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Sagardoy J.A., Guelloubi R.

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GENDER INDICATORS IN WATER MANAGEMENT: REVIEW, PROPOSALS AND GUIDANCE

J. A. Sagardoy* and R. Guelloubi**
* GEWAMED Project Manager, CIHEAM - Mediterranean Agronomic Institute of Bari, Italy.
Email: sagardoy@iamb.it
** GEWAMED Technical Support Officer, CIHEAM - Mediterranean Agronomic Institute of Bari, Italy.
Email: guelloubi@iamb.it

Abstract - The present paper aims at providing an overview of the indicators that are presently in use for measuring the progress made in the conditions of equality and empowerment of women in the context of the management of the water resources in the Mediterranean Region.

At national level, it is clear that the existing indicators only provide a marginal coverage of the subject and that other indicators are needed to give a more completed perspective. In the document some proposals are made to fill the gap. Some of the indicators proposed are already used by some countries but their use is not generalised. The idea behind the proposals made is to discuss them at different levels and see if a more generalised application can be made.

As the document is one of the outputs of the GEWAMED Project, the proposals made here will be discussed with the project partners. It is expected that some of the partners will volunteer for the application of the proposals made and collect the corresponding information during the project life. Results will be reported at later date.

The document besides analysing the indicators needed at national level makes a review of those that should be developed or used at local level. Here the generalisations are more difficult as the need for monitoring systems at local level are very much dictated by the activities or programmes carried out at that level. Nevertheless, the document reviews some of the indicators that are already used in this different contexts and make some suggestions for their use.

It is important to underline that although most of the indicators are linking water management aspects and gender issues it is recognized that some of the problems found in this area have their origin in other social problems that may be fundamental to solve in other to improve the situation of women and men in the management of the water resources. A typical example is the illiteracy that affects many rural area and that may condition the access to technology and information. Therefore the use of indicators that are related to water resources may need the complement of other socio-economic indicators that may provide a wider perspective of the local situation.

MONITORING AND EVALUATION: DEFINITIONS AND CONCEPTS

Introduction

More than 30 years have passed since the first United Nations World Conference on Women was held in Mexico in 1975. Since then, many other conferences and events have taken place and provided mandates, recommendations and political commitments to mainstreaming gender in all development process. The response of governments, international agencies, NGOs and other development agents has been to some extend positive although many claim that is much less than could be expected. However, when it comes to an objective evaluation of the process, it is difficult because the need to monitor these processes was not evident initially and there is an objective lack of data and information to document some of the related processes.

It is only at the World Summit for Social Development (WSSD) in 1995 and the Beijing Platform for Action that the importance for producing gender indicators to assess the sustainability and gender equity was stressed. Since then, other international events have also emphasized the need for developing such information. The United Nations Development Programme (UNDP) has been particularly active in the development of indicators that are strongly connected to development processes and some of them to gender mainstreaming but also other UN organizations and international associations have promoted other gender indicators that are quite useful. Although the

information available is not yet very rich, there is a reasonable amount of national indicators that provide fair estimations of the gender equity and women empowerment. Some of them are briefly discussed in this document.

Where there is a large vacuum of gender information is the water resources area. While there is a great amount of information regarding the available water resources and its use for any country, information on how these resources are used by women and men are extremely scarce. Since recent years, countries are becoming sensitive to the need of collecting gender information when carrying out national surveys and agricultural censuses but still the information is little and can rarely be compared due to the lack of uniform criteria in the collection of information.

To fill this gap, the present paper makes some suggestion in terms of gender sensitive indicators that could be used in the domain of water resources to assess the process of women empowerment in the use of the water resources. Essentially, they are simple percentages that try to provide a photography of the situation at the national level and they are already used in some countries but what is needed is a wider use by countries to be able to better understand the differences between countries. The suggested indicators are concerned with the use of water in agriculture and for domestic use but other uses are not included. However, considering that these two uses represent for most of the countries more than 90 percent of the total uses, the emerging picture can be considered as largely representative.

Basic Concepts Related to Monitoring and Evaluation

The use of indicators is not frequently well understood in the sense that indicators do not exist as isolated entities but they are part of a monitoring and evaluation system aimed to measure the performance of interventions of any kind. For this reason it will be convenient to review some of the basic concepts related to monitoring and evaluation.

Definitions

Monitoring is a continuous process that aims at providing early indications of progress, or lack of it, in the achievement of project outputs or programme objectives and socio economic goals. It is the regular collection, analysis and distribution of information and data on the progress of the activities and programmes implemented.

Indicators are numerical or qualitative data that provide relevant information regarding the development of activities or processes necessary to achieve an objective or social goal.

Qualitative and Quantitative indicators Some of the activities or processes that indicator try to monitor are related to cultural levels, social attitudes and perceptions where qualitative assessments will be relevant. Qualitative and quantitative indicators complement each other well.

Evaluation is a time-bound exercise aiming at assessing whether completed (or on going) programmes (or projects) achieved the intended objectives. Evaluation is normally an integral part of the M&E process and in that sense the indicators provided by the monitoring system are examined regularly (monthly, bi-monthly, quarterly, etc) and the results of the evaluation are passed on to the management for appropriate action. Evaluation is also understood as the process whereby a project or programme is assessed against the objectives that were supposed to be achieved. This later type of evaluation is carried out normally at the mid or end of project life and the evaluators use all kind of information available (reports, interviews, indicators, internal information and any other) to assess to what extend the objectives have been attained.

Benchmarking is a particular M&E system where for each indicator a reference value is established (generally the average for a given period) and future targets are established which normally are higher than the average. The indicators are defined so as provide periodic information (weekly, monthly, quarterly, etc.) on the achievement of the set target. Hence the indicators permit to assess how the target is being achieved (or not) within the planned period. Benchmarking is a highly respected practice in the business world. It is an activity that looks outward to find best practices and high performance and then measures actual business operations against those goals.

Types of Monitoring and Evaluation Systems

There are two basic types of M&E, namely:

1. **Output Oriented M&E**. The most conventional and the simplest. Project outputs are taken as defined in the Project document and a number of indicators are developed to follow the activities undertaken under each output. The achievement of the activities leads necessarily to the achievement of the outputs. The achievement of the outputs normally leads to the achievement of project objectives but not necessarily. Accepts objectives as defined in the Project and intends to evaluate if achieved. In this kind of monitoring a strong relationship between project outputs and indicators is necessary. But a complete evaluation of the achievement of project objectives may require other indicators besides those related to the outputs.
2. **Multi-perspective or process M&E**. This type of monitoring essentially follows the development of an activity or process where the objectives are not clearly defined. This activity or process may contribute to one **or several objectives** and in this case the evaluation part is difficult because the same indicator may provide different perceptions about the achievement of the possible objectives. For instance, there are several indicators that measure the labour contribution of women to the agriculture labour force. From a point of view of social equity the more women work in the sector the greater equity will be achieved. From a point of view of national efficiency the perception of such increases may be different and even considered negative if the women entering into the labour market has less preparation and training than the replaced males. To asses this second perspective further indicators (related to worker's productivity) may be required.

In the first part of this document (National Indicators) most of the indicators used or proposed correspond to the second type of M&E system while in the second part (project or local level indicators) the Output M&E system will be predominant.

Reviewing Some Concepts of Monitoring and Evaluation in a Gender Context

Monitoring and Evaluation are processes intimately linked. Evaluation can hardly be done without some monitoring information and to monitor a process without making any assessment does not make much sense. Hence it is logical that indicators should be developed having in mind one (or several) objective(s) to be achieved. If the indicators have been well developed, their analysis will inform us how far or close we are from the objective.

An indicator is normally defined as summarising a large amount of information in a single figure in such a way as to give an indication of change over time. Bauer (1966) described social indicators as "statistical series, and all other forms of evidence.... that enable us to assess where we stand and are going with respect to values and goals, and to evaluate specific programmes and determine their impact". This characterisation of indicators is useful because it highlights:

a. the inclusion of different forms of information, i.e. statistical data, as well as qualitative descriptions based on attitudinal information;
b. the link to objectives;
c. the diagnostic role (during the implementation and monitoring phases of projects) and the evaluative role (upon completion) of indicators; and
d. the link to measurement with respect to values and goals, i.e. the normative nature of indicators.

Indicators, as the name suggests, are best interpreted as indicative or suggestive, that is they are not prescriptive in nature in terms of providing diagnosis and remedies.

The development of indicators and the collection and analysis of data are vital functions in providing information to governments to set priorities, design strategies and follow up on advancements made towards achieving the planned objectives. A gender indicator provides "direct evidence of the status of women, relative to some agreed normative standard or explicit reference group" (Johnston 1985). In other words, a statistic becomes an indicator when it has a reference point against which value judgments can be made. A Gender Indicator can be defined as using quantitative and qualitative measures to capture gender-related changes in society over time.

Composite Indicators

Complex processes may need the development of several indicators to give us a perception of the different factors that influence the process. To have an integrated view of these factors, often

composite indicators are developed. These composite indicators are an arithmetic combination of the indicators that measure the factors contributing to the process under analysis. For example, the Human Development Index (HDI) of UNDP is made of the combination of several indicators measuring respectively long and healthy life (life expectancy at birth); knowledge (adult literacy rate, gross enrolment ratio) and decent standard of living (GDP per capita and PPS US$). Each one of these indicators enters into the HDI indicator with a different weight. It is not always necessary to integrate all indicators related to a process into a composite indicator. For instance, Table 1 shows the indicator used by UNDP to analyse the women's political participation but they are not integrated into a single one due to the obvious difficulty of their integration.

Table 1. UNDP indicators on women's political participation

Year women received right to vote
Year women received right to stand for election
Year first woman elected (E) or appointed (A) to parliament
Women in government at ministerial level (as % of total)
Seats in lower house or single house held by women (as % of total)
Seats in upper house or senate held by women (as % of total)

Hence, the most important step in developing a monitoring strategy is to identify the indicators that need to be used to follow the process as close as possible and they depend essentially on the scope and purpose of the process, programme or project. In choosing the indicators, it is necessary to strike a balance between the number of indicators and the difficulty linked to obtain the necessary information. Considering that obtaining the required information is generally a complex process, it is good to try to reduce the amount of indicators to the minimum indispensable (Vermillion and Sagardoy, 1999).

