

February 22, 1998

**NATIONAL COMMUNITY WATER CONSERVATION
PROGRAM IN EGYPT**

BEST PRACTICES

Final Report

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**SUBMITTED TO:
AED/GREENCOM**

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I - BACKGROUND TO WATER SITUATION IN EGYPT

1. WATER RESOURCES AND WATER DEMAND

Egypt is a Nation that relies almost totally on the Nile River that supplies about 97 percent of its annual fresh water resources. However, annual abstractions from the Nile River are limited to 55.5 billion cubic meters according to the International Water Treaty between Egypt and Sudan in 1959. Prospects for increasing this quota are improbable in the near future.

Ground water resources are also limited. According to 1990 estimates, ground water supplied Egypt with 3.7 billion cubic meters from the Delta and the Nile Valley as well as from the deep desert ground water which is an inrenewable source and can only supply Egypt annually with up to 3.5 billion cubic meters (Abdel Daim: 1994). Rain as a renewable source of fresh water is negligible.

Water reuse produces an additional amount of water resources mainly used for irrigation. In 1990, reused agricultural drainage water constituted an additional 4.7 billion cubic meters and expected to increase to 7 billion cubic meters by the year 2000. However, with increased control over the Nile water and increased use of the Delta and valley ground water, it is expected that agricultural drainage water will increase in salinity to a degree inhibiting its reuse. Treated municipal waste water is estimated to supply 17 billion cubic meters in the year 2000.

Historically, Egypt's economic development has been strongly influenced by the ability to control water resources and to use them effectively and sustainably. The emergence of the earliest civilization in Egypt was the result of the need for strong centralized system of government to control and allocate the River Nile water for the development of irrigation and agriculture.

During the Twentieth Century, major water projects were constructed to increase the capacity of control and use of water resources including Aswan High Dam and the creation of Lake Nasser to eliminate the annual flooding of the Nile and reduce water losses into the Mediterranean sea.

Yet, the demand on water has increased sharply as the increased developments and use of water resources supported rapid agricultural, urban and industrial growth. New demands on water resources continue to increase with population and economic growth. Population growth rate is estimated to be in the average of 2.2 percent per annum. Thus, the per capita share of fresh water has declined below international scarcity level (981 cubic meters per

annum). At the same time, new water supplies are extremely limited and with a very high marginal cost.

Egypt is currently faced with the situation of water demand growing faster than supply with competing rising water demands in the agricultural, domestic and industrial sectors. Agriculture consumes about 84 percent of available water for a total area of 7.4 million acres. There are political, economic and social needs to expand the cultivated area to 10 million acres after the completion of two large irrigation canals in North Sinai and South West desert. That depends on additional water resources. Similarly, domestic water uses around 5 percent of the available water allocation and is expected to increase to 7 percent by the year 2000. Industry uses 8 percent of the water resources and is also expected to increase.

With limited potential increases in supply of water and continuous increases in water demand, demand management is required to increase water use efficiency and to bring use in balance with supply. Shortages in supply is a form of a forced rationing if conflicting water demands are not effectively and efficiently managed.

2. THE NEED FOR DOMESTIC WATER CONSERVATION

Though domestic water consumes 5 percent of water allocated to Egypt (1990 estimates), investments cover around 80 percent of total investments in the water sector. Around 4.9 billion cubic meters are estimated to have been produced in 1996/1997 and is expected to increase to respond to population growth and to provide the service to deprived areas, as 28 percent of the population are underserved.

A number of studies have estimated domestic water waste to be around 50 percent of treated water. Around 15 percent is lost within the public network and 35 percent wasted through leaks in plumbing devices within buildings. That estimate does not include waste through misuse and overuse. It has been estimated that if Egypt succeeds in reducing the domestic water waste by 20 percent by the year 2001, the demand for water for the same year will be reduced by 1.9 billion cubic meters which would require additional investments to produce in the range of LE 9.9 billion (in 1994 prices) and annual operating costs of LE 479 million. This quantity of water represents 3 percent of total available water resources (El Safty, 1997:3)

A number of issues culminate in the existence of these water waste conditions:

Bad Quality of Plumbing Fixtures and Retrofits

The Egyptian market is infested with bad quality fixtures and retrofits. From a survey of 14.3 manufacturers in the major urban centers of Egypt, the findings indicated that 57 percent of manufacturers do not utilize any standard specifications in their production; 71 percent did not use any measures to ensure compliance to specifications; 88 percent do not have built in systems for quality control; and ultimately 75 percent were classified as producing poor quality retrofits (NCWCP 1994)

Additionally, water conserving devices are not adequately known, produced, nor marketed. Even the few produced were not marketed as water conserving.

