) once a drought episode is declared.

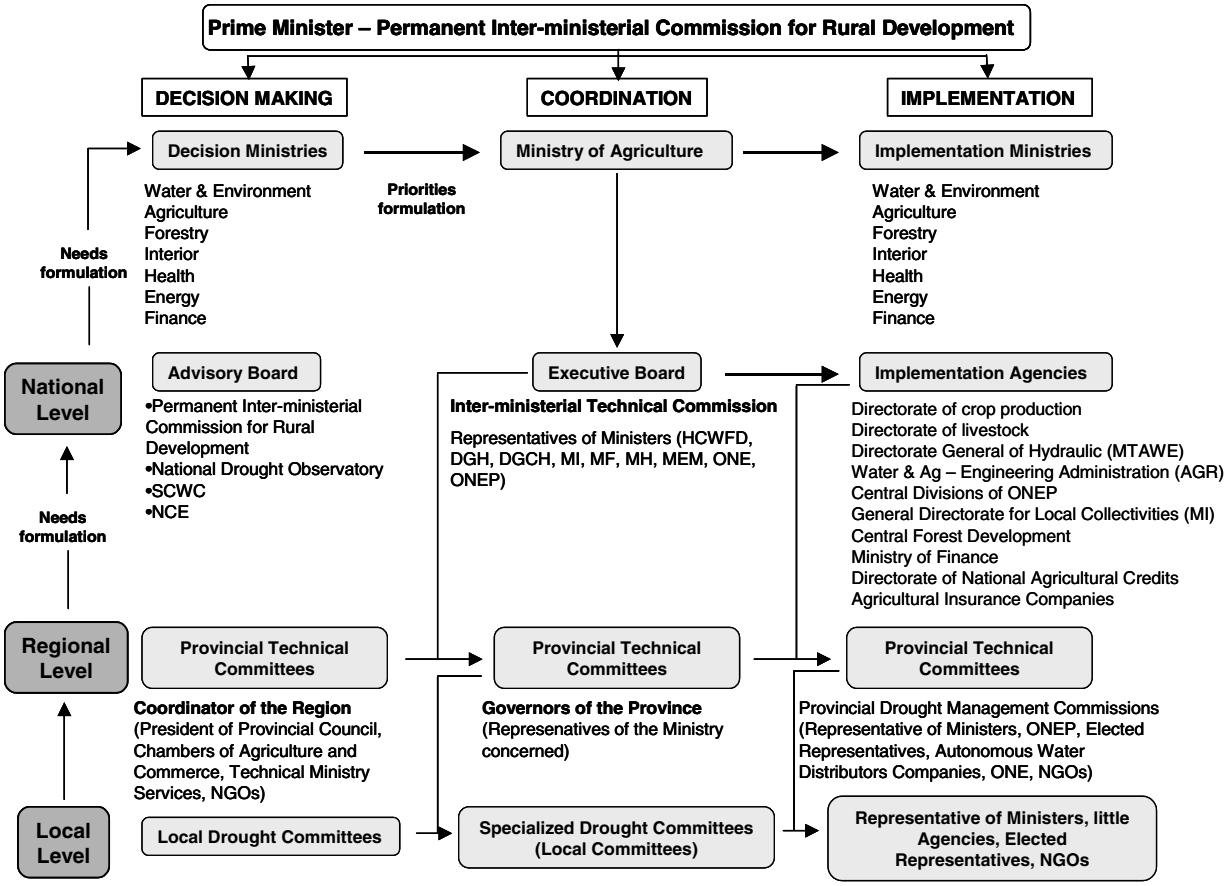


Fig. 4. Drought management in Morocco.

National Advisory Board

In addition to the political board represented by PICRD the other members of the National Advisory Board on Drought are the NDO, the National Meteorology Office, the SCWC and the NCE. The first two structures have an advisory role to their respective ministry on a continuous basis while the latter two have a much less frequent consultative role on drought issues.

National Executive Board

The ITC is the basis of the Executive Board at the national level. It includes ministry representatives of Agriculture (MARD), Forestry (HCFWFD), Water (DGH, ONEP), Energy (ONE), Interior (MI), Health (MH), Finance and Credits (MF, CNCA). The ITC meets weekly to report to the PICRD which, based on the Commission report and the information provided by the advisory bodies, may or may not declare drought and drought affected regions. If drought is declared nationwide, then the National Drought Mitigation Plan is set for execution. This is basically the reactive relief dimension of the plan that has to be implemented and supervised at the national, regional/provincial and local levels.

Regional and local setting of drought management

The Regional Drought Committee is headed by the Wali of the economic region, who normally

supervises more than one province in the region while the province is headed by a governor. The Regional Drought Committee is responsible for all decisions pertaining to the National Drought Mitigation Plan related measures and actions to be implemented in the region. This committee includes representatives of key ministries (ONEP, ORMVA, DPA) and elected members of the rural and urban collectivities of the region, in addition to active NGO's operating in the region. The coordinating role and the composition of the Provincial Technical Committee at the province level are similar to those of the regional drought committee at the region level. At the local level, a number of Local Drought Committees/Specialized Drought Committees representing ministry line agencies and NGO's are responsible for detailed examination of the content of the proposed measures in order to match the needs of the local drought affected population, livestock and environment. At the different levels of implementation of the National Drought Mitigation Plan, political pressure groups and elected members of the local communities become actively involved.

Current status of water and drought management reforms

The role of the State in water resources management is outlined as follows:

(i) *Water mobilization*. The State, through the DGH, is in charge of all infrastructures relating to water mobilization, except for small dams and wells.

(ii) *Irrigation water allocation*. The State is in charge of all large scale irrigation. Many projects of medium and small scale irrigation dimension have also been realized and/or planned. The Administration through regional structures of Ministry of Agriculture (ORMVA) directly manage large scale irrigation water, although involvement and active participation of water users associations (AUEA) are growing.

(iii) *Water distribution*. The State is involved in production, through ONEP; and in distribution through ONEP and the "régies", which are also in charge of the drinkable water programmes for rural areas.

(iv) *Water pricing*. For the "régies", the prices are set by a commission headed by the Prime Minister that defines pricing structures and levels to all water users. For the ORMVA, prices are set by a decree involving three ministers.

(v) *Water allocation.* The State is in charge of realizing the master plans of water resources for the main hydrological basin. At this level, demand by sectors are estimated and resources are allocated. The master plans are presented to the SCWC to be amended or approved. These plans are the basis of water allocation between ONEP (for potable water) and irrigation.