The Evaluation Process

The evaluation process is the analytical component of the process of monitoring and evaluation. It analyses basically the project processes and impacts to assess whether the planned activities have lead to achieve the objectives or whether modification of the targets is necessary. The evaluation process starts with the analysis of the data collected by the monitoring indicators. Often this analysis entails questions that cannot be answered by the available indicators and requires further investigations (questionnaires, other indicators, etc). In fact, the analysis of indicators may reflect that the process is not going as expected at a certain moment but does not provide information on the causes of the problem which may require a more in depth analysis. Most of the indicators act as an alarm system to point out that the process is taking a direction different from the expected and corrective actions are needed.

Regarding the evaluation of indicators at national level, it should be noted that the objective of the indicator is often not stated. In such cases, the actual value of the indicator for a given year and country represents how far that country is (in the specific year) from the maximum value of the indicator and is already an evaluation in itself. For instance, a country that has a HDI of 0,796 (Mexico, year 2000) represents that Mexico is about 20% far from reaching the highest possible value of the index. Such values are often used to rank countries according to the values of the indicators providing a comparison that is also significant. But also this value is significant historically to asses how quickly the country is changing with regard to the process that is assessed.

Access to and Control of Resources

Another important consideration is that most of the indicators used at national level try to measure the access or to the control of resources (land, water, work, education, etc) but there is a strong difference between having access or controlling a resource. In the first case the person has the right to use the resource while in the other has decision powers over the resource: S. Ibrahim (2006) illustrates these differences for the case of Egypt and they are reflected in the table below and shows that the access is generally open to men and women (with some exceptions) but the control is rarely in the hands of women. In this text the terms access and control are both used taking into account the different meanings associated to them.

Geographical Coverage

Finally a consideration is necessary regarding the geographical coverage of the indicators. Those at national level provide an average vision of the country but often result from the aggregation of regional information. Such regional information is by itself also interesting and will surely show important differences between regions that should deserve a closer analysis. The indicators at local level tend to be related to specific programmes and projects and therefore are more site-specific but sometimes this local information may also reflect regional and national realities. Hence also this type of indicators can be extremely useful to point out realities that escape to the analysis at higher levels. In the present paper, these local indicators are not considered but their possible relevance is acknowledged.

NATIONAL GENDER INDICATORS

Review of Indicators Available at International Level

As indicated earlier, several international agencies and private organizations (NGOs) are making substantial efforts to collect a number of gender indicators that provide some interesting information regarding the empowerment of women in certain areas and progress in gender equity. Some of the main ones are mentioned hereafter.

UNDP Gender Indicators

In 1995, the *Human Development Report* introduced the gender-related development index (GDI) and the gender empowerment measure (GEM). These measures have since been used as advocacy and monitoring tools for gender-related human development analysis and policy discussions. The GDI is not a measure of *gender inequality* rather it is a measure of *human development* that adjusts the human development index (HDI) to penalize for disparities between women and men in the three dimensions of the HDI: a long and healthy life, knowledge and a decent standard of living. The GEM was intended to measure women's and men's abilities to participate actively in economic and political life and their command over economic resources. In contrast to the GDI, which is concerned with well-being, the GEM focuses on agency. It measures three dimensions in this area: political participation and decision-making power, economic participation and decision-making power, and command over economic resources (UNDP, 2006). As these two indicators are composite, a substantial number of other indicators need to be determined in the area of education, economic activity and political participation.

A recent review of these indicators by an external panel has indicated that the GDI is often misinterpreted and some changes are under consideration or eventually complement it with additional indexes.

All the information regarding these indexes can be downloaded from the UNDP website: www.undp.org.

In addition UNDP collects all indicators related to the Millennium Development Goals. The Goal number 3 is: Promote gender equality and empowerment of women. To monitor the progress in achieving this goal the following indicators are used:

- Indicator 1: Ratio of girls to boys (for primary, secondary and tertiary education)
- Indicator 2: Ratio of illiteracy
- Indicator 3: Female share of non-agriculture wage employment
- Indicator 4: Seats in parliament held by women

Some of these indicators, like number 4, are used to calculate composite indicators like the GDI earlier mentioned.

The Word Economic Forum (WEF) Gender Indicators

The WEF is a private international organization that undertakes many meetings and publications. They have recently published *The Global Gender Gap Report 2006* which covers all current and candidate European Union countries, 20 from Latin America and the Caribbean, over 20 from sub-Saharan Africa and 10 from the Arab world. Together, the 115 economies cover over 90% of the world's population. Basically this publication presents the calculation of a composite index called “gender gap”. The index mainly uses publicly available "hard data" indicators drawn from international organizations and some qualitative information from the Forum's own Executive Opinion Survey.

The Global Gender Gap Report 2006 includes an innovative new methodology together with detailed profiles of each economy that provide insight into the economic, legal and social aspects of the gender gap. The Report measures the size of the gender gap in four critical areas of inequality between men and women:

1. Economic participation and opportunity - outcomes on salaries, participation levels and access to high-skilled employment
2. Educational attainment - outcomes on access to basic and higher level education
3. Political empowerment - outcomes on representation in decision-making structures
4. Health and survival - outcomes on life expectancy and sex ratio

Table 2 presents the values of the gender gap index and the ranking of the selected countries for the four areas of inequity mentioned above.

The World Bank Gender Indicators

World Development Indicators (WDI) is the World Bank's premier annual compilation of data about development. The data base includes more than 800 indicators in 83 tables organized in 6 sections: World View, People, Environment, Economy, States and Markets, and Global Links. However, few of these indicators concern gender or water. The main indicators concerning water and gender are:

- Access to improved water source: refers to the percentage of the population with reasonable access to an adequate amount of water from an improved source, such as a household connection, public standpipe, borehole, protected well or spring, or rainwater collection. Unimproved sources include vendors, tanker trucks, and unprotected wells and springs. Reasonable access is defined as the availability of at least 20 litres a person a day from a source within 1 kilometre of the dwelling.
- Access to improved sanitation facilities: refers to the percentage of the population with at least adequate access to excreta disposal facilities that can effectively prevent human, animal, and insect contact with excreta. Improved facilities range from simple but protected pit latrines to flush toilets with a sewerage connection. To be effective, facilities must be correctly constructed and properly maintained.
- Gender Parity Index: is the ratio of girls' to boys' primary net enrolment/attendance ratio. The net enrolment/attendance ratios are obtained as the proportion of children of primary (or secondary) school age (defined at the country level) who were enrolled/attending primary (or secondary) education. Enrolment refers to the reporting by countries from administrative records on education. Attendance refers to the reporting obtained via household surveys on school participation during the week preceding the survey. Ideally, enrolment and attendance should be the same, but in practice enrolment tends to be greater than attendance because not all children enrolled attend school. Ultimately, the focus of primary/secondary school participation is on attendance.
- Total fertility rate: is the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with current age-specific fertility rates.

Data are shown for 152 economies with populations of more than 1 million and 14 country groups, plus selected indicators for 56 other smaller economies. Indicators are shown for the most recent years or period for which data are available and, in most tables, for an earlier year or period (usually 1990 in this edition). In addition the World Bank also provides detailed information on the Millennium Development Goals using its own data base.

Water Resources Management and Gender Issues: The Case of the Mediterranean Region

The region is the most arid in the world. Total renewable water resources are estimated at about 593 km^3/year, with demand already exceeding 300 km^3/year, and which will continue to grow reaching a demand of about 360 km^3/year by the year 2010. The region also has the highest dependency on external water resources (about 21%, of which 14% are non-Mediterranean countries). Due to the scarcity of water resources in the region, non-conventional water supplies have been widely adopted in the form of desalination plants for brackish and sea water, wastewater reuse programs, and reuse of agricultural drainage water. Fossil groundwater has also been extensively tapped: for example, in the two major shared aquifer systems of North Africa, the Nubian Sandstone and the North Western Sahara fossil aquifers, which extend from Egypt to Mauritania. Major investments have been directed to the water supply and sanitation subsector within the region, however, coverage is variable (Fig. 1 and 2).

Table 2. The Global gender gap 2006 rankings for some of the countries of the GEWAMED project

Country	Overall ranking	Overall Score (0 to 1 scale, 0=inequality, 1=equality)	Economic participation and opportunity ranking	Educational attainment ranking	Political empowerment ranking	Health and survival ranking
Spain	11	0,7319	85	37	5	71
Greece	69	0,6540	70	45	87	53
France	70	0,6520	88	1	60	1
Italy	77	0,6456	87	26	72	77
Cyprus	83	0,6430	75	54	95	84
Tunisia	90	0,6288	97	76	53	98
Jordan	93	0,6109	105	69	100	62
Algeria	97	0,6018	103	83	98	78
Turkey	105	0,5850	106	92	96	85
Morocco	107	0,5826	102	99	92	90
Egypt	109	0,5785	108	90	111	66

Source: World Economic Forum, Extracted from the Global Gender Gap Report 2006

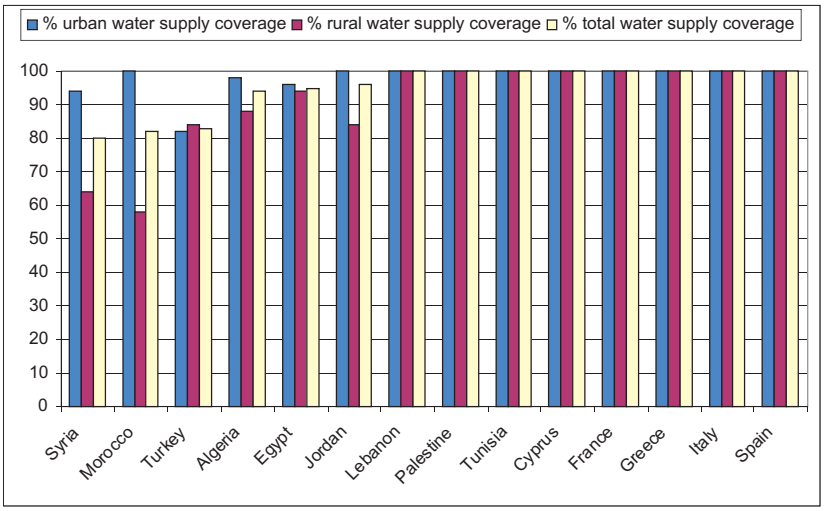

Fig. 1. Water supply coverage for the selected Mediterranean countries (GWA, 2003)