Consequently, in a study carried out by Greater Cairo Water utility that measured 24 hours water intake of 24 buildings in Cairo has concluded that 15 percent of water intake during the 24 hours was used during the reference period between 12 to 4 O'clock in the morning: a proportion ten times that of many European countries. Thus between 50 to 60 percent of total per day water use is wasted through leakages of retrofits. (Seureca & WMI: 1994)

Water Tariffs and Accountability

Domestic water is highly subsidized by the government. Water tariffs are far below cost of production. Furthermore water meters are either installed for the whole building and not for every unit, are not working, and/or are not systematically read. In the absence of water meter readings, a flat rate basis is used. Consequently, the tariff system tends to be inequitable and non conducive to water conservation.

Water Waste Practices

There is lack of public awareness of the need to conserve potable water. The public do not participate in water conservation activities. With the absence of economic incentives, users are not adequately motivated to invest time, effort and money in water conservation.

Research has indicated that urban upper and middle socio economic classes are the main water wasters. On average, they use a higher quantity of plumbing retrofits and they are connected to large sewage systems so they can afford leakages and inefficient water use. In addition, large quantities of potable water are used to defrost frozen food, wash stairways and cars by water hoses, for irrigation of green areas and gardens, as well as spraying of streets.

4. Institutional and Legal Aspects

There are no integrated national nor local policies and plans for water related institutions directed towards water conservation. No legal codes exist for prevention of water losses and waste. Appropriate mechanisms for enforcement of legal stipulations are lacking. The manpower skills in design, installation, operation and maintenance of plumbing devices are deficient. There are no licensing procedures for licensing trained plumbers. In short, there is no integrated system for managing the domestic water sector in which management of demand is an integral component of overall management of the system.

II - METHODOLOGY

This report presents Egypt's endeavors towards domestic water conservation by initiating a

National Community Water Conservation Program (NCWCP) in 1994. As a program, it represents a number of best practices that in totality have had an impact in raising awareness to the need to institutionalize these practices within relevant agencies for expansion and sustainability.

Data for this report have been collected from relevant documents especially those prepared for NCWCP. The author has been one of the initiators of NCWCP and the Managing Director of Phase I implementation.

III - THE NATIONAL COMMUNITY WATER CONSERVATION PROGRAM

1. MISSION OBJECTIVES

NCWCP is an advocacy program initiated in 1992 and started official implementation in May of 1994. The mission of the program is to address the problems of domestic water waste through conservation efforts directed at the national and local community levels to demonstrate the social, technical, and economic feasibility of water conservation in Egypt and to support long-term conservation efforts. Reducing domestic potable water loss through behavioral change, industry development, and other institutional activities will allow allocated funds, otherwise used for expansion of existing services, to be used towards rehabilitation and maintenance of water supply systems. Funds would also be made available to supply water to areas currently in need.

Thus the major objectives of NCWCP are to:

1. Raise level of public awareness to the need for water conservation through public communication programs and to promote low cost/no cost technologies for reducing water waste.
2. Promote the development of local industry to raise the quality of plumbing fixtures, to manufacture devices that conserve water and to raise the technical know how of plumbers.
3. Promote cooperation between water related entities in the planning and implementation of a water conservation strategy in Egypt.

2. IMPLEMENTORS OF NCWCP

NCWCP implementation provided an innovative model of partnership between government, non-government and private sector entities, supported by technology transfer from USA entities. The program was originally initiated by three partners: an informal group of American expatriate consultants that worked in Egypt in a variety of USAID funded projects and who called themselves The Water Waste Watchers Group (WWWG), Social Planning, Analysis and Administration Consultants (SPAAC), an Egyptian private consulting firm specialized in social research and development (SPAAC), and an Egyptian non-government organization, the Arab Office for Youth and the Environment (AOYE) that has organized and implemented various activities to involve local communities.

The proposal developed by the three initial partners and supported by the governors of three governorates: Cairo, Ismailia and Suez was approved for funding by the government of Egypt from a special fund (416B) from sale revenue of agricultural crops originating from the USA government. The Egyptian Environmental Affairs Agency (EEAA) was assigned by the government to be the supervising agency. The American expatriate team identified South West Florida for Water Management District (SWFWMD) to provide water conservation technology transfer to NCWCP.