(vi) *Conflicts resolution*. Through the courts or the administration, the State mediates conflicts over water use. Usually, these conflicts relate to the management of dams and are settled through the arbitration of the "Direction Régionale de l'Hydraulique, DRH" (Regional Hydraulic Directorate), which have become the regional river basin agencies.

(vii) *Registration of water rights*. The State is in charge of registration of water rights although this function is still in its infancy. There is no uniform registration of agreement, concession or of the different water rights that are supported by the law. The basin agencies will have to put a registry in place in order to unify this treatment.

Recent evolution

These multiple interventions have a huge cost to the State budget and have forced the Government to reconsider its options. It was estimated that the overall budget accounts for more than 90% of total investment cost for irrigation. All the cost of water mobilization is also paid by the public budget. As a public operator, ONEP doesn't pay water charges, and only the concessions pay for water diverted. The cost of current policies explains the shift in favour of more involvement of the private sector and a change in cost sharing between the State and the water users beneficiaries. The following actions have been taken or underway:

(i) The two most important "régies" (i.e. water distribution companies) were conceded to the private sector, which agreed to finance a huge investment programme in extension of the network and rehabilitation of sewage system.

(ii) The Irrigation Extension Program for increasing the irrigated areas is partly carried out under the Water Users Law, reducing the cost for the State budget.

(iii) The exemption for smallholders of any participation to investment cost in LSI has been cancelled. All beneficiaries will pay 40% of investment costs.

(iv) Water charges were increased to cover all operation and maintenance costs in the LSI perimeters.

(v) A fee, based on the quantity abstracted, will be paid by all users to the basin agency, to cover some investment cost previously supported by the budget.

Rates for municipal water were regularly increased during the past ten years to eliminate investment subsidies to ONEP and to pay for the new investments realized. These recent new developments indicate a clear tendency for a relatively less interventionism of the State and an increasing role for the private sector in water management. Because of the large number of institutions involved in the water sector, the institutional setting needs streamlining. The increased number of institutions creates opportunities for conflicts of attributions and reduces the scope for an easy implementation of the policies adopted. The second point is that the regulatory bodies are not independent of the executive institutions. The Moroccan system is still very much impregnated by the French model with a very powerful state apparatus not balanced by legislative power or clear regulatory systems.

Reactive and proactive action plans

In Morocco, rain-fed agriculture concerns about 90% of agricultural land and makes an important contribution to GNP, rural employment and other economic activities in the arid and semi-arid zones. However, climatic conditions of these regions fluctuate widely from year to year and severe droughts often occur at any time during the growing season. As a consequence, agricultural production and the welfare of rural populations, which represent half of the country's total population, may be dramatically affected. For example, the drought of 1995 decreased cereal production from 9.6 million tons in 1994 to 1.7 million; it reduced rural employment by 60% and led to a reduction of 50% in agricultural added value, as compared to 1989-1994 average. The more recent successive droughts which occurred during 2000 and subsequent years have even more dramatic impacts.

Because of the severe droughts which dominated much of the country during the 1980's and occurred more frequently during the 1990's, the Government adopted in 1985 a reactive action plan to mitigate the drought effects in the form of relief operations which initially focused on population drinking water and livestock relief. However, the more dramatic subsequent development of the droughts and the growing awareness from the scientific community and civil society led the policy makers to adopt a more pro-active approach to this recurrent problem. As a result, the National Programme for Drought Mitigation has now two clear orientations: (i) an operationally oriented short term reactive programme with relief operations as the main focus; and (ii) a structurally oriented drought planning programme focusing on the long term pro-active approach to drought mitigation.

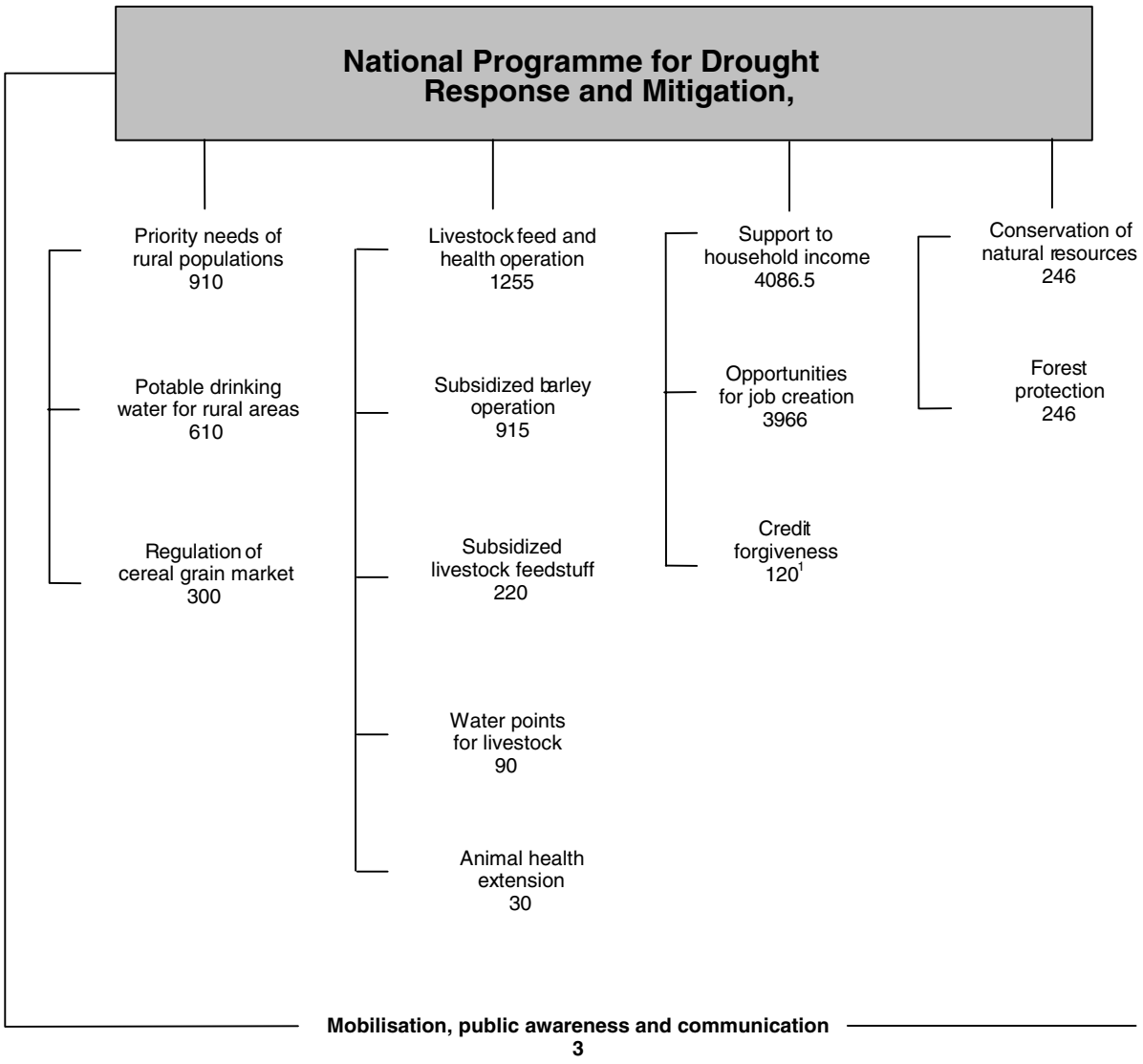
It is now strongly believed at the political level that any national drought management strategy should address these two conflicting and/or complementary approaches of the long term drought management policy. Consequently, an NDO was proposed in 1999, and officially created in 2001 within the MARD, as a coordinating structure and also as a link between the scientific community working on various drought issues and the decision makers in charge of the drought mitigation activities.