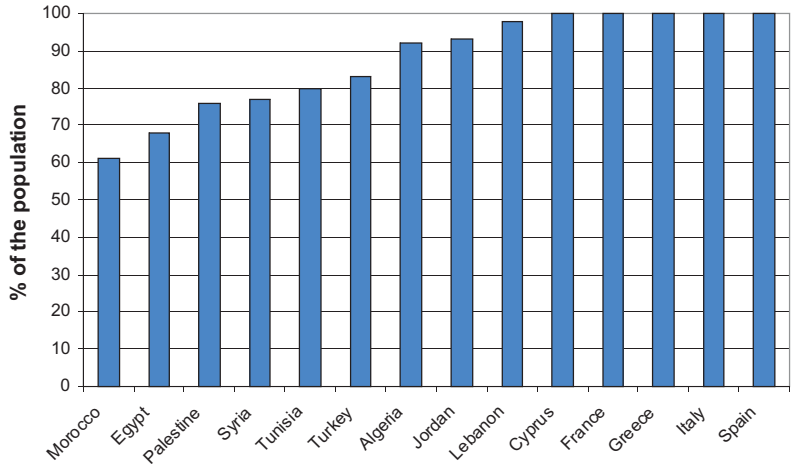

Fig. 2. Access to improved sanitation facilities (World Bank, 2006)

Driven by the need to make the most of scarce resources, countries in the region have made massive investments in infrastructure to store and divert water, to provide water supply and sanitation services to the population, and to provide irrigation services. For example (WWC and CONAGUA, 2006), in Egypt in the five years 2002-2004, about US$ 2.5 billion was spent on irrigation infrastructure, and about US$ 1.5 billion on the provision of water supply and sanitation services. Over the two decades 19822004, Egypt spent a total of US$ 10 billion on investments in potable water supply services, and US$ 16 billion on investment in sanitation services. The investments produced remarkable increases in services. Potable water production increased from 5.8 million m^3/d in 1982 to 18.2 million m^3/d by year 2000. The per-capita share of potable water use increased from 130 l/d in 1981 to 275 l/d in 2000. The capacity of the sanitation system increased from 1.0 million $m^{3/}$d in 1982, to 8.3 million m^3/d in 2000, and is planned to reach 20.0 million m^3/d by 2017. About 20% of total government capital expenditures in Egypt are in the water sector.

In spite of the work done, the SEMR countries show huge differences of water supply coverage, especially if we look at national level (urban versus rural areas), the case of Morocco is a clear one where just 58% of the rural population is covered by water supply systems compared to a full coverage of the urban ones, while just 61% of the population has access to improved sanitation facilities.

Another point that should not be overlooked is the quality of the service. Institutional structures have paid too little attention to the imperatives of financial sustainability. Both in irrigation and in water

supply and sanitation, the quality of service delivery has too often been undermined by inadequate budgets, themselves in part resulting from inadequate cost recovery.

Politicians and policy-makers have to take into consideration that sanitation programmes offer a natural entry point for gender approaches. Coping with sanitation inadequacies adds enormously to women's domestic burdens as well as robbing them and their children of health and dignity.

Furthermore, solving the problems of water supply and sanitation will help achieving greater gender equalities, especially when dealing with the gender disparity index.

At regional level, gender disparity at primary level in 2005 is still in favour of the boys (96.7 per cent versus 95.1 per cent for girls), which still participate more than girls in primary school. However, greater disparities in favour of boys are observed among the South and East Mediterranean countries. Even among the SEMR countries, different situations can be seen, e.g. Morocco (91,7% boys' NE/AR[1] versus 85,2% girls' NE/AR) and Jordan (94,3% boys' NE/AR versus 95,5% girls' NE/AR).

According to UNICEF (2005), gender differences are extreme with GPIs below 0.85, yet, non of the Mediterranean countries registers such values, which are between 0.96 (Morocco) and 1.01 (Jordan); as a consequence, all the Mediterranean countries, partners of GEWAMED project, show no gender disparities (Fig. 3).

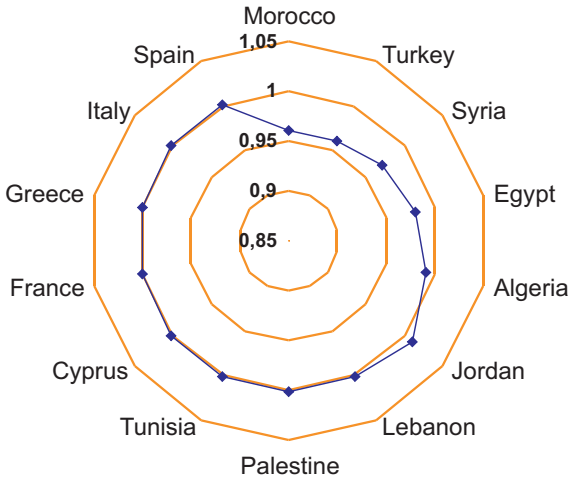

Fig. 3. Gender disparity index of selected Mediterranean countries (UNDP, 2006)

In the same report, it was mentioned that there have been remarkable gains in school participation by girls in the countries of the Middle East and North Africa. Yet, further studies should be done in order to find from one hand these difference at national level and, from the other hand the origins of such disparities (though not remarkable) and to correlate them to the socio-economical problems, the tradition ones, …etc. In the SEMR countries, and especially in the rural areas, girls generally remain at home in order to help their mothers in carrying on the domestic activities (cooking, cleaning, washing, …) as well as the farming ones, whenever the family has either agricultural or husbandry activities.

Furthermore, as mentioned previously, actually girls are more and more present at schools. In fact, in the Mediterranean region there is a continuous development (GNP increased from 1,666 US$ in 2000 to 1,972 in 2004), combined with a reduction of the fertility rate (from 3.2 to 3.0 for the same period) and having as a consequence an increase in the standard of life, characterised by a more presence of not only the girls at school, but also the boys (Fig. 4).

[1] Net enrolment / attendance ratio

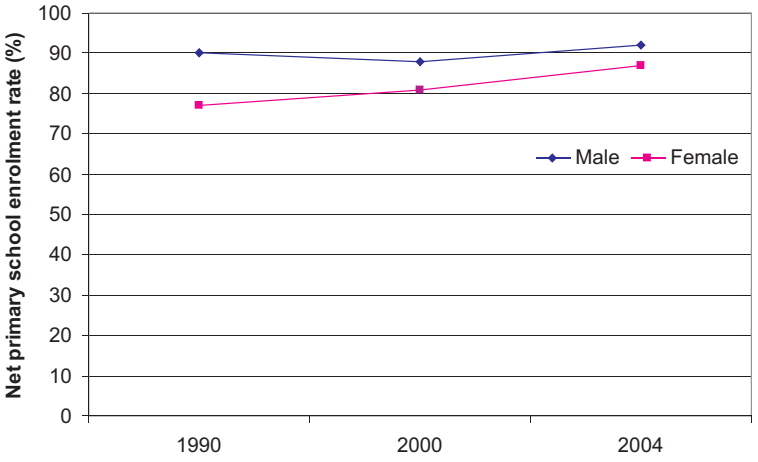

Fig. 4. Net primary school enrolment in the Middle East and North African countries (World Bank, 2006)

Droughts, over-extraction and contamination accentuate the scarcity of the water resources of the region. The effects of all these are gender and class-specific. Worst affected are users of water systems in small rural communities and the poor in urban growth areas. In both types of community, women have the most direct interests in better management of freshwater as they must either accept the poor quality or walk long distances to alternative acceptable sources, that's why water supply and sanitation problems should also be seen from a gender point of view.

Gender Sensitive Indicators to Measure Inequalities and Gender Empowerment in Water Resources

As earlier said, the number of indicators concerned with socio-economic aspects of the participation of women in development process is relatively limited and most of them have been previously mentioned. When this is referred to the water resources sector, the number of indicators is even smaller. In 2002, the International Water Management Institute (IWMI) proposed a gender irrigation indicator that has not got much recognition and remains an isolated effort, The Gender and Water Alliance (GWA, 2003) did a compilation of the main existing gender indicators in 2003 which has remained as one of the most complete reviews but used information formerly developed by international agencies, most of which have been mentioned before. FAO has also developed some gender indicators but mostly concerned with socio-economic aspects but none in the field of water resources. The well known AQUASTAT (FAO, 2002) data base contains very useful information regarding water resources but no gender indicator is included. Hence there is a real vacuum in this area and in the following sections of this paper some proposals are made to reduce this gap.

The term of water resources covers many uses such agriculture, domestic, industrial, power generation, environmental and others. In a Mediterranean context, the agriculture use cover more than 80 percent in most of the countries and precisely women play a particularly important role in this sector. Therefore the indicators here mentioned are mostly addressed to assess the inequities and empowerment of women in this sector. Women also play an important role in the domestic use of water and in the sanitation sector but in this sector, several indicators already exist and the information gap appears smaller.

Within each of these uses, the typical phases of planning, development and management exist and within each of them women and men play different roles. Although the involvement of women in all these phases is important and relevant, so far, the presence of women is more apparent in the management phase and implicitly the indicators here proposed are more connected to this last phase.

The indicators proposed here address the following areas of inequity:
1. The access and management of land and water resources,
2. The access to paid employment
3. Educational attainment
4. Institutional empowerment

A final observation regarding the use of water in agriculture appears necessary. Irrigated agriculture is a true use of available water resources in the sense that water is taken from where the resource is available and applied to the land. Rainfed agriculture uses the water from the rainfall accumulated or trapped in the soil. In this sense, rainfed agriculture uses a part of the available resources but the possibility of controlling its use is limited to some agriculture practices. But in both cases, in agriculture water remains the main input to produce crops.

The Control of the Land and its Management

Before proceeding to the selection of indicators aimed to measure the respective progress made by males and females to the control of the land and its management, it is convenient to analyse both concepts.

The property of land is determined by inheritance or purchasing processes. Most of the countries have laws that establish some general principles for the transfer of the properties of one person in case of death. Such laws generally apply to all items that integrate the property of the person. In general, such laws prescribe that a certain percentage of the total property must necessarily go to the children and wife and the rest can be distributed at the will of the person.

Besides the law, there are very long traditions that are sometimes stronger than laws and followed by many individuals particularly in the rural society. For instance in some provinces (Navarra and Aragon) of the North Region of Spain, it was customary that in case of death of the owner of a farm, the farm will automatically go to the eldest son and would be his responsibility to distribute the benefits arising from managing the farm among brothers and sisters. By this custom, the fragmentation of farms was avoided. In several Muslim countries of the Mediterranean Region, it is also customary that the land be divided among brothers and sisters but the females give their land to the males for its management. Although many of these traditions are becoming less predominant, they are still applied and condition the management of the land which is the real source of income.

The management of farm is generally correlated to the property of the land but this is not always so. Land is often rented under many forms of contract and managed by other persons than the owner. From the point of view of making a living out of agriculture, the important criterion is the management of the farm and no so much the property. The property represents the capital but the management is the use of this capital for generating income and a “life style” which is characteristic of the rural societies.