Actual and official implementation of NCWCP started in May of 1994 till June of 1997 as the first experimental phase. The Prime Agreement was between SPAAC and EEAA. SPAAC was responsible for overall management of NCWCP and acted as the Technical Secretariat for the program responsible for research, management of information systems, institutional development, engineering and industry development and IEC activities. AOYE was responsible for all community action activities within the three governorates (Cairo, Ismailia and Suez) in collaboration with Governorate Local Administrative entities and local NGOs. The American team was responsible for technology transfer through study tours to the USA and through long and short term consultants.

For coordination and policy guidance, EEAA chaired two committees that met monthly on regular basis. The High Steering Committee and the High Advisory Committee, in addition to EEAA, SPAAC and AOYE, was also membered by representatives from the three governorates, Ministry of Finance, Ministry of Planning, Ministry of International Cooperation and the National Investment Bank. NCWCP management submitted quarterly and annual plans and progress reports to the two committees.

At local level, a Technical Advisory Committee was formed in each of the three participating governorates chaired by the Governor or Secretary General and membered by representatives of relevant local agencies and NGOs. These committees ensured coordination of community activities and provided overall support and guidance to local offices managed and funded through NCWCP.

3. CONTEXT OF NCWCP

NCWCP was implemented at the national and community levels. Mass media communication activities, engineering and industry developing activities, and institutional development activities were directed at the national level. Community mobilization activities, and demonstration projects were implemented at local community levels.

Each governorate identified an area for implementation of NCWCP local community activity. Two rural areas were selected from Ismailia Governorate, one semi-urban area from Suez Governorate, and two areas from Cairo Governorate representing middle and upper middle residential areas.

Originally, these area selections were considered quite appropriate because on the one hand the selected areas constituted a continuum of level of urbanization and socio-economic

categories to test most relevant strategies for each type of community. On the other hand, it was assumed that these areas could be easily metered to be able to measure impact of NCWCP activities on overall water use in these areas.

As it turned out, it was extremely expensive and logistically difficult to meter these five areas to measure changes in water use. In addition, a number of houses in the rural areas were not connected to the water system and those connected did not have effective waste water facilities thus the water consumption was relatively low with the exception of the use of domestic water to irrigate home gardens in some cases. Consequently, and through time, not all local activities were concentrated in the selected areas as originally planned. However, the base line knowledge, attitudes and practice survey (KAP) and follow up surveys covered these selected areas as well as two other urban areas used as control.

The baseline survey identified the different building characteristics of the four areas which demonstrates the differences between types of buildings that exist in middle class urban residential areas, upper middle class urban areas, semi-urban and rural (See Table 1). The higher the level of urbanity and the socio-economic level of the residents, the higher the buildings with greater numbers of apartments. The multiple story buildings tend to have water tanks, additional rooms in the buildings as well as communal toilets and taps thus increasing the potential number of retrofits that leak water. Also the higher the socio-economic status of residents the higher the number of cars that are washed either those in car garages or those parking in the streets.

Expensive treated water is used for washing stains, washing cars (sometimes by hoses), irrigating home gardens and spraying streets and pavements (also by hoses). Large amounts of domestic water are wasted through such misuse.

Most of the surveyed buildings have one water meter per building. Multi-story and multi-apartment buildings pay an aggregated bill for water used. Thus water wasters do not pay for their waste. Additionally, the majority of water meters in urban residential areas are out of order and they are billed on a flat rate basis by number of rooms per apartment.

This is the context which necessitated an advocacy program to raise awareness for the need to conserve water.

Table 1

**SELECTED CHARACTERISTICS OF SAMPLED BUILDINGS IN THE FOUR AREAS
SELECTED TO IMPLEMENT NCWCP AT COMMUNITY LEVEL**

	Urban Middle Community	Urban High Community	Semi-Urban Community	Rural Community
Total number of buildings according to 1986 census	1510	1765	7304	NA
Sampled buildings	150	150	152	150
Average number of stories per building	7.2	6.1	1.7	1.1

	Urban Middle Community	Urban High Community	Semi-Urban Community	Rural Community
Mode number of stories	6	5	2	1