National reactive plan for alleviation of drought effects

When a drought occurs nationwide, the policy so far applied consists of setting up a National

Drought Programme which is monitored by an inter-government committee headed by the MARD, in close collaboration with the PICRD under Prime Minister leadership. To implement the planned activities, funds are made available to combat the deleterious consequences of drought and to assist rural populations in solving the problems associated with: (i) drinking water; (ii) livestock protection; (iii) job creation; and (iv) agricultural credit debt relief. This is typically a crisis-management oriented approach whose cost is tremendous in terms of public money investment, time and human resource needs.

For example, during the 1999 drought year, a total of 3.18 billion Moroccan dirhams (MAD) (approximately US$ 318 million) was allocated to the national drought relief programme, including 332 million dirhams for the drinking water component, 300 million dirhams for the livestock component, 1.91 billion dirhams to create job opportunities in rural areas, and the remainder was to cover the agricultural credit sub-programme. In the case of the 2000 extremely dry year, the public investment budget for drought mitigation more than doubled with 6.5 billion dirhams (approximately US$ 650 million) in addition to 1.5 billion dirhams (US$ 150 million) in the form of international aid relief, basically in in-kind provisions of cereal grains for food and livestock feed. The details of the public money expenditure component are indicated in Fig. 5.



[1]Total programme concerns 360 million dirhams over 7 years, the first part to be reimbursed to the Agricultured Bank (CNCA) is 120 million dirhams.

Fig. 5. National Programme for Drought Emergency Response and Mitigation (year 2000) in Morocco.

Proactive drought management

Following the severe drought episodes of the 80s, and the rising awareness among decision makers and the large public, the Government decided to set up a strategic drought planning and to move from the prevailing crisis management of the drought. The process is outlined in Fig. 6. That effort resulted first in the organization in 1985 of the ''Agadir International Conference on Drought and Food Security in Morocco'', and secondly in the creation of the Superior Council for Water and Climate. This Council meets annually to discuss and propose broad orientations for water management policy in Morocco. Meanwhile, the set up of an integrated livestock safeguard plan was also worked out and implemented since then. In 1995, preliminary guidelines for a new approach to drought based on risk management principles provided the basis for a more proactive drought management approach in the country.

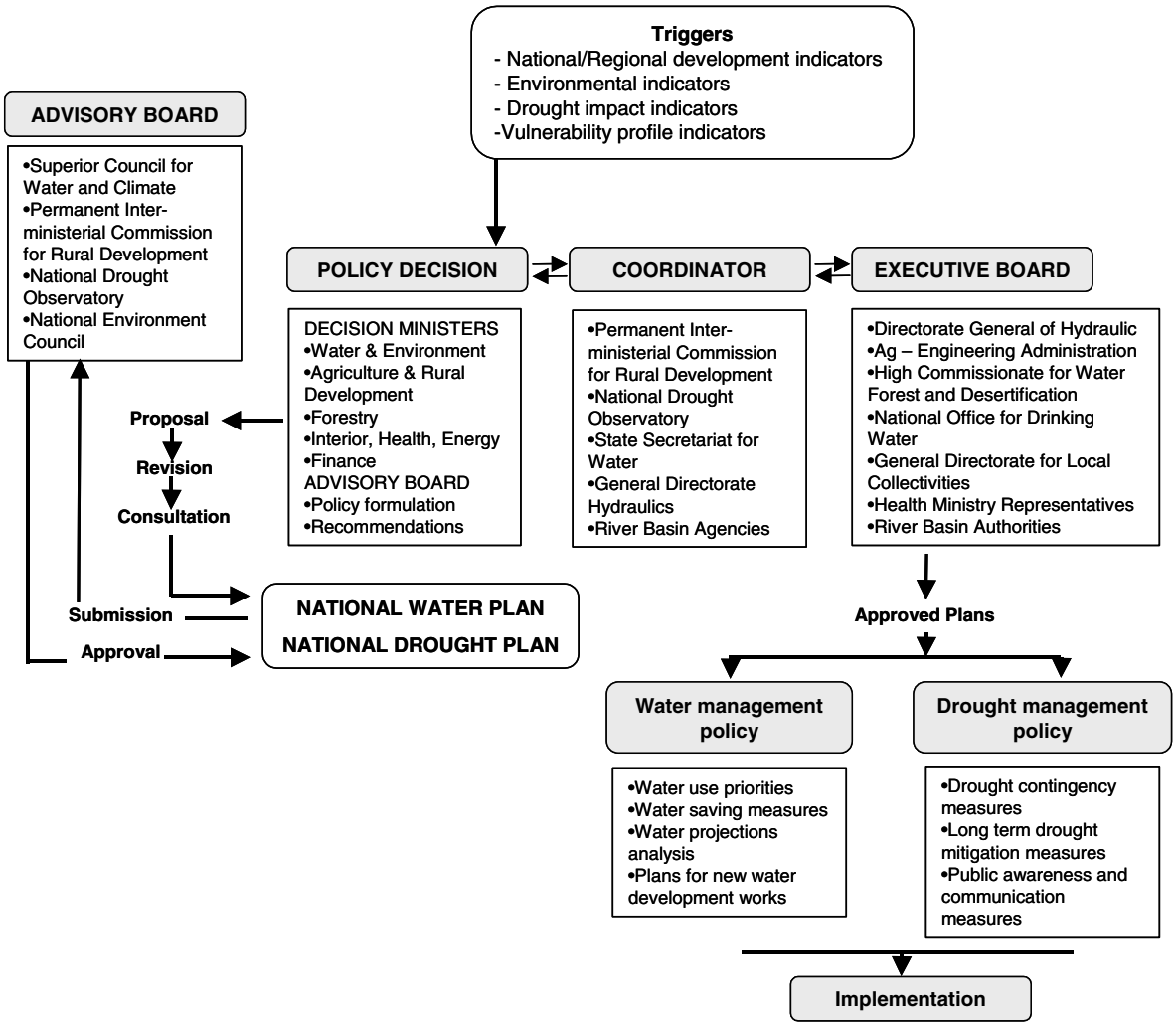


Fig. 6. Proactive responses in agricultural and hydrological drought in Morocco.