As a consequence, the gender analysis of the property of the land offers certain interest but much less than that of its management because the “property” of land is a relatively static situation while its “management” is a much more dynamic one where there are much more possibilities for changes due to the transformation of the society. Hence, in this paper, the need for developing indicators for the Property of the land is replaced by that of its management under the assumption that this information is more relevant from a gender perspective. This is not to say that such information is easily available. It would also be interesting to analyse it with similar criteria as those proposed in the next section for its management.

The Gender Management of Agriculture Farms

The information regarding the number of farms or hectares that are run by women related to those run by men in a given country is an important indicator about the process of feminisation of the agriculture. Such data are normally collected in the agriculture censuses and the observation of a relatively long period (10 years or more) permits to assess the degree to which women are having a greater role in the agriculture sector. FAO (1999) has promoted the collection of gender data when censuses are undertaken and a considerable number of countries are responding to this recommendation.

The feminisation process - when it occurs - of agriculture is mainly due to male migration but also due to several other socio-economic factors and it is beyond the scope of this paper to analyse the causes of the process. The indicators here suggested give an idea of the importance of the process and this may suggest the need for further analysis, as with any other indicators.

Three indicators are suggested to measure the gender distribution of the management of farms and they are described below:

- *Indicator No.1: Percentage of farms run by females:*
  These indicators measure to some degree the feminisation of the agriculture sector:

$$\text{No.1} = \frac{\text{Number of Farms Managed by Females}}{\text{Total Number of Farms of the Country}}$$

Example 1
Year 1990,
Total Number of farms managed by females: 667 000
Total Number of farms managed by males: 1 998 000
Total Number of farms of the country: 2 665 000

Indicator No. 1 = 667 000 x 100 / 2 665 000 = **25,02 %**

The absolute numbers of farms run by males or females also represent an interesting information in itself and they should be recorded, but they are more meaningful when compared with the total number of farms.

- *Indicator No. 2: Percentage of cultivated area run by females*
  This indicator is similar to the previous one but instead of numbers of farms it compares the respective areas. As there is a certain correlation between cultivated area and economic returns, this indicator reflects to some extend the economic power of one with respect to the other. This indicator can be expressed as the total area of the farms or as the cultivated area which is normally smaller.

$$\text{No.2} = \frac{\text{Total Cultivated Area by females}}{\text{Total Cultivated Area}}$$

Indicator No.2 can be referred to the “total area of the farm” or to the “surface area used for agricultural” production also called “agricultural land” (FAOSTAT, terminology). We do not recommend to use the Total area as it includes non productive areas.

Example 2
Year 1990
Total Area Cultivated by females: 2 241 000 ha
Total Area Cultivated by males: 12 707 000 ha
Total Area Cultivated: 14 947 000 ha

Indicator No. 2 = 2 241 000 x 100 / 14 947 000 = **14,99 %**

The two examples are based on real data from Italy and they show that although the percentage of women managing farms is quite substantial (25%), the “economic power” represented by the area covered by women (15%) is considerably inferior to those of men (85%).

- *Indicator No. 3: Percentage of the average size of farms run by females compared to those of males*

$$\text{No.3} = \frac{\text{Average Size of Female Managed Farms}}{\text{Average Size of Male Managed Farms}}$$

NB: The Average Size refers to the Agricultural land (FAOSTAT terminology) and not to the Total Area of the farms.

This indicator is precisely addressed to provide some justification on the apparent disparity between the values of the indicators No.1 and No.2.

The example No 3. illustrates the fact that the average size of the farms run by females are nearly half of those of men, which to some extend explains the diversity of percentages between the two previous indicators.

All the examples made refer to a specific year and this information is relevant by itself but becomes more relevant when available for several years as it allows to follow the tendencies in the period under analysis.

Example 3
Year 1990
Average size of female run farms = Total Cultivable area by females / Number of farms run by females = 2 241 000/667 000 =3,35 ha
Average size of male run farms = Total Cultivable area by males/Number of farms run by males = 12 707 000/1 998 000 = 6,35 ha

Indicator No.3 = 3,35 x 100 / 6,35 = **52 %**

Table 3 presents the data and the corresponding indicators for the years 1990, 1998 and 1999. This time interval is chosen in order to compare the predominant values at the beginning of the 90's and at the end of the decade. It can be noticed that the number of farms managed by females has decreased in absolute values but the indicator No. 1 shows a growing trend, this is due to the fact that the reduction of the farms managed by males have decreased even more rapidly than the ones of the women.

Table 3. Gender distribution of the management of farms in Italy

Type of Management	Year		
	1990	1998	1999
Farms (1000)			
Females	667	599	596
Males	1.998	1701	1.674
Total	2.665	2.300	2.270
Indicator No. 1(%)	25,03	26,04	26,26
Cultivated land (1000 ha)			
Females	2.241	2.541	2.543
Males	12.706	12.425	12.454
Total	14.947	14.966	14.997
Indicator No. 2 (%)	14,99	16,98	16,96
Average size of farms			
Females	3,36	4,24	4,27
Males	6,36	7,30	7,44
National average	5,61	6,51	6,61
Indicator No. 3 (%)	52,83	58,07	57,35

Source: ISTAT, 1999, Italy

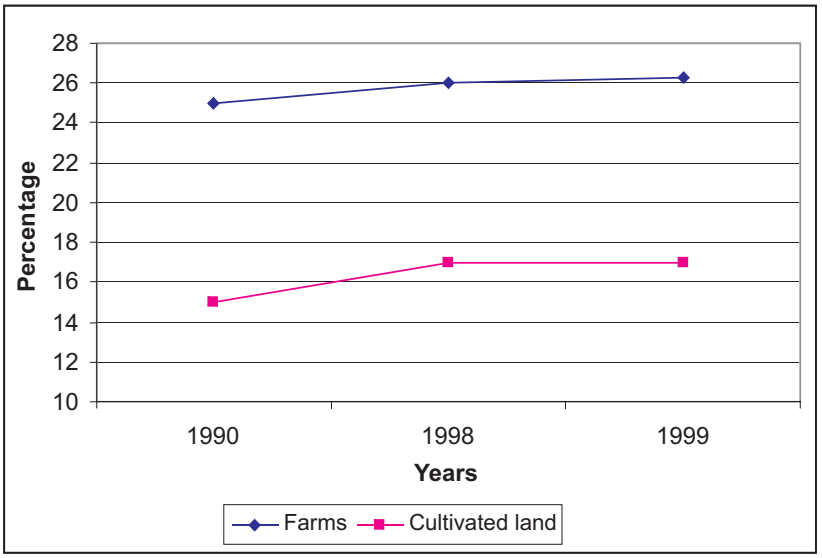

Fig. 5. Indicators No.1 and 2 of the gender distribution of the management of farms

Therefore the tendencies can be identified: one is that the total number of farms is decreasing or in other words a substantial number of persons are abandoning the agriculture activity. The second is that proportionally more males than females are abandoning the agriculture and therefore there is an increasing trend of the feminisation of the agriculture. Thirdly, because of the abandoning of the agriculture activity, the average size of the farms is growing but still those managed by females are growing more rapidly than those of men precisely for the feminisation process of agriculture.

From the point of view of gender analysis, these indicators provide a primary view of the female/male presence in the management of the agricultural sector. If the available data allows it, the analysis can be more detailed. The type of management is not only dictated by gender considerations but also by the fact that the farm is run only with the family labour resources, or with labour resources external to the family and other intermediate possibilities. The relation of this type of management with the gender component can provide interesting observations but such analysis are more in the context of detailed socio economic studies.

The Gender Management of Irrigated Agriculture Farms

The indicators presented in the previous section refer to the total agriculture sector but similar indicators can be developed for the irrigated agriculture. Analysing the irrigated agriculture separately from the total agriculture is relevant because the irrigated agriculture in the Mediterranean context contributes with more than 50% of all the production of the sector reaching in some cases the 83,7%, like in Italy, and nearly 100 % in the case of Egypt, and secondly because the interrelation between water related activities and those of women / men are very gender dependent.

Hence for this important sub-sector of the agriculture, the following indicators are proposed that are similar to those mentioned in the previous section.

- *Indicator No.4: Percentage of farms run by females*

$$\text{No.4} = \frac{\text{Number of Irrigated Farms Managed by Females}}{\text{Total Number of Farms of the Country}}$$

These indicators measure to some degree the feminisation of the irrigated agriculture.

Example 4
Year 2003
Total Number of irrigated farms managed by females: 199 813
Total Number of irrigated farms managed by males: 478 475
Total Number of farms of the country: 678 288

Indicator No. 4 = 199 813x 100 / 678 288= **29,45 %**

It is interesting to note that the percentage of farms managed by females in irrigated agriculture is considerably higher than for the total agriculture sector.

- *Indicator No. 5: Percentage of cultivated area run by females*

$$\text{No.5} = \frac{\text{Total Irrigated Area by females}\ ^{2}}{\text{Total Irrigated Area}}$$

Example 5
Year 2003
Total Irrigated area managed by females 916 903
Total Irrigated area managed by males 1 584 421
Total Irrigated area: 2 501 325

Indicator No. 5: 916 903x100/2 501 325 = **36,66 %**

Although the data do not correspond with those used for indicators No 2, it is very revealing to see that in irrigated agriculture the presence of women is proportionally more important than in the case of the total agricultural sector.

This means that whatever programme is addressed to improved the performance of the irrigated agriculture must pay particular attention to women because they are important partners of the process.

- *Indicator No. 6: Percentage of the average size of farms run by females compared to those of males*

$$\text{No.6} = \frac{\text{Average Size of Female Managed Irrigated}\ ^{3}\ \text{Farms}}{\text{Average Size of Male Managed Irrigated Farms}}$$

Example 6
Year 2003
Average Size of Female Managed Irrigated Farms: 4,59 ha
Average Size of Male Managed Irrigated Farms: 3,31 ha
Average Size of all Irrigated Farms 3,69 ha

Indicator 6 : 4,59x100/3,31= **139 %**

The above example illustrates that the size of the average female managed farms are larger than those of males by 39%. This is another indication of the important role of women in irrigated agriculture in Italy as they run fewer farms than men by with a larger average area. This is another indication that women managing irrigated farms in Italy are not the “poorer” of the sector but is the opposite. They manage farms which are more economically important than those of men.

In summary, in countries where the irrigated agriculture is important, the determination of these indicators is as important as those given for the whole agriculture sector and their determination is

[2] The irrigated area refers to the area that is equipped with facilities to be irrigated independently of the fact that is irrigated or not in a given year.
[3] The average size of the irrigated area refers to the area that is equipped with facilities to be irrigated.

strongly recommended. Like in any other case when indicators are applied to a process the historical data are essential to follow the trends of the process.