	Urban Middle Community	Urban High Community	Semi-Urban Community	Rural Community
Highest number of stories	22	21	5	3
Average number of apartments in a building	23.1	17	2.2	1.2
Highest number of apartments in a building	142	66	4	5
Average number of non-apartment rooms per building	5.6	1.3	0.2	0.4
Highest number of non-apartment rooms in a building	75	19	3	6
Average number of commercial stores per building that have stores	5.3	2.7	1.9	1.4
% of buildings with water tanks	78.7	39.3	7.2	12.0
% of buildings with apartment water meter	1.3	2.0	1.3	1.3
% of water meters out of order	68.1	77.4	15.3	0.7
% of communal toilets leaking	13.4	4.1	---	---
% of communal taps leaking	5.2	3.7	3.7	---
% of buildings with gardens	18.0	9.4	24.1	15.6
% of buildings with garages	49.3	21.3	1.3	1.3
% of buildings that wash cars with building water	56.0	46.0	2.0	---

4. TARGET AUDIENCES

NCWCP identified three categories of target audiences: consumers, consumer influentials and consumer supporters.

The **consumers** are the primary target group. Their practices will ultimately culminate in reduction of water waste and losses. They are the housewives, other family members, and other water users such as building porters, gardeners and public building users (government offices, mosques, schools, hospitals, youth hostels, gasoline stations, public water stands). Consumers need to reduce excessive use of water, maintain and repair devices to reduce water leakage, invest in good quality plumbing devices, and invest in water conserving devices.

Consumer influentials are those that can produce changes in consumer practices through raising consumer awareness, discouraging water waste, and reinforcing water conserving behavior. Consumer influentials are children, teachers, religious and informal community leaders (including women), mass media leaders (television, radio and press), local government executives, political leaders and local environmental NGOs.

Consumer supporters are the institutions that provide the necessary support services that assist consumers in their efforts to conserve water. They include water and waste water utilities, relevant ministries, plumbing training institutions, manufacturers and importers of water devices and retrofits inside and outside buildings, and research and development

institutions. Consumer supporters need to introduce changes that would lead to sound management of water demand through introduction of changes in building codes for water conservation, enforcement of existing laws for installation and maintenance of water meters for each housing unit with monthly readings to relate water cost to water use, and the introduction of equitable water tariff structure conducive to water conservation. Plumbers need to be well trained and licensed to provide high quality work. High quality water consuming devices need to be introduced into the Egyptian market.

5. SUMMARY DESCRIPTION OF NCWCP ACTIVITIES

As a complex advocacy program working at the national and community levels and targeting three different categories of target audiences, NCWCP included a variety of activities utilizing mass media, and interpersonal communication channels as well implementing "demonstration projects" to demonstrate the feasibility of reducing water waste and setting up exhibitions for water conserving devices. The main theme of NCWCP was "We Are All Partners in Water conservation".

1. Mass Media Activities

NCWCP mass media activities included mobilization activities, solicitation activities, as well as production and dissemination of printed materials and TV spots.

a. Mobilization Activities

1. A press conference was carried out at the start up of the program to inform mass media leaders (TV, Press and Radio) about the importance and objectives of NCWCP.
2. A workshop was implemented in partnership with the Faculty of Mass Communication at Cairo University to discuss the important role of the mass media in the success of water conservation and the reduction of water waste.
3. A special one day workshop was organized for TV and radio leaders to present to them the extent of water losses in Egypt, the challenges to water conservation, and the crucial role of the mass media for consumers as well as consumer supporters.

b. Solicitation Activities

1. Leading mass media staff were always invited to attend NCWCP public functions to ensure media coverage.
2. Specialized TV and radio programs as well as popular press columnists were periodically solicited to present water conservation issues.
3. Some TV and radio programs carried out contests related to water conservation especially during the month of Ramadan and NCWCP provided the prizes in cash, in water conserving retrofits, or shirts with NCWCP logo.
4. Towards the end of Phase I of NCWCP and to put pressure on decision-maker supporters of water conservation, the press was highly solicited to publish reports, articles, columns and caricature jokes related to water conservation.

c. Production of Communication Materials

The communication material developed included posters (3), flyers (3), brochures (8), stickers (3), street billboards (67), phosphoric boards (30), video documentaries (5), TV spots (10), radio spots (9), press announcements (6), speakers bureau (4), mail messages (5000 families).

All these materials targeted consumers and consumer influentials. The TV spots were broadcasted in 4 TV channels: two national and two regional channels to reach Greater Cairo and Canal area (Ismailia and Suez). They were also aired in the underground television circuit.