Working towards further development and implementation of this proactive approach, the MARD and the Ministry of Public Works (MTP) organized in 1999, in close collaboration with the IAV Hassan II, an international workshop on ''Drought Management Strategies in the Mediterranean''. The purpose of this workshop was to gather information on the state of the art of drought planning and management by considering not only the local experience but also foreign experiences, with particular reference to Australia, South-Africa, Andalusia in Spain and to the US experience. The workshop recommended that promotion of risk management principles should be a key component of any strategy of drought management. It was also shown that drought risk management can be achieved by encouraging development of reliable climate forecasts and prediction, comprehensive early

warning systems, preparedness plans, and mitigation policies and programmes that reduce drought impacts and population vulnerability.

The National Drought Observatory (NDO)

In 2001, the NDO was created within the MARD, and located on the campus of IAV Hassan II, as a mean of building institutional capacity to cope with drought in Morocco. This centre is conceived as a multidisciplinary forum for information processing and exchange to produce reliable indicators for drought monitoring and prediction, drought mitigation, preparedness and response, and to objectively evaluate droughts effects and impacts on short, medium and long term basis for economic planning purposes.

The NDO specific objectives are to:

(i) Collect, analyse and deliver drought related information in a timely systematic manner.

(ii) Characterize drought and define reliable indicators that can provide early warning or emerging drought conditions.

(iii) Conduct vulnerability assessments to determine those sectors most at risk from the occurrence of drought.

(iv) Establish criteria for declaring drought and triggering mitigation and response activities.

(v) Ensure timely, accurate assessment of drought impacts.

(vi) Establish procedures to evaluate the effects and impacts of drought programmes.

The NDO is designed to operate as an institutional network with a central management unit and regional sub-units, the whole system benefiting from existing structures, particularly the existing scientific human resources, both centrally and regionally. It has a scientific advisory committee and an orientation advisory committee to support the Board of Directors of the partner institutions which operate in the area of water and drought management. The organizational structure of the Observatory comprises a central management unit supported by regional units both for the scientific and the operational activities. These activities are carried out by three committees: (i) drought monitoring and prediction committee; (ii) drought impacts evaluation committee; and (iii) strategic drought planning committee. Each committee is organized into working groups of subject matter specialists to address specific issues of drought management, including meteorological drought, hydrological drought, agricultural drought, and the resulting socio-economic and environmental impacts on the populations and national economy.

At the national level, the Observatory is managed by the MARD, through a central management unit located at IAV Hassan II. In addition to the involvement of the central administrations of the Ministry, its regional structures are also involved in the proposed operational activities during implementation of the national programme for drought mitigation. The Observatory has indeed to work with the Royal Centre for Remote Sensing (RCRS; "Centre Royal de Télédetection Spatiale, CRTS"), and has to develop links with the other ministerial structures and institutions, basically the National Meteorology Office and the Hydrology Administration (Water Department), the Department of Environment, the Department of Forestry, and the Ministry of Higher Education and Scientific Research through university centres. Other national partners may join the network as activities around drought management develop.

At the international level, the NDO is supported by the US National Drought Mitigation Center, University of Nebraska, Lincoln, and by the United States Department of Agriculture (USDA). The Observatory has also organized a joint workshop with the US Corps of Engineers on the shared vision methodology for water management under drought conditions. Further developments of scientific links are being established with other institutions and centres. Since its creation in 2001, the Observatory has developed training programmes on proactive drought management approaches to meet the needs of national professionals and has organized an advanced course at IAV Rabat with the Mediterranean Agronomic Institute of Zaragoza (IAMZ) on drought management strategies in the Mediterranean. On this occasion, the need to create a Mediterranean Network on Drought

Preparedness was highlighted and discussed. This development led to the creation of the NEMEDCA Network (Network of Drought Management for the Near East, Mediterranean and Central Asia) with FAO, ICARDA (International Center for Agricultural Research in the Dry Areas) and CIHEAM/IAMZ. Of direct relevance to the MEDROPLAN project, the NDO organized the Regional FAO Workshop on "National Capacity Building for Drought Mitigation in the Near East Countries" which was held in Rabat, 1-5 November 2002, and where the latest developments on water management policies and drought preparedness issues in 14 countries of North Africa and the Middle East were presented and discussed.

Meteorological drought and weather forecasts

Morocco has some 40 complete weather stations (called synoptic stations) operated by the National Meteorology Office which now comes under the Secretary of State for Water after a long history under the previous Ministry of Equipment and Public Works. The climatic data are reported on an hourly basis in World Meteorological Organization (WMO) format. Several parameters including rainfall, temperature and dew point are reported. The stations are located throughout Morocco, but are primarily near the larger cities, which tend to be in the northern part of the country. In addition to the primary stations, there are five agricultural plot sites that have extensive meteorological equipment. There are also a number of supplemental stations that have only rainfall and sometimes temperature records available on monthly basis. The Meteorology Office has full-time meteorologists who monitor rainfall patterns and weather forecasts in relation to drought events, using different models.

Three categories of models are run on a monthly basis to help forecast drought trends. These are CIMMS from the University of Oklahoma, FMA from the EU in Italy and El Masifa from France. After getting the results from each group's model and evaluating the monthly rainfalls totals, the Meteorology Office publishes a monthly newsletter on drought trends. All these features are considered as strengthening the organization whose expertise is recognized by WMO and bilateral collaborative agreements particularly with France, Italy and the US. Meteorological drought can be described in terms of reactive and proactive responses (Fig. 7). A series of triggers are used by Ministry of Agriculture for monitoring crop stage and the state of livestock and pasture, by Ministry of Water (as State Secretary) for available water management, and by Ministry of Communication for public awareness about development of the drought situation. The National Directorate of Meteorology uses long term weather forecast simulation models for a more proactive approach to meteorological drought management.