Assessing the Gender Labour Contribution to Agriculture

Before attempting the proposition of any indicator in this area, some general considerations are necessary. First of all, there is the question of the reliability of the information that one may find in agricultural censuses or other statistical data. The information provided is surely reliable but may not give a true picture of the situation given the nature of the work in agriculture, which is highly variable with high peaks and moments of low demand, the labour requirements tend to group at certain periods of the year and hence a lot of casual labour is utilized. Most of the casual labourers are paid in cash and payments are not registered in any official source. Hence, official labour statistics in the agriculture sector tend to reflect a situation that is below the reality in terms of actual inputs.

Another consideration is that in the rural environment, the contributions of the wife and children are also not recorded in spite of the fact that they can be quite substantial. Such situations can be assessed at local level and they provide an orientation of how the national situation is likely to be in reality. Nevertheless the official statistics reflect the important reality of those that in a legal way receive a salary for their work and can be compared to other sectors of the economy.

The third related consideration is that most of the farms are “family managed” in the sense that they satisfy the labour requirements only with those available within the family. In Italy, the number of family managed farms is close to 85% of the total. If those other farms are added where the family labour is predominant, but not only, the percentage is close to 90%. In this rural and family environment, women often play a role of a complement to the labour provide by the male and often interrupted due to pregnancy and other roles in the household.

Taken into account the above considerations, the analysis of the official statistic offers certainly great interest but it is likely that in this “official picture” the labour women contribution is under-evaluated. Most of the censuses and statistical annual reports provide information regarding the number of working days that have been used in agriculture and it is normally differentiated by males and females. On the base of such information, an interesting indicator is the one that gives the percentage of the relative input of females and males. The corresponding indicator is defined below.

- *Indicator No. 7: Percentage of female labour contribution to agriculture*

$$\text{No.7} = \frac{\text{Total Number of Working Days Contributed by females}}{\text{Total Number of Working Days Used in Agriculture}}$$

If the statistic information provides details about the different categories of female workers, like wife, family relative, workers hired outside the family, and others, it will be interesting to develop similar indicators for these categories but, as this information is not always available, the corresponding indicators can not be recommended in a generalized form.

Example 7
Year 1999
Total number of days provided by females = 80 982 000
Total number of days provided by males = 345 100 000
Total number of days provided by females and males = 426082000

Indicator No 7 = 80 982 000 x 100/426 082 000 = **21,1 %**

Like with any of the indicators mentioned, their value increase when they are known for a number of years that permits to analyse the trends. For instance, the value of the Indicator No. 7 for the year 1990 was 15,9%, which indicates that in spite of a reduction of the farms managed by females occurred in the period (see Table 1) the number of working days provided by women has increased by nearly 5,2% and therefore the feminisation trend of the labour in agriculture is a growing one.

As the number of days provided by males and females is necessary for determining the indicator No. 7 and we know the number of farms managed by males and females, the average number of labour days used respectively can be determined and this is another useful indicator. Hence the indicator number 8 is defined as follows.

- *Indicator No. 8: Average number of females / males days used in a average*

$$\text{No.8} = \frac{\text{Total Number of Days Contributed by Females}}{\text{Number of Farms Managed by Females}}$$

Example 8
Year 1999
Total number of labour days provided by females = 80 982 000
Total Number of farms managed by females = 596 000 (Table1)

Indicator No. 8= 80 982 000/ 596 000 = **135,87 days/farm**

A similar set of indicators could be developed for the irrigated agriculture giving a better view of the labour distribution in a type of agriculture that is normally intensive and where the participation of women is even more intense.

Examples are provided bellow of Indicators No 7 and 8 for the irrigated agriculture:

Example 9
Year 2003
Total Number of Days provided by females workers in irrigated agriculture:
46 562 335
Total Number of Days provided by males workers in irrigated agriculture:
153 489 323
Total Number of days provided by males and females in irrigated agriculture:
200 051 658

Indicator No. 7 (IA) = 46 562 335*100/ 200 051 658= **23,27 %**

The values of the example 9 are estimated from previous years but they show that the labour contribution of women in irrigated agriculture is higher than in the total agriculture sector:

Example 10
Year 2003
Total Number of Days provided by females workers in irrigated agriculture:
46 562 335
Total Number of farms managed by females in irrigated agriculture: 199813

Indicator No. (IA) = 46 562 335*100/ 678 288 = **233 days / farm**

The values of example 10 show that women dedicate much more time to their irrigated farms that in the case of the agricultural sector. This result makes sense as irrigated agriculture is more intensive than rainfed agriculture.

However, this labour information is not very frequently disaggregated for irrigated and rainfed agriculture although it would be highly desirable. Where this is the case, the development of similar indicators as to those illustrated in the examples 9 and 10 are strongly recommended.

Assessing the Gender Access to Formal Education in the Agriculture Sector

Some agriculture censuses provide information regarding the different degrees of formal education of the persons responsible for managing the farm. When information is often disaggregated by males and females, it is possible to identify whether men and women working in agriculture are having higher levels of education and higher professional competences. This information is relevant because in a way the performance of the agriculture sector is dictated by the quality of the operators that work in the sector.

Table 4 provides an example of such information. As it can be seen, the table reveals that in general the level of education in the agriculture sector is low compared to other sectors of the economy and that the level of education of females in the sector is much lower than those of men.

Although the type of information reflected by these percentages is relevant, they are not included as part of the main body of indicators suggested in this text because of the difficulty of obtaining the corresponding information.

Table 4. Level of Education in the Agriculture Sector (year 1999)

	Absolutes numbers (1000)			Percentages	
Level of Formal Education	Males	Females	Total	Males	Females
University degree	50	17	67	74,63	25,37
B.Sc. (Diplom)	163	57	220	74,09	25,91
Medium level school	401	126	527	76,09	23,91
Elementary school	893	332	1225	72,90	27,10
Without any title	167	73	240	69,58	30,42
Total	1674	605	2279	73,45	26,55

Gender Empowerment in Water Management Institutions

Traditionally water has been organized by sectors that correspond to the different uses. This approach has shown serious limitations when water becomes scarce and there is a greater need for integration and coordination of activities. These limitations have lead to the need for an integrated approach which is known as Integrated Water Resources Management (IWRM) and many international and national efforts are made to promote its application. However, even when IWRM prevails, the ministries responsible for the individual uses remain in existence but some of their responsibilities may have passed to coordinating bodies or decision making bodies such as the river basin authorities.

In addition to these governmental bodies, other local institutions like the Water User Associations may be responsible for managing the resource at local level. Such associations may be established for one single use as Irrigation Associations or several uses. Furthermore, there is the private sector that may be concerned with the planning (consulting firms), development (construction companies) or management (water supply companies) of the resource.

Given the multiplicity of existing institutions that are concerned with water, it will be difficult to have a complete picture of the access of women to all these institutions. Hence, as a complete picture appears impossible the goal may be to select the most representative institutions and develop for them some simple indicators that may be representative for the whole institutional sector.

In this sense, our suggestion is to select the Ministry that may be more engaged in the development of agriculture (main user). In some countries, this could be the Ministry of Agriculture, in others the Ministry of Irrigation and still in others the Ministry for the Environment. There is no problem in selecting more than one ministry; the analysis can be undertaken for each ministry separately. The resulting figures will give a more complete picture and can be aggregated in one single indicator by making the weighted average of the ministries analysed.

If we assume that one ministry has been selected for this analysis, there are two basic types of indicators that could be developed. One is the respective access of women and men to work in this technical area. The other one measures the control men and women of the decision making processes. The first indicator reflects the equality policy practiced by the institution and the second is the control to decision making levels. It happens very often that in water ministries the number of women working can be high although they occupy mostly secretarial and administrative positions but few of them are engaged in the decision making positions.

Hence the following two indicators are proposed.

- *Indicator No. 9: Percentage of women employed in a selected ministry*

$$\text{No.9} = \frac{\text{Total Number of Women Employed in the Ministry}}{\text{Total Number of Employees in the Selected Ministry}}$$

Example 11
Year 1990
Total Number of women employed in the Ministry: 45
Total number of employees in the selected Ministry: 1 303

Indicator Number 9 = 345 x 100 / 1303 = **26,47 %**

The second indicator is the following.

- *Indicator No. 10 Percentage of decision making women employed in a selected ministry*

$$\text{No.10} = \frac{\text{Total Number of Women at Director Level and Above in the Selected Ministry}}{\text{Total Number of Directors and Above in the Selected Ministry}}$$

Example 12
Year 1990
Total Number of women employed at the director level or above in the selected Ministry: 7
Total number of Directors and above in the selected Ministry: 45

Indicator Number 10 = 7x 100 /45 = **15,55 %**

In this second indicator, it has been assumed that the Director category is the one where main decisions are made but it could be that a lower category such as the one of Chief of Units may meet the condition of decision making level. Nevertheless, as certain degree of uniformity is desirable our suggestion is to select the director category and above as it is well defined in most of the ministries.

It will be possible to define similar indicators for the social organizations like the Water Users Associations but they are more relevant at the local level and the present document is concerned essentially with the national level. If this information would exist for all the water users organizations of a given country, it would be possible and useful to have the corresponding indicators at national level but as generally that information is not available such indicators are not included here.

Overview of National Gender Indicators and the Processes Monitored

The indicators earlier reviewed or proposed try to assess the access and control of women and men to natural and social resources but also to the benefits that society generates through economic and social activity. The table below tries to relate these indicators to the processes of accessing or controlling these resources and benefits in order to have an overview of the existing coverage.

The cells marked in yellow denote indicators that keep a more direct relation with water uses. The list of indicators is not complete for some of the resources and benefits listed but it is meant to provide an orientation of the absence or existence of indicators in that specific area.