More specialized booklets were developed mainly for consumer influentials and supporters to promote NCWCP vision and mission. These include:

- * Ncwcp Views on Water Metering and Tariff
- * Requirements for Modification of Water Meters.
- * Water Demand Management Strategies.
- * The Role of Women in Water Conservation.
- * Water Conservation Strategy for Greater Cairo Water Utility.
- * Water Conservation Industry Inside and Outside Buildings
- * Water Conservation Guidelines for Hotels and Touristic Establishments.
- * Water Conservation Through Xeroscaping Concepts.
- * A Guide for Selection for Local Water Conserving Plants.
- * Catalogue for New Water Conserving Devices Introduced into the Egyptian Market.

These booklets were discussed and distributed in group meetings, workshops and conferences of NCWCP.

2. Interpersonal Communication Channels

NCWCP utilized interpersonal communication channels for community and consumer influentials' mobilization and for integrating water conservation policies and strategies within the relevant institutions.

a. Schools

NCWCP targeted school children of 41 schools within the three governorates as future water consumers and as consumer influentials. Workshops were held with executives of Educational Directorates of the three governorates, school masters and teachers for development of the action plans at schools. The activities included group meetings with children to mobilize them to be partners of water conservation, religious and artistic contests, and exclusion trips to local water utilities to appreciate efforts and costs of treating water for domestic use.

b. Mosques

Through coordination with Waqf directorates, religious leaders were mobilized to include water conservation messages within Friday prayers at the mosques.

c. Youth

NCWCP mobilized the youth through group meetings at youth institutions such as youth clubs, hostels, Arab Youth Scouts, and universities.

d. National and Social Celebrations and Festivals

NCWCP participated in all local festivals by organizing conferences, workshops and exhibitions. Such festivals include governorate regional days, annual Nile celebration, International Environment days, Reading for All Festivals, Local Popular Folklore festivals, and national annual exhibitions.

e. Local NGOs

Workshops were held with local NGOs to mobilize and coordinate their efforts to support and promote water conservation issues within their local communities.

f. Local IEC centers

Local IEC centers are under State Information Services and they are centers that raise local public awareness to critical national issues. Water conservation issues and concepts were introduced to these centers at the three governorates and NCWCP communication materials were provided to them to utilize in group meetings organized by them.

g. National Conferences and Workshops

These conferences and workshops targeted mainly water consumer supporters and influentials and they aimed at institutionalizing water conservation concepts within relevant agencies. Ministers of relevant ministries attended the opening of all national conferences implemented by NCWCP (4). Manufacturers and importers of water conserving devices were encouraged to exhibit their products in exhibition halls adjacent to conference halls.

h. Engineering and Industry Development Activities

Through individual contacts and through group meetings, NCWCP encouraged a number of manufacturers to manufacture water conserving devices. Instrumental working group meetings were organized to discuss requirements for upgrading quality of manufactural devices and retrofits, for upgrading manpower skills in plumbing industry and for promotion of manufacturing of water conserving devices. recommendations developed by these groups were transmitted to the relevant ministries and agencies through the support of the Minister of Environment and the chairman of EEAA.

i. Donor Agencies

Representatives of donor agencies supporting the water/waste water sectors were always invited to attend NCWCP conferences. Special meetings were organized for donors and team leaders of donor supported projects to coordinate their support in integrating water demand management within policies and activities of water/waste water utilities as the main agents for the promotion and support of conservation practices among consumers.

3. Demonstration Projects

To prove the technical, economic and social feasibility of water conservation 146 demonstration projects were implemented in the three governorates through the coordination and support of the Local Technical and Advisory Committees under the supervision of the Local Offices of the Community Action Team. Each demonstration project consisted of four components: meter readings before and after using water conserving devices, raising awareness of users, and training of maintenance plumbers and the engineering component which included leak detection and fixing of internal network of piping, retrofitting and introduction of water conserving devices.

Demonstration projects were implemented in a variety of institutions including government offices, homes, hotels, public water taps, gas stations for car wash, mosques, schools, clubs, hospitals and sea shores.

One of the demonstration projects was the manufacturing and distribution of 250,000 plastic water displacement bags. Each displacement bag saves two liters of water every time the toilet is flushed. The purpose of this activity was on the one hand to promote low cost technologies to conserve water and on the other, educate the public on the functioning of toilet tanks that the water pressure is more important than the quantity of water used for efficient functioning.