Agricultural drought – Crop production and livestock

The reactive response to agricultural drought includes drought triggers, ministries involved to produce a national drought plan of action, the components of that plan and its implementation. The organization structure for implementation is shown in Fig. 8. Actions taken by the Government and implemented through the Ministry of Agriculture's four main Directorates (Water Engineering Administration, Directorate of Crop Production, Directorate of Livestock, Directorate of Programming and Economic Affairs) are of two kinds. A first series of measures concerns the financing of agricultural activities affected by the drought. Among these measures, a system of farmer insurance for cereal production failure, in case of drought, was also launched. The drought insurance allows through a "financial weather contract" for partial coverage of farm expenses by hectare, by considering the differences between estimated average yields and observed real yields. The financial weather contract is defined as a weather contingent contract whose payoff will be in an amount of cash determined by future weather events as measured by a weather index, expressed as values of a weather variable measured at a stated location.

A second series of measures concerns seed supplies, the objective being to increase seed availability for the next agricultural campaign. Considering the cost of seed imports, the Government has defined a seed strategy aiming to increase available local seeds. The Crop Production Directorate collects information mainly through its regional structures, the provincial directorates in the rainfed regions and regional irrigated offices. Every week during the drought period, a campaign document is prepared summarizing main events observed by province particularly on cereal growth and phenology development. This information – in addition to that provided by the Meteorological

Office – is used to monitor the drought process during the growing season. Monitoring of dysfunction of market prices for basic commodities and agricultural inputs, along with pricing policies and subsidies during a drought period is the responsibility of the Programming and Economic Affairs Directorate. Lack of a continuous recording system and of quantitative assessment of drought development in the different regions on a real time basis may be considered as the main weakness within the MARD. Coordinating mechanisms for water management issues with the newly established Secretary of State for Water have yet to be reshaped.

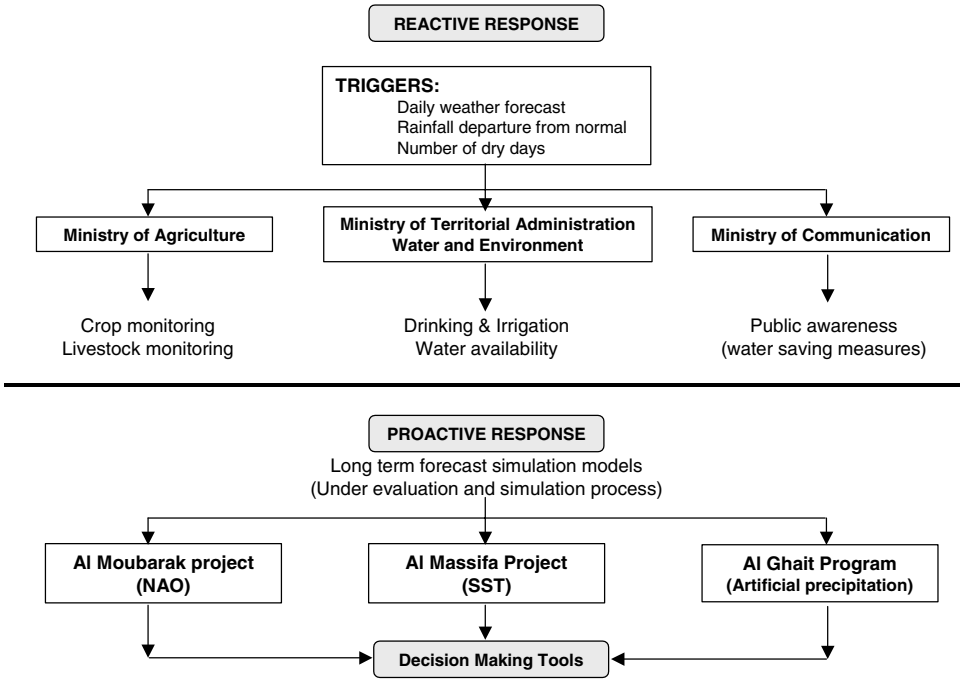


Fig. 7. Meteorological drought in Morocco.

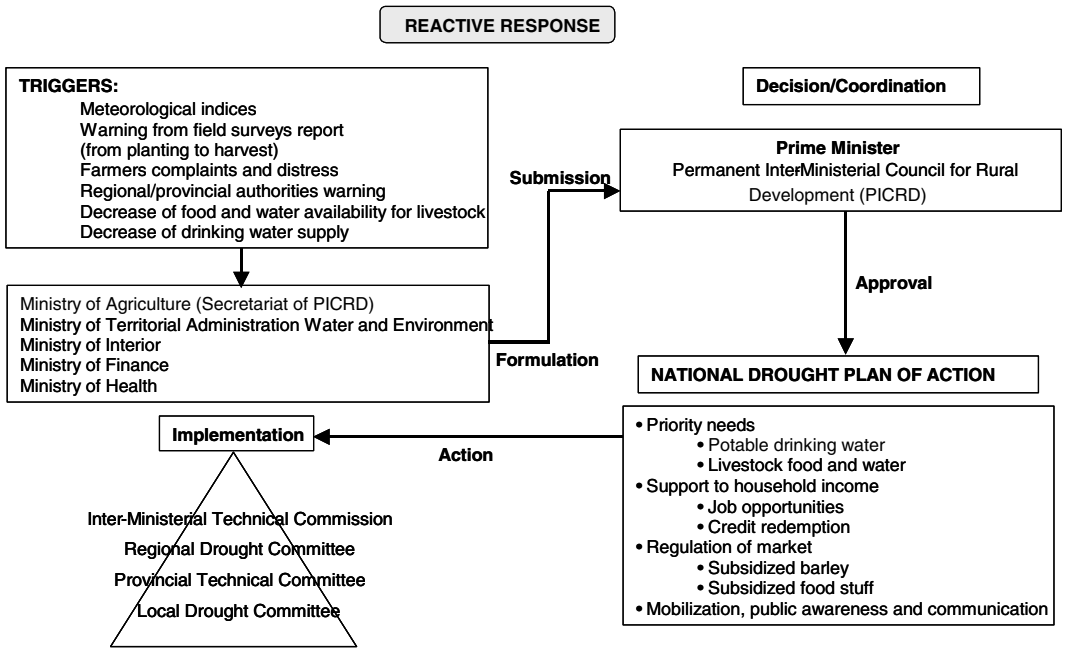


Fig. 8. Agricultural drought in Morocco.

The National Programme of Livestock Safeguard and Protection has been elaborated from estimation of the fodder deficit expected after the drought period. It includes estimations of the pastoral production of rangelands, cereal production and their by-products, by-products of the agro-industry and fodder crops.