Table 5. Main indicators for monitoring the access/control to resources and benefits

Resources and Benefits		Indicators	Main Int. Org.	Notes
Resources				
Natural Resources	Land	-No. 1 to 6		The number of the indicators refer to those presented in this publication
	Irrigation Water	-No. 3 to 6,		In the Mediterranean land and water rights are often linked.
	Water Supply and sanitation	-Households covered by water supply -Access to improved sanitation facilities	UN, WB, WHO,	These indicator are not really gender indicators as there is no sex differentiation
	Other water uses	Not available at national level.		Only some local information is sometimes available
Education and knowledge achievement	Education Achievement	-Ratio of illiteracy -Ratio of girls to boys in primary and secondary education	UN, WB;	Indicators need to specify the level of education.
	Training	Gender Indicators exist for individual training activities but cannot be consolidated in a single one		Many types of training exist which are not comparable
Heath and survival	Survival	-Life expectancy -Sex ratio -Birth expectancy ratio -several others	UN, GEF,WHO	Many aspects of health can be monitored. Indicators are specific for each aspect
Economic Activity	Work	-Employment levels for different sectors -Level of salaries -Ind. No 7 and 8,	UN, FAO	
	Capital/credit	Few banks keep indicators of the access to credit by males and females	WB	It is rare to find national indicators providing information on the access and control of this resource
	Transportation	There are some indicator about the use of transportation but rarely disaggregated by sex	WB, National level	
	Markets		Many types of markets exist and difficult to aggregate in one single indicator	Some information exist regarding the control of markets at local level
Economic	Income	-GDI	UN, WB,	Income indicators are integrated in the HDI and GDI
Benefits				
Social	Status/Decision making power	-GEM, -Seats in parliament held by women -No. 9 and No.10	UN, WEF	

The main conclusion of this overview is the existence of a serious gap in the monitoring of some of the processes related to the access or control to these resources and benefits and the need for promoting some new indicators to cover the gap. The indicators earlier proposed in the document are intended to cover the gap although there is still space for further indicators but the concern exist that the larger the number of indicators proposed the smaller the opportunities for collecting the corresponding information.

Conclusions and Recommendations

International organizations have developed a considerable number of indicators with the purpose of measuring the process of development. However those concerned with gender equality and empowerment are still few in spite of the numerous mandates from international conferences and other similar meetings.

The lack of gender indicators is still greater in the water resources sector where only isolated efforts are made by few countries. Based on those experiences, the present paper suggests 10 indicators that could constitute a first step to provide a clearer picture of the presence and empowerment of women in the sector. The indicators are simple percentages but because of their simplicity are clear to understand. They are concerned with 4 main areas of inequity:

a) the access and management of land and water resources,
b) the access to paid employment,
c) educational attainment, and
d) institutional empowerment.

Certainly such indicators can be completed with others that may give a more complete picture but already achieving the application of these 10 indicators in a limited number of countries would be an important step ahead.

GENDER INDICATORS AT PROJECT AND LOCAL LEVEL

Introduction

There is an intrinsic difficulty in providing guidance for the development of the indicators at project level because there is a multiplicity of projects and the corresponding indicators must be related to each specific project. Nevertheless some generalizations are possible in terms of establishing the adequate M&E systems and some general orientations which correspond to the first section.

Another difficulty arises from the fact that up to very recent date most of the projects did not contain specific objectives or target to be achieved in terms of gender equity or other objectives and therefore if we wish to assess the impact of the project from a gender perspective we may have few data for doing it. Hence it is important to define outputs, outcomes and objectives for the main categories of projects in such way that they spell out specific gender components. A sort of “check list” of such possible outputs and objectives is given in the text for the main categories of water projects in order to ensure that planners and water managers. The indicators to be associated with such outputs are also suggested. This constitutes the second section.

The third category of problems correspond to the situation where we intend to assess the gender impact that a given water project had in a specific area or community and the kind of information, and corresponding indicators that should be collected. Here again the data and indicators mentioned may need to be complemented from others arising from the specific location. This is the last section of this part.

General Considerations for the Establishment of M&E Systems at Project Level

Benefits of the M&E Systems

Previous experience showed that once plans have been made, momentum tends to fade, and activities are never implemented or are stopped half way through. In some cases, lack of funds or

human resources presents an obstacle to the implementation of plans. But the absence of **monitoring mechanisms** to systematically follow up and keep reminding policy makers about progress, or lack of it, is doubtless also part of the explanation.

In this context, countries are expected and advised to create monitoring mechanisms for continuous assessment, ensuring feedback during the implementation period. In addition to these benefits, the following issues should be mentioned:

1. Monitoring and evaluation (M&E) are key issues to ensuring the efficiency, effectiveness, and sustainability of research organizations. In the context of M&E, gender analysis addresses "whose needs and participation".

2. In the past two decades there has been considerable rethinking of conventional approaches to project management, including planning, monitoring, and evaluation (Gijsbers et. al. 2001). These are based on the general movement away from linear, even cyclical processes of project management (from initial diagnosis to design to evaluation, to re-diagnosis…). The debates in evaluation are directly related to the growing awareness that project implementation is a "messy" area that cannot be equated with simple delivery of a hypothetically well-planned project.

3. Another important consideration in the area of M&E has been the need to give more attention to what can be called "learning by users." This means that the tools we use for M&E are often employed sporadically or without seeing them as an investment in the organization and its knowledge base. Monitoring tools, such as progress reports, are often completed and filed. Analysis of these records in terms of apparent trends, and follow-up to them are needed if they are to inform performance assessments. Similarly, evaluation efforts have often been more reactive than proactive, responding to a senior management decision rather than serving as an "early warning device" to keep track of progress in designated themes or issues across a number of projects.

4. The need to translate learning absorbed by users to new practice is also better recognized in project management. Monitoring and evaluation from within the organization (as opposed to external evaluation or externally led impact assessment) should be focused less on "show and tell" and more on stimulating innovation. As long as M&E is seen as an externally imposed requirement that makes project managers and participants feel "under siege," the potential learning process will be short-lived.

5. Gender analysis and evaluation have converged at this interesting juncture in project management thinking. It is now actually quite common to find gender equality or gender issues appearing in the guidelines for project monitoring and evaluation. This has come about as a result of better attention to gender issues early in policy formulation and project design, gender skills of evaluation staff, and standardizing of evaluation criteria (e.g., through terms of reference) (SIDA, 2000).

6. Another argument is for gender and evaluation to be converged during key shifts in project implementation. The difficulty here is that project design and its instruments, such as the logical framework, are not sufficiently flexible (usually for good reasons, such as the fact that funding is determined according to a designated project design). Yet many research and development project management specialists are addressing this situation and coming up with tools that can be adjusted in a systematic manner as project implementation evolves.

7. It is evident, too, that the convergence of gender analysis with evaluation is consistent with new thinking in management practice. In particular, some of the following principles of evaluating gender have emerged:
   - Leadership and management teams (composed of persons with different skills and knowledge) are essential for bringing gender into M&E.
   - Individual gender specialists cannot substitute for the team effort.
   - Management teams are change agents.
   - There will be resistance to change, at least at some levels.

8. The final point, regarding resistance to change, is important and it requires awareness of the team involved in gender evaluation. There has been sufficient evidence in gender and development activities to suggest that gender evaluation has posed a challenge to project managers. For

instance, one can find that gender-blind evaluations pay little or no attention to *policy compliance*. There is also a tendency to use “gender-neutral” indicators without attention to whether or not there is a need to use more specific gendered indicators. Indicators that represent the key aspects of change in the view of stakeholders at the local level should also be considered, including what has been referred to as “grassroots indicators”. Typically, a mix of skills and knowledge in the evaluation is not utilized and expert advice is not sought. There may also not be any specific tools of gender analysis used in the evaluation. And finally, it is typical to find powerful concepts such as “poverty' or “environmental sustainability” without visible attention to gender issues.

9. In future, as the field of gender evaluation progresses we can expect to see evaluation criteria viewed more critically and the tools and processes used in evaluation opened up by gender analysis. These efforts would fill an important gap currently existing in the overlap of project management (planning and evaluation), beneficiary participation (e.g., participatory research), and gender analysis.

Common Weaknesses of M&E Systems

M&E systems are being recommended for several decades already, still few are developed formally and their use remains still limited among project managers and other decision makers. Some of the reasons for this limited expansion are identified below (Sagardoy, 2003):

- Produces excessive information that cannot be synthesized easily. This is perhaps the greatest enemy of M&E systems. Excessive information can be as dangerous as too little.
- M&E results are often not utilized because they are not related to objectives that the responsible person for the programme or intervention can use for their own management decisions.
- The goal oriented approach may not give a broad enough picture. When the objectives of the programme are not clear the multi-perspective option may be more appropriate.
- Sometime field surveys and sampling are necessary to provide information for some indicators but they can be expensive and difficult to organize.
- M&E systems are often seen as a tool to evaluate the managers of the programmes and not as a tool to assist them in their management tasks and hence they do not receive the necessary support.
- Most of the performance evaluation systems were developed for comparative purposes and not to help the managers of the irrigation systems.

How to Design a M&E System

The success of any monitoring and evaluation system depends largely on the selection of the indicators to be used. They should be simple and have the possibility to adapt to changing targets but above all they should respond to the objectives that the manager of the project or programme system wishes to monitor and improve.

The weaknesses of many M&E mentioned above gives some good orientations for avoiding them and hence on how to design a M&E system. They can be summarized as follows (Vermillion and Sagardoy, 1999):

- follow a minimalist approach;
- identify the key aspects of implementation (i.e. performing tasks and meeting targets) and for each of them identify the suitable indicators;
- the indicators should inform about essential outcomes and impacts;
- the results of the evaluation system should not exceed the optimal amount of information that can practically be absorbed by planners;
- select indicators which are “information efficient”;
- distinguish between top- and bottom-directed needs for monitoring; and
- distinguish between those few indicators for which data must be collected from all sites versus those for which sampling may be sufficient.

Main Steps for Organizing a M&E System

Developing a M&E system is a process for which a certain period of time is available. Within this period of time the sequential organization of the activities is important. The following sequence integrates the suggestions made for designing M&E systems and the time sequence.

1. Identify who will involved and how.
2. Define clearly the objectives or priorities of the stakeholders or project.
3. Identify how the results will be used.
4. Develop a system of indicators that correspond to the priorities established or targets to be reached.
5. Develop a systematic method for data collection.
6. Present in a visually attractive manner the data and utilize M&E results for management decisions.

The above mentioned steps are in correspondence with the traditional phases for developing any M&E system.

1. **Planning**. The extent and specification of data needed for the M&E system is defined at this stage. Also the consistency in the definition of performance indicators use for each objective is checked here.
2. **Data collection.** This stage concentrates on the collection of data for the activities that will be subject to a M&E process. It is important to mention that data that are not reliable make the system invalid. Results on doubtful data make the conclusions uncertain and therefore of little use. The importance of obtaining reliable data cannot be overemphasized.
3. **Data input.** Most of the indicators need simple data but others may need intermediate elaboration of the data. In any case it is important to ensure that no errors are made when inputting data into the indicators or intermediate calculations. Often indicators are not well defined in their temporal dimensions and the problem becomes evident at the time of the data input. This may indicate the need for redefine some of the indicators.
4. **Assessment of indicators results** This stage of the M&E consists in the comparison between the results of the indicators and their comparison with the expected performance. Such comparison is essential to understand whether we are approaching or separating from the established target. This comparison may also permit to understand better certain results that by themselves may look strange or need complementary information to be better understood. This assessment permits to understand whether the system developed was comprehensive enough or needs to be expanded to better understand results.
5. **Action**. For management purposes this is surely the most important stage. If the M&E is efficient, its results will have an important value for the managers of the programme and other stakeholders and will promote the adoption of actions directed to maintain the course already taken or modify it as necessary.