4. Gender Impact

NCWCP is a gender sensitive program. Women as housewives are primary target audience as water managers and users in their homes. They are also targeted as influentials within their own families and for other housewives.

Messages and communication activities are directed to both males and females. the mass media campaign (TV and radio spots) used male and female voices alternatively to ensure messages reaching both genders. the slogan for the campaign of "Satisfy Your Conscience and Conserve Water" was gender neutral. The verb "satisfy" in Arabic (Irdee) is appropriate for both genders. Focus groups for pretesting communication materials were administered to men and for women. Women programs on TV and radio were indirectly promoted to include water conservation messages to housewives.

Nevertheless, no specific strategic activities were planned to ensure reaching women. Also

the Program failed to request reporting of the number of beneficiaries of NCWCP communication activities by gender. Such an overlook weakened the alertness of local community Action Teams to reach women within the community.

5. Record of NCWCP Success

NCWCP used a variety of criteria to measure its success in terms of measurement of knowledge, attitudes and Practices (KAP) of consumers before and after NCWCP activities, measurement of water savings from demonstration projects, content analysis of press coverage of water conservation related topics, and close follow up of institutional development achievements.

a. Changes in KAP of Consumers

Pre and post KAP surveys have indicated that water consumers have become more aware of the future potential water problem in Egypt such as 55% to 74% in Suez before and after NCWCP respectively. They have become more aware of water conservation practices such as proper closing of tapes, prompt fixing of water leaks, not washing cars by hoses, not spraying streets and pavements, and the moral and religious responsibility of not wasting water. Awareness of national and local efforts towards water conservation has increased from 35% to 95% (Wafai Associates, (1996: 13, 17). NCWCP and its logo became known to 63% as compared to the previous 9% (Wafai Associates 1996: 22)

Respondents who have declared adoption of water conserving practice to reduce water consumption increased from 65% to 98%. Knowledge of water conserving devices increased from 14% to 83% (Wafai Associates 1996:44). Television was the main channel for receiving such messages and information.

6. Measurement of Water Savings from Demonstration Projects

As demonstration projects were metered, NCWCP was able to measure the average per day water consumption before and after intervention. From the 146 projects implemented, 35 projects had greater average per day use either because washrooms before the intervention were in quite unusable condition so use increased after retrofitting or because in some buildings users were not used to water conserving devices and they were damaged out of misuse.

On the other hand, there are buildings that saved up to 90 percent of water used such as one secondary school in Cairo Governorate (a total of 849 cubic meters per day mainly from fixing leaking internal piping network). In a large government building in Cairo (Tahrir Building) used by 9 thousand employees and visited daily by about 13 thousand, the average water use per day was reduced to 178.2 cubic meters from 382.9 cubic meters, a saving of 53.2 percent.

The following table (Table 2) presents the total costs of the demonstration projects by

governorate, the total estimated annual saving of water, the operation and maintenance cost of such an amount of saved water and the estimated number of years to cover the investment.

Table 2

Governorate	No. of Projects	Total Costs (in LE)	Annual Savings		Cost Recovery in Years
			in M ³	in LE	
Cairo	27	745,763	411,187	189,146	3.9
Ismailia	72	647,479	451,254	146,907	4.4
Suez	47	708,378	319,363	-----	3.4

Source: NCWCP, Demonstration Projects: Replicable Models:10

* The cost is estimated on the basis of the estimated cost of O&M of one cubic meter in Greater

Cairo: LE 0.46

One five stars hotel in Cairo, in consultation with NCWCP, invested LE 25,000 in water conserving retrofits and saved 33 percent of water used and was able to recover the investment in less than three months.

In an informal statement received by NCWCP from a consultant to the General Organization for Greater Cairo Water Supply (GOGCWS) stated that during the months of April until July 1996, when NCWCP was well underway, water production data indicated a decline in water demand of approximately 2.5 percent from the existing water demand trend (a five year average based on the years 1991 through 1996). Over the course of a year, such a reduction was estimated to represent deferred production equivalent to approximately 36 million cubic meters of potable water. The estimated financial saving during the 12 months beginning March 1996 to (GOGCWS) is LE 1.25 million.