The Livestock Directorate receives information from agriculture provincial directorates (rainfed areas) and from agricultural development offices (irrigated areas), about the state of cattle feed supply, prices for animals and for feed, state of watering points for livestock, grazing land availability and herd sanitary states. Also, this Directorate closely monitors the animal feeding balance, and the imports of animals and animal products which are communicated by sanitary services control at the country border. The livestock numbers surveillance system allows to control herd reduction during drought and to maintain a minimal population for reproduction. Collected information is analysed by the services of this Directorate to elaborate necessary scenarios for decision-makers regarding livestock safeguard and protection. A weekly report is established on the drought impact situation and severity on animal productions. The main objective of the livestock safeguard and protection programme is largely to fill part of the fodder deficit to enable herders to overcome their financial incapacity to face important feed purchases to protect their herds. Under drought conditions, activation of the livestock safeguard plan is considered to be operational enough but independent evaluation of its impacts in different regions of the country is still to be carried out.

Hydrological drought and water management

The General Hydraulic Directorate has the responsibility of surface and underground water resources mobilization, water storage in the dams, and evaluates with the relevant structures of agricultural sector (mainly the AGR) and other users the water needs throughout the drought period (Fig. 9). The evaluation is regularly made in joint meetings on the basis of indicators concerning the average rainfall deficit across the country, the amount of water stored in dams and the situation of the main groundwater tables. The outcome is a number of scenarios for water allocation by sectors (irrigation water, domestic, industrial). For each scenario, estimates are proposed to activate the water supply programme including: drinkable water supply of the urban and rural zones mostly affected by drought; mobilization of water resources from groundwater by creation of additional water sources; water supply for livestock in rural areas; and water economy package including public awareness campaigns to adopt hygienic and water saving measures envisaged under drought conditions.

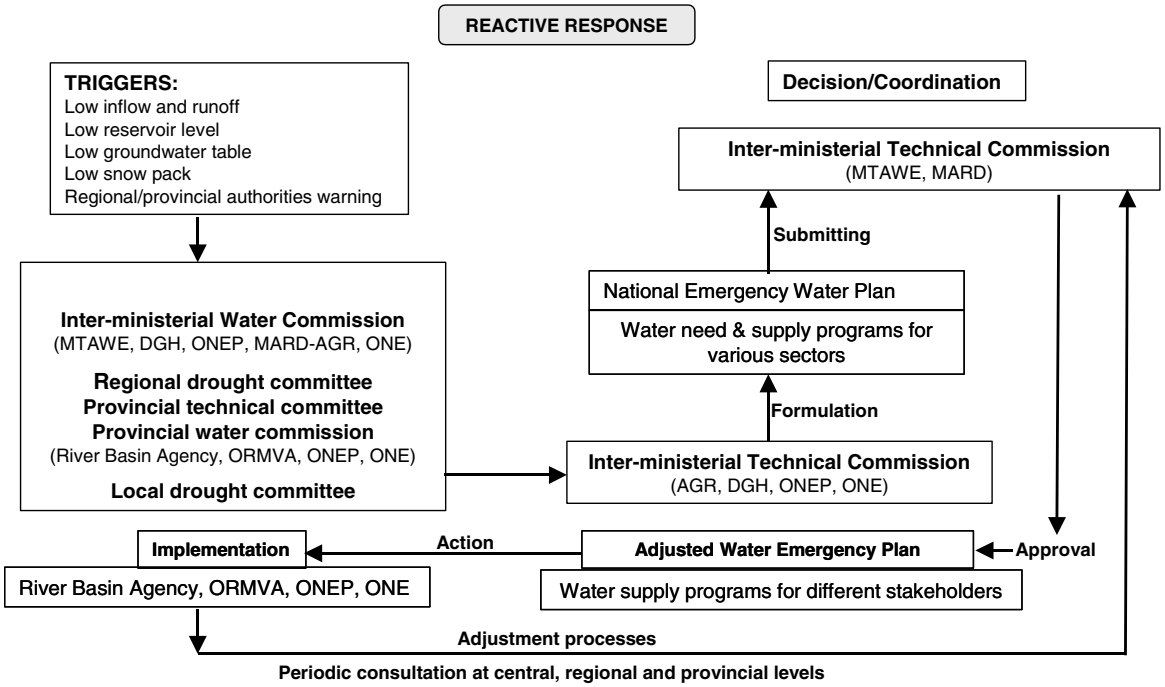


Fig. 9. Hydrological drought in Morocco.

Responsibility for implementing the proposed measures is shared with other ministry departments and institutions, mainly Ministry of Agriculture and ONEP. The newly promulgated participation of the regional water basin agencies to decentralize decisions and to consider specific needs at the regional/local levels is an important element of equity. The participatory approach to decision taking with regard to water allocation under drought conditions is certainly a strengthening factor of the overall functioning of the system. However, conflicting views between the hydraulics and agriculture decision makers may alter the decision process with sometimes negative impacts on irrigated agriculture. This is particularly true when the level of stored water in the dams is low enough to have the right water allocation compromise between irrigation and other users.

Until recently, the leading ministry for water mobilization infrastructures and management was the Ministry of Equipment and Public Works. The hydrological services and administration are now undergoing a major restructuring by grouping the water management activities into a ministry headed by Secretary of State for Water, with a ministry of environmental issues headed by the Secretary of State for Environment; both Secretaries of State with the Secretary of State for Territorial Management and Urbanization being part of a larger Department. While politically this is a rather strong department, it is too early to judge how integration of the drought management issues with water management will be achieved, knowing that the largest water user is agriculture and that a large part of the National Programme for Drought Mitigation, including water management in the irrigated areas, is run by the MARD through its Water Engineering Administration (AGR).

Socio-economic drought

One of the major impacts of drought is the considerable loss of agricultural seasonal jobs and the risks of rural migration to urban areas which result from it. In order to maintain populations in rural zones, the Government has included in the national drought relief programme job creation activities such as organization and construction of country roads, operations of land improvement like land stone clearing, and irrigation management operations of small and average hydraulic structures. This component of the national drought relief programme plays a key role to ensure minimum levels of revenues for the farmers and herders who lost their harvests and/or part of their animals. Again, lack of reliable evaluation of the impacts is an important weakness to overcome. The Directorate of Programming and Economic Affairs of the Ministry of Agriculture also closely monitors the commodity prices variability on the international market and assists the Ministry in policy issues, thereby contributing to strengthen the Ministry's analytical capacity.

Model structure for moving from crisis to proactive drought management

The crisis management approach – the operational component of the National Programme to mitigate the drought effects – has been improved over time, particularly during the drought event of 2000, through better definition of the National Plan for Drought Mitigation; and through a clear framework for implementing the proposed measures. The first part of this section describes the model structure for drought crisis management and how it has been improved through better definition of the drought plan of actions and by introducing more flexibility regarding implementation of the proposed contingency measures. In the second part, the focus is on how moving from crisis to proactive drought management is taking place in Morocco.

Drought crisis management

Organizational structure and procedures for crisis management

Implementation of the National Drought Mitigation Plan since the 2000 severe drought episode in terms of decision execution and follow-up has been organized in four organizational levels:

(i) *National* – the supervision of the overall programme is made by the PICRD, which holds monthly meetings to examine execution reports produced by the Inter-ministerial Technical Commission.

(ii) *Regional* – the regional link is made through regional committees under the presidency of the Region Governor (Wali). These committees have to establish real regional capacity in supervision and in decision-taking. They produce monthly execution reports to be passed on to the Secretariat of the Inter-ministerial Technical Commission.

(iii) *Provincial* – the provincial commissions, assisted by the provincial technical committees, are the coordinating organ for dialogue and follow-up of the execution of all the proposed measures and actions in the drought plan for the concerned provinces. They have to establish specialized committees as needed. A biweekly report of execution has to be produced and passed on to the Wali through the Provincial Governor.

(iv) *Local* – local committees are proposed at the circle level which may include several communes, the commune being the lowest administrative and political unit at the local level. Members of local committees include municipal councilors, representatives of the concerned ministerial departments, representatives of the agriculture chambers, representatives of the professional and community organizations as well as independent NGO's. Local committees have to report, on a weekly basis, the state of execution of actions and measures to be implemented at the local level.

Simplification of administrative procedures for contingency planning and programme implementation

Simplification of administrative procedures was proposed to speed up the execution of proposed drought mitigation activities and to improve their implementation efficiency. Procedures considered relate to ordering visas for rapid assignment of physical activities (i.e. digging wells) as well as for expenditure and payment soon after the authorized activities have been completed. The procedures have been simplified with regard to: (i) definition of programme of activities to be undertaken to alleviate the drought impacts; (ii) visa and signing of the programme; and (iii) spending and payment regulations. For illustration purposes, the setting up of the programme of actions to be implemented is as follows:

(i) Description of detailed activities including clarifying the nature of operations, their locations, their costs, the schedules of realization and the budgetary lines for imputations. The programme must be established before the middle of April for urgent operations and before the end of April for the remaining activities to be realized between April and June.

(ii) Transmission of the proposed programmes of activities to the Prime Minister Cabinet and to the Ministry of Economy and Finances (Budget Directorate, General Control of the Spending and General Finance).

(iii) Delegations of credits and decisions of emission orders by the Services of the General Control within 48 hours from the date of their reception, if they do not raise observations.

(iv) Announcement of authorization of credits by the General Finance Office within three days from the date of approval of financing the programme; a copy of the announcement of credits is faxed to the regional and provincial finance services on the day of the visa by the General Finance Office.

More flexibility was introduced by assigning coordination of fund spending to the Wali (Region Governor) and to the Provincial Governor, besides the appointment within the Ministry of Finance of a single General Finance Control officer for programme implementation. The ministries concerned have also their own regional and provincial delegates to follow up the financial implementation of their proposed activities for the region/province. An important flexibility measure concerned the a posteriori control that has to be substituted for the a priori control to make sure the good execution and implementation of programme operations.

Commission chaired by the Economy and Finance Minister and formed by technical and financial experts from the Ministries of Interior, Agriculture and Rural Development, Equipment and Public Works (currently Ministry of Territorial Administration, Water and Environment, MTAWE), is created to report to the Inter-Ministerial Committee of Rural Development for appreciation and action. All these procedures are notified in the Directive of the Prime Minister which was sent to the members of the

Government for immediate implementation. Comprehensive evaluation of the impacts of implementing the National Drought Plan of the 2000 drought episode has not yet been completed in all regions. Preliminary evaluation at the national level indicates overall positive impacts of the relief operations on rural population and their livestock, although appreciations vary from region to region and depend on the programme components under consideration (drinking water supply, livestock safeguard measures, job opportunities to improve rural families' revenues, agricultural credit forgiveness, and market price regulation for grain cereals).

Moving from crisis to proactive drought management

In a first move to integrate climate variability with water resources management, the Superior Council for Water and Climate, headed since inception by the Ministry of Equipment and Public Works (currently MTAWE) and now by the Secretary of State for Water, was created as an advisory body for water policy and orientations. Subsequently, the Water Law was adopted as the modern legal framework for regulating water scarcity management. The creation of regional water basin agencies is also a response to the need of a more integrated water management approach at the regional level. In a second move towards a more proactive approach to water scarcity management under drought conditions, it was decided to develop an NDO system to assess the frequency, severity and localization of droughts, as well as their various effects and impacts on crops, livestock, environment and living conditions of rural populations. It has been stressed that this assessment should be based on objective, measurable scientific criteria including meteorological, agronomic, and hydrological data as well as environmental information and socioeconomic data such as net farm income. The spatial scale of the drought event is all critical in assessing its potential impacts. It is also useful to place Morocco's experience in the proper international context with regards to other countries and regions currently experiencing severe drought conditions.

The NDO was created as an entity attached to the General Secretary of Ministry of Agriculture and based at the IAV Hassan II, as a result of a ministerial decision to locate it physically in an academic institution allowing multidisciplinary collaboration, and giving it certain neutrality with regard to policy pressures. It has an institutional structure involving regional centers in research institutions in Settat, Meknès and Salé, and a framework of working groups that can include and be led by a number of partner institutions. For example, the National Meteorological Office impressive capacity and track records needs to be allied to the potential for multidisciplinary and policy oriented work of the NDO. At present, a clear policy decision has been taken by the Ministry of Agriculture to make the Observatory central to drought planning and to integration of the multi-disciplinary issues of drought preparedness in Morocco. This is an important feature of the force and strength of the proactive drought management in the country. However, there are still weaknesses to overcome, the most important being: (i) institutional constraints associated with the major restructuring of the ministry departments dealing with water management; (ii) lack of availability of data and of clear mechanisms for the circulation of information as required by the proactive approach to drought management; and (iii) lack of internal financial resources to meet the recurrent cost of the proposed activities for institutional capacity building in proactive drought management.

Conclusions

Legal framework and the Water Law

The basic sets of laws with regard to water management did not change for a very long time although they have been criticized by the political parties. The laws started to be seriously reviewed only in 1990 for the water users associations (WUA) and in 1994 for a more comprehensive legal framework for water use. The revision of WUA (AUEA) Law in 1990 reduced the scope of interventions of the WUA by introducing explicitly that all interventions are done by the Administration or under its close supervision. The issue of water rights, and the provision that all unregistered rights would be cancelled if not declared in the five years following the promulgation of the law did not provoke reactions from representatives. Very clearly, the Administration is still largely in charge of the formulation of policies regarding water and the legislative control is not very well developed.

Role of the administration

The consultative institutions in charge of advising the various line agencies and ministries regarding water and drought management do not have regulatory powers. They issue recommendations and approve plans. The regulatory function over water utilities, in irrigation as well as in municipal water distribution, are usually mixed with operational duties as planning, project financing and supervision, and supervision of line agencies. The list of ministerial bodies involved in the sector shows very clearly the shortcomings of the actual setting, although improved by the consultative bodies.

Reforms and changes

In the current setting, stakeholders do not always have a proper say on water issues, except locally by the control over municipal water through the local collectivities, which work under the supervision of the Ministry of the Interior. However, slow change is taking place. This change will be supported because NGOs and civil society are more active in this field, and water user associations are gaining more autonomy in their dialogue with the administration.

Moving from crisis to proactive drought management

An important shortcoming of the drought policies so far envisaged is that when the drought cycle is over, the activity of the national inter-government committee is abandoned. Should the drought recur, the same procedures are reproduced regardless of the results of the previous drought episode. There is however a renewed political will to move away from this crisis management to a more proactive drought management approach. This has been activated in 2001 by the creation of the NDO in the form of an institutional network of representative stakeholders working on drought issues at the national/regional/local levels. A major thrust of this newly established structure is to assist decision makers and drought managers with the design of appropriate drought policy to achieve better risk management. Such a policy should establish a clear set of principles or operating guidelines to improve drought characterization, monitoring and impact evaluation; to reflect regional differences in drought characteristics, vulnerability and impacts; and to effectively govern drought management. The NDO should be closely working with national scientific institutions and key stakeholders; and draw up practical experience through international cooperation.

Acronym list

AEFCS	Water and Forests and Soil Conservation Administration/Administration des Eaux et Forêts et de la Conservation des Sols.
AGR	Water and Agricultural Engineering Administration/Administration du Génie Rural.
ANCFCT	National Agence of Land Conservation, Cadastre and Topography/Agence Nationale de la Conservation Foncière du Cadastre et de la Topographie.
ASAP	Privileged Farmers Associations/Associations Syndicales Agricoles Privilégiées. (Replacing some ASAPs, 1984).
AUEA	Agricultural Water User's Associations/Associations des Usagers des Eaux en Agriculture (replacing some ASAPs, 1984).
CFLD	Authority for the Forest and for Combating Desertification/Commissariat pour la Forêt et la Lutte contre la Désertification.
CGDA	General Council of Agricultural Development/Conseil Général du Développement Agricole.
CNCA	National Bank of Agricultural Credit/Caisse Nationale du Crédit Agricole.
CNE	National Council of the Environment/Conseil National de l'Environnement.
CRE	Regional Councils of the Environment/Conseils Régionaux de l'Environnement.
CRTS	Royal Centre of Spatial Remote Sensing/Centre Royal de Télédétection Spatiale.
DAF	Direction of Forestry Works/Direction des Aménagements Forestiers.
DCL	Direction of Local Communities/Direction des Collectivités Locales.
DDF	Direction of Forest Development/Direction du Développement Forestier.
DE	Direction of Livestock/Direction de l'Elevage.
DEA	Direction of Water and Water Purification/Direction de l'Eau et de l'Assainissement (MI).
DEPAP	Direction of Public Agriculture Enterprises and of Professional Associations/Direction des Entreprises Publiques Agricoles et des Associations Professionnelles.
DGCL	General Direction of Local Communities (MI)/Direction Générale des Collectivités Locales (MI).
DGH	General Direction of Hydraulics/Direction Générale de l'Hydraulique.
DMN	National Direction of Meteorology/Direction de la Météorologie Nationale.
DPA	Provincial Direction of Agriculture/Direction Provinciale de l'Agriculture.
DPAE	Direction of Planning and Economic Issues/Direction de la Programmation et des Affaires Economiques.
DPV	Direction of Plant Production/Direction de la Production Végétale.
DREF	Division of Forestry Research and Experimentation/Division de Recherches et Expérimentations Forestières.
DRH	Regional Direction of Hydraulics/Direction Régionale de l'Hydraulique (promoted as Basin Agencies).
DRSC	Direction of Public Services and Concessions/Direction des Régies et des Services Concédés (MI).
ENA	National School of Agriculture/Ecole Nationale d'Agriculture.
ENFI	National School of Forestry Engineering/Ecole Nationale Forestière des Ingénieurs.
GCAD	National Council for Agricultural Development.
HCEF-LCD	Haut Commissariat aux Eaux et Forêts et pour la Lutte contre la Désertification.
HCFWFD	High Commissariat of Water, Forest and Fight against Desertification.
IAV	Hassan II Agronomic and Veterinary Institute/Institut Agronomique et Vétérinaire Hassan II.
INRA	National Institute for the Agricultural Research/Institut National de la Recherche Agronomique.

ITC	Interministerial Technical Commission.
LSI	Large Scale Irrigation.
MAMDA	Moroccan Mutual Company of Agricultural Insurance/Mutuelle Assurance Marocaine d'Agriculture.
MARD	Ministry of Agriculture and Rural Development.
MC	Ministry of Commerce.
ME	Ministry of Environment.
ME/Water	Ministry of Environment/Secretariat of State for Water.
MEM	Ministry of Energy and Mines.
MF	Ministry of Finance.
MH	Ministry of Public Health.
MI	Ministry of Interior.
MTAWE	Ministry for Territorial Administration Water and Environment.
MTP	Ministry of Public Works.
NCE	National Council of the Environment.
NDO	National Drought Observatory.
NGOs	Non Governmental Organizations.
ONE	National Office of Electricity/Office National de l'Electricité.
ONEP	National Office of Drinking Water/Office National de l'Eau Potable.
ONICL	National Office for the Importation of Cereals and Leguminous Grains/Office National d'Importation des Céréales et Légumineuses.
ORMVA	Regional Offices of Land Reclamation/Offices Régionaux de Mise en Valeur Agricole.
PICRD	Permanent Inter-Ministerial Council for Rural Development.
RBA	River Basin Agencies.
Régies	Autonomous state-controlled Companies for the distribution of Water and Electricity/Régies Autonomes de Distribution d'Eau et d'Electricité.
SCWC	Superior Council of Water and Climate.
SMSI	Small and Medium Scale Irrigation.
WUA	Water Users Associations.