Evaluation of Impact

The evaluation of impact is normally associated with the evaluation of goals that are not only related to the activity, project or programme in question. In other word it tries to evaluate if objectives of higher rank are achieved. The project or programme may not be directly responsible for the achievement of such higher objective but it contributes to it. The challenge here is to try to evaluate to what extend the project or programme may have contributed to achieve the said objective. The implication of such evaluation is that it needs to consider other factors that may have contributed to the achievement of the goal to draw relevant conclusions.

Typical example is the evaluation of one of the many factors that contribute to increase production. Increased production may depend on a more effective management of the irrigation water but also on many other factors: such as fertilizers use, climatic conditions, … etc. To assess the impact of any of the factors contributing to increase production requires inevitably to consider the possible contributions of the other factors.

The society is becoming more and more concerned about the impacts of programmes or projects in other sectors of the economy. There are many examples of projects that achieved their primary objectives but neglected the environmental and social impact with the result that the society was not satisfied with those projects or programmes in spite of achieving their main objectives. For this reason the evaluation of impacts (environmental, social, etc.) is becoming a high priority for many donors and financing agencies.

Information and Indicators for Evaluating Gender Impact Of Projects or Programmes

Most of the abovementioned indicators can also be used and applied for studies about the impact of gender projects and/or programmes, which are even carried at local level and not only at the national one. Consequently, these indicators (No 1 to No 8) will not be mentioned again in the present section; the others (No. 9 and 10) cannot be included because they deal with aspects at National level.

Rural Women Status: General Information

Sometimes, project fails because they do not take into consideration the general information about the status of the gender component. These information are very simple, easy to collect, and more than that, they facilitate the analysis of the impact of the programmes on men and women and at the same time, they help in identifying the way to follow in order to integrate the gender dimensions in water management, whether it is about irrigation water, potable water or sanitation.

The most important general information to collect and process are the following:

- Age categories,
- Gender distribution of the concerned population
- Marital status (single, married, divorced, widower, …),
- Gender Rate or illiteracy,
- Number of children under the age of 18.
- Average family income

It's obvious that the abovementioned information are not directly linked to water resources management, however, they allow us to identify which approach we should follow to deal with the lack of women's empowerment. For instance, in most of the South and East Mediterranean countries, widowed women have a full control over the water and land rights, especially if they are left alone (generally children move to the main towns after graduation and don't accept to turn back and work in the field). In addition, if they are old enough, generally they delegate the technical responsibilities to family members or to hired workers. So, they conserve the management decisions (e.g. investments, agriculture modernisation, crop choice, products distribution, …) and leave the technical ones to the production manager (irrigation scheduling, application of conventional fertilisation or fertigation, …).

In Morocco for example (Zrira, 2006), rural women head of farms are in general old, 70% are older than 45 years (over a sample of 250 families from 5 regions), are either widowed or divorced, with a low level of literacy. These numbers are very similar in the case of Tunisia and Algeria.

Knowledge about the illiteracy rate is a relevant information that helps in identifying women's access to the technologies of information and communication and at the same time the methodologies and tools that should be used to make them more aware about the gender and water issues.

The gender distribution should include more than the standard distribution of male and females but sometimes it is important to understand the importance of other categories like elderly people, children of different ages. In general it is important to know the composition of a “standard” family.

The number of children under the age of 18 is an indicator about the potential contribution of the family labour (the level of 18 years old can vary from region to another, for example, in urban agriculture, children start to show more resistance towards field works even before reaching 18). In addition, combined with the number of hours women dedicate to work, it shows the trade-off between time allocation to work and to family. Sometimes, irrigation projects (conversion from rainfed to irrigated agriculture) have negative impacts especially on children, if this data isn't being taking into consideration. In Tunisia, for example, it was observed that women started allocating less time to the young children particularly, while a lot of young girls were obliged to leave the school and contribute in the family labour.

The family income divided into 2 or 3 strata will be useful to understand the financial capacities of the different groups and to what extend they are capable of undertaking initiatives that may imply some financial disbursement.

1. Women participation in the agricultural practices

Essentially this indicator related the time contributed to a given agricultural practice, for instance: weed cleaning, planting, harvesting, etc., as compared to the total time required to undertake it. The indicator is expressed as a percentage but the input of data is normally expressed in work days or hours (rarely). The remaining percentage up to 100 is the work provided by men. Although the differentiation is rarely made the contribution of children should also be included

Table 6. Rate of women participation in the agricultural activities

Activities	Percentage
Ploughing	
Sowing	
Weeding	
Fertilising	
Harvesting	
Irrigation	
Storing	
Threshing	

Experience from Morocco indicates that on average the contribution of women to the agricultural practices in the farm is around 18% and the rest is undertaken by men but there is a great variability between regions. These differences are related mainly to the age, family size, fertility, and the available land (CERED, 1994). From this study also emerges that the contribution of women to the different tasks is not much different from the men's contribution although the harvest, irrigation, sowing and the control of plant diseases appear to be slightly predominant (around 25%). However there are certain crops like cotton and sugar beet for which the contribution of women is much higher than in other crops. In fact, the manual activities are generally done by women (e.g. hoeing) while the mechanised ones are done by men (e.g. ploughing). Wheat, for instance, if conducted extensively, does not require a lot of labour, and the main activities are generally mechanised (and consequently done by men), which implies a high contribution from men, while horticultural crops are characterised by a predominance of the women labour, as mechanisation is not very well diffused for such crops in the South and East Mediterranean countries.

Hence it is not only important to compare the contribution rates for different task but the differentiation by crop may illustrate important differences, taking into the consideration the type of agriculture (intensive or extensive).

In addition, generally, women are underpaid compared to men (30% lower in the case of Lebanon) (Raad, 2006), that's why, managers look for a feminine work, combined to the fact that they are more efficient as well as less complainers. Hence a related indicator is:

Labour wages for men and women in the irrigated agriculture sector

An important indicator to understand the time availability of women to undertake work in agricultural production is:

Number of daily hours dedicated to home affairs

When this number is very high the opportunity for women to undertake any paid (or not paid) work in the farm remains very limited

2. Role of women in livestock rising

Livestock rising is one of those activities where women play an important role and they dedicate considerable time to it. However not all farms have a livestock component and even some families may be dedicated entirely to livestock care and raising without having land or using only land of common property (governmental or given to the administration of villages).

The first question to be investigated is how important is livestock production in the context of the area under examination. Hence a number of indicators should be concerned with:

- ❖ Percentage of farms that have a livestock activity compared to the total number of farms.
- ❖ Relative importance of the livestock component in the farms. Here the average description of the number and kind of animals per farm can provide a picture of the relative importance of the animals in the context of the farm.
- ❖ Number of livestock flocks that are rented out care and raising and approximate composition of the flock.

The above indicators are meant to give an image of the relative importance of these activities compared to those more directly related to agricultural production

Once the above information is known, the next step is to find out the role that women play in livestock care and rising. Like the case of agricultural production, it is important to differentiate the main activities to be undertaken and the amount of time dedicated to each one by women and men. Table 7 illustrates an example.

Table 7. Rate of women participation in livestock activities

	Percentage
Feeding	
Forage supply	
Watering	
Milking	

The tasks to be undertaken in the case of rented livestock are slightly different and in some cases may merit a separate analysis of the activities to be undertaken.

In addition, every livestock should be analysed independently. In fact, for some types (e.g. poultry, rabbit, …), rural women participate to all the abovementioned activities, and their rate of participation exceeds the 80%.

It has been reported that women in Morocco participate by a rate of 70% in cattle livestock; it's about 80% in the extensive systems, and 64% in the intensive ones (Zrira, 2006). The main activities women contribute in are: cleaning, milking, watering, feeding, forage supply and commercialisation of the by-products.

3. Women and irrigation water management

In a previous section (Women participation in the agricultural practices), we already mentioned an indicator about the time dedicated to irrigation with respect to the other agricultural activities and we said that it is better to determine it per crop. In addition, we can focus on the weight of the irrigation tasks with respect to all women's activities, and this is an important indicator if we want to know how much irrigation tasks is time-consuming with respect to all women's activities. Of course, such study should be carried not only during the whole year, but also during a succession of years as irrigated agriculture depends also on the climate conditions, and the Mediterranean region is well known for their variability.

- *Women and irrigation water supply*

The source of irrigation can be a well (private or public, generally managed by a water users association) or a dam (public). These are the most important cases. A third case can exist, but it's not relevant; and that's why it won't be included in this study (use of potable water to irrigate small cropping plots, generally for self-consumption).

The recommended indicators are the following:

- ❖ Rate of women participation to the construction of wells or irrigation canals: generally, in the South and East Mediterranean countries, the excavation starts manually in order to reduce the total costs of digging the well. During that phase, women contribute a lot in the labour force. The same applies to earth canals

- ❖ Women knowledge about the irrigation water fees paid (amount paid, who pays, where is paid, etc..)
- ❖ Women knowledge about irrigation water flow available and frequency of irrigation distribution
- ❖ Have women access to the irrigation supply or is restricted to men?

These indicators are very specific, and should be determined after a preliminary questionnaire, and for specific purposes and apart from the first one they are addressed to know the level of understanding of the provision of irrigation water supply by women and men and the access to the resource.

- *Women and irrigation techniques*

In the South and East Mediterranean countries, generally, surface irrigation is the most used technique, that's why it is important to characterise, first of all, the degree of knowledge of the irrigation techniques by rural women. The first indicator about women and irrigation techniques could be the knowledge percentage by women of a given region about all the irrigation techniques (surface, sprinkler and drip irrigation). In some regions of Morocco (Zrira, 2006), this knowledge is about 70%, which means that 30% of the population doesn't know the existence of water saving techniques. If such systems are to be used in order to cope with the increasing water scarcity, it's normal that the programmes could fail, due mainly to the lack of awareness.

Furthermore, the knowledge of the different irrigation techniques will allow the decision-makers (women, men or both) choose more efficiently the different crops to be cultivated in relation to the available and/or hired labour force, as the labour requirement for a same crop, but irrigated with different irrigation techniques differs from one system to another.

Another important indicator is the rate of women participation in the maintenance of the irrigation systems within the farm, always expressed as number of hours (or days) of work dedicated to the maintenance, with respect to the men's one. While the maintenance of the irrigation system in traditional surface irrigation may be small in pressurized systems may be quite relevant and may need information regarding the amount of time dedicated to their maintenance

The case of using groundwater may require a more in depth investigation of the time dedicated to the maintenance of the pump set and related structure. The use of groundwater is often associated to the use of modern irrigation techniques and they also need maintenance. In such cases the gathering the information of Table 8 will be relevant.

Table 8. Rate of women participation to the maintenance of groundwater systems with modern irrigation techniques

	Number of hours (or day)
Maintenance of the motor	
Maintenance of the pump	
Maintenance of the filters	
Maintenance of the laterals	
Maintenance of the drippers	
Maintenance of the sprinklers	

- *Women and irrigation practices*

By irrigation practices, we mean mainly the irrigation scheduling (time and amount) and the role of women in practicing irrigation.

- ❖ Women knowledge in determining the irrigation amount (in terms of volume in m^3, or time in hours): This indicator is linked to a previous one (women knowledge about irrigation water flow). In fact, if women already have an idea about the available irrigation water flow, they can decide whether to irrigate on a volume basis or time basis.
  This indicator reflects the knowledge of women about the soil-water plant system, related to water management from one hand, and the irrigation system used at field scale from the other hand.

Expressed as a quantitative indicator, it becomes as the number of hours (or days of work), during the life cycle of a given crop, dedicated to irrigation (the activities of installing or maintaining the irrigation system are excluded).

- ❖ Women knowledge in deciding when to irrigate: this is qualitative indicator; it depends on whether the water source is private or public, and for the latter, whether the system is on-demand, restricted demand or rotational. So basically, this indicator is about when do women irrigate: according to the crop needs or on a rotational basis.
  Sometimes, women have to irrigate during the night as imposed by the rotational system (this was observed in Lebanon) (Raad, 2006).

- ❖ Amount of time (hours) that women dedicate to practicing irrigation: this indicator represents the number of hours (or days of work) during which women irrigate the fields, with respect to men, per activity. For example, in Morocco, women's contribution in opening and closing the furrows varies from 0% (in this case, it's a men's activity) to 100% (an activity done exclusively by women).

- *Women and irrigation water quality*

This section includes three aspects: water quality aspects (in terms of salinity), irrigation water quality (mainly in the case of fertigation) and the main issues related to the mismanagement of the irrigation water.

- ❖ Are women aware about the salinity of the irrigation water?
  When we speak about water quality, in this section we mean mainly the salinity of the irrigation water and its relative use for irrigation. Later we will speak about the water quality for domestic use. It's known that the Mediterranean region is characterised by not only its scarce water resources, but also the low quality of the already available water resources. It's also known that management of saline water is different from the fresh one that requires special irrigation practices. This study isn't about gender management of saline water, that is why we will limit just to knowledge about the quality of the water (women are or aren't aware about the quality of the water they are using). In Algeria, this percentage is about 81% (Bellache, 2006).

- ❖ Do women know and apply the fertigation?
  In the case of Morocco (Zrira, 2006), it appeared that women don't participate to the practice of fertigation. This can be explained by the fact that the most dominant irrigation method is the surface one. In the contrary, in Algeria (Bellache, 2006), and over a sample of 36 women, 43% apply the fertigation method, while just 33% are the managers of the farm. Consequently, as a worker or as a leader, women are involved not only in irrigation water management but also in the practice of fertigation.

- ❖ Are women aware about the problems related to the mismanagement of the irrigation water:
  - ➢ rising of the level of the water table,
  - ➢ pollution of the ground and surface water resources by chemicals and pesticides,
  - ➢ seawater intrusion as a result of groundwater over-pumping, in the case of the coastal zones, … etc.

  In Algeria (Bellache, 2006), 44% of the women are aware about the risks linked with the over-fertilisation and the possibilities of groundwater pollution.

All the above mentioned information or indicators aim at knowing the knowledge that women and men have regarding the irrigation quality of water and the eventual need for bridging the gaps.

4. Rural women and farm management

The management of farms like other business implies the following fundamental tasks: planning of the crops that will be planted, financial management (credit, investments, payments), selling of the production and distribution of the benefits.

If we want to have a vision of the role of women in the management of the farm we need a number of indicators that can give us an image of their level of participation. Table 9 suggests the main indicators that could be used in this context.

Tableau 9. Rate of women participation to farm management

Indicators	Percentage
Participation to the planning of the agricultural activities	
Participation to the marketing of the agricultural production	
Do you have an idea about the financial balance of the firm	
Do you participate to the decisions concerning the expenses and the benefits	
Could you have a certain amount of money for your personal expenses	
Participation in the decisions concerning the investments/improvements to be made in the farm	
Do you have access to the credit	

It would be possible to make an average of the above indicators and have a sort of composite indicator providing an average value of the participation of women in the management of the farm.

Rural Women Empowerment in Local Organisations

When we speak about women and local organisations, we mean mainly women as decision-makers and to which level they are involved in policies and decision-making. It's obvious that the number of local organisations can be very big, but the indicators should be calculated just for the ones dealing with water resources development and management, at local level.

The main indicators are:
1. Percentage of women working on local organisations dealing with water resources,
2. Percentage of women in the decision making category: (President. Management Board, Manager, etc)
3. Percentage of women present during the meetings.

It's obvious that the more women are present, the better equity in distributing water between men and women farmers is implemented, especially during the drought periods. In fact, it was observed in Tunisia that during the periods of drought, generally, the priority is given to men; including as much as possible women as members in the council will lead to a higher equity in water distribution.

Rural Women and Potable Water Supply

Before giving a list of indicators that can be applied for studies about women's contribution in the provision of potable water supply, it is worthy to mention the main objectives of a potable water system in a rural area, which are:
- Access to water within a reasonable time and distance.
- Permanent water availability, with an adequate quantity and quality.
- Reasonable water price.

Potable water in the rural areas is also used to livestock watering. However, the importance here will be giving to the time and means used to get enough potable water and to the gender differences in water provision, rather than water allocation for domestic, livestock or agriculture uses.

The main indicators are:
1. Number of persons having access to personal connection to potable water network with respect to the collective one: this will help us identifying the group of persons which deploy physical effort to get potable water supply.
2. Distance between the home and the source of potable water.
3. Quantity of water taken by trip: this will depend mainly on the volume of the container (tank, flask drums) and the mean of transport (children, women, animals, tractor).
4. Influence of the distance home-water source on the mean of transport used.
5. Variation of the quantity of water collected according to the seasons. In fact, in the South and East Mediterranean countries, and generally in Arid and Semiarid regions, sometimes families implement rainwater harvesting systems (rooftop water harvesting) and the collected water is used for domestic purposes. It becomes obvious that during the rainy season, potable water comes from

the water harvesting system, while during the summer, and according to the available resources, women tend to transport water from the collective potable water networks.

6. Knowledge of the problems related to draining off the wastewaters.

Constraints

Rural women are involved in all the activities related to agriculture and water resources management, however, their contribution is limited to the manual works and not the mechanised ones. In addition, they are hired as non-qualified workers, and this explains their lower salary. In the opposite, men still dominate the easy tasks, and own water and land rights. These gender differences could be explained mainly by the following reasons:

1. Control over the natural resources

- Land constitutes a key component for rural women in food production for self-consumption and marketing purposes. However, their access to land rights remains very low from one hand, and even when it exists, they have a lower arable land with respect to men. In addition, in the case of the collective public lands, men remain always the managers (absence of women as leaders). As men tend to abandon the family and look for a work in the main cities in order to improve the living conditions, women work in the filed, yet, just as non-qualified workers, which implies a lower salary. As a consequence, men tend to not only have a control over the land resources, but also on women as a labour force.
- Water right is another issue limiting the integration of the gender dimension in water resources management in the Mediterranean region. As mentioned before, during the periods of droughts, managers of the water users associations tend to give more irrigation water to men than women, at the same time, women's voice cannot reach the managers of the associations as they are generally not well represented in the governing board and during the meetings.
- Access to micro-credits remains limited too due to socio-economic factors among them the most important one is the difficulty of rural women to present a guaranty, as they lack the land and water rights. As a consequence, agriculture remains extensive and not enough developed, especially concerning the conditions of work and the high need of women labour force.

2. Access to the services

Rural women do not constitute the main target of the plan of work of the extension services and within the training programmes. As a consequence, the productivity of the agricultural lands managed by women is lower than the ones managed by men, as the former are characterised by a high rate of illiteracy, combined with a total exclusion from the training programmes and seminars, and whenever carried, these programmes aren't gender targeted.

3. Access to the information and communication technologies

All the statistics confirm the fact that rural children (especially girls) suffer a low educational level. Among the factors limiting children's schooling, among them rural girls, the followings are the most relevant ones:

- children represent a labour force of a high relevance, either in the field or for the domestic tasks,
- distance school-home,
- traditions and cultural norms, and
- low financial means of the rural population, in contrast with the increasing level of life.

As a consequence, the illiteracy rate is higher for women than men. Their technical competences in water resources management are then limited. Furthermore, women have a lower access to public sources of information (extension services, …). Till now, the major part of the actual system for information diffusion is men-centralised, excluding completely the presence of women. In addition, local organisations dealing with gender and water issues are almost inexistent, while men continue to lead all types of organisation.

4. Cultural and legal constraints

Concerning the cultural and juridical point of view, for the Arabic-Muslim countries, women have the right to inherit land; however, they leave the control over and management of the inheritance to the men-members of the family.

The South and East Mediterranean countries are also characterised by a long chain of bureaucracy, yet this is more evident with the case of women rather than men's case. This is made worsened as by the fact that rural women often hasn't any kind of identity documents, and as a consequence, signing contracts, buying water rights, hiring labour force, …etc., becomes impossible.

Although not specific recommendation has been made in terms of possible indicators for the above constraints it is obvious that any qualitative or quantitative information about them will be valuable to assess to what extend women are limited to access to more equality situations by external constraints.

Final Considerations

In this second part an analysis has been made of the main indicators or information that may be required to a better understanding of the situation of women in a rural environment. However this becomes only meaningful when undertaken within a development purpose. Information per se has some value but it becomes really useful when placed within a context.

The boundaries of what can be considered an indicator and what is specific local information may not be entirely clear to some of the readers. The same figure can