7. Press Coverage

NCWCP monitored press coverage on water issues before and during NCWCP Phase I. A university professor from Faculty of Mass Media carried out quarterly content analysis of the press clippings. Findings indicated a substantial increase in coverage of topics related to domestic water in general and to water conservation specifically. Prior to NCWCP, water conservation as a topic and the imbalance between water demand and supply were rarely covered in the press.

6. INSTITUTIONAL DEVELOPMENT ACHIEVEMENTS

1. Water Conserving Retrofits

Over 16 water conserving retrofits have been manufactured through the coaching of NCWCP and utilized in different demonstration project sites. Specialized engineering professionals from Cairo University assessed these retrofits for NCWCP. The different assessed retrofits ranged in efficiency (maintained and not broken or leaking) from 98 percent to 23 percent (El Sheimy et.al.

1997). The main conclusion of the study was the necessity to continue with such endeavors and the need to manufacture heavy duty water conserving retrofits for use in public places.

2. Governorate Five Years Strategic Plans

Each of the three governorates, with the support of NCWCP staff, prepared comprehensive 5 year strategic plans for water conservation (till the year 2000). These plans were developed separately by governorate relevant executives, yet they all shared the same components of water meters and tariff structure, the important role of water/waste water local utilities, alternative water sources for gardens, and IEC activities. Each governorate requested the Ministry of Planning to include their water conservation plans within their Five Year Plan.

3. Water Conservation Within GOGWS Master Plan

In an update of GOGWS Master Plan sponsored by the Government of Egypt and USAID, a Technical Memorandum (No. 5A) was prepared by the consultants to integrate water conservation within the Master Plan. The components included are: education programs for domestic, institutional and industrial users; water metering for domestic, institutional and industrial users; engineering improvements to plumbing; leakage detection and repair in communication pipes; use of water conservation devices; etc., i.e., all NCWCP concepts that have been promoted.

4. Continuation of NCWCP

The Ministry of Planning has entered NCWCP within EEAA Five Year Plan starting 1996/1997 and has allocated LE 20 million to replicate NCWCP in ten additional governorates. Hence, EEAA will be responsible for the continuation of NCWCP concepts and activities through Phase II.

7. LESSONS LEARNED FROM NCWCP - PHASE I

Through the experiences of NCWCP- Phase I in three years, the need for integrated domestic water management that manages demand for water as well as water supply, distribution and collection of waste water became obvious. Efficient domestic water use through water conservation is the quickest and cheapest alternative to increase water supply.

The Egyptian public have indicated interest in water conservation and concern for water

wasted. Yet they require the necessary mechanisms to be put in place so they become effectively motivated to invest time and effort to reduce water waste.

Mass media channels proved to be very powerful in reaching the masses especially the TV. They can be influential in informing citizens of methods and technologies to conserve water.

The water conservation industry is a new industry and required governmental support to successfully pass the transitional phase until sufficient demand is created to allow for mass production at lower costs.

Large amounts of water are lost through internal water connections, i.e., unfelt and unseen, and detrimental to building foundations. Systems need to be put in place to ensure leak detection and repairs.

All public and government buildings require plumbing maintenance staff and adequate maintenance budgets to ensure reduction of water wasted through leaks.

Large areas of public gardens are irrigated negligibly with domestic water (77% of public gardens of Greater Cairo). Alternative sources of water need to be investigated to conserve domestic water for domestic potable use.

Data on domestic water use patterns of different socio-economic households are lacking. Such data are needed for the development of an effective hierarchical water tariff structure that is equitable and conducive to water conservation for successful water demand management.

Finally, success in reduction of water loss requires support from political leadership to assign it as one of the priorities of sustainable development.

8. RELEVANCE OF NCWCP TO THE REGION

The latest World Bank report (1995) has indicated that all countries in the Middle East and North Africa suffer from water shortages and/or water quality problems. One of the two strategic recommendations for water demand management was to improve efficiency of water use and reduction of waste and losses.

Water conservation mechanisms have been declared as essential for the region through pricing reforms, water efficient technologies, recirculation and recycling technologies, treated waste water reuse for non-potable uses and mobilization of community efforts.

However, pricing and cost recovery are two concepts highly promoted by the World Bank and Donor Agencies. Water has to be treated as an economic commodity with a price to promote efficient use and conservation.

NCWCP has demonstrated the social dimensions of water demand management in addition to the technical and economic dimensions. Stakeholders as users, influentials and supporters

need to be addressed if the Middle East Region is successful in conserving domestic water.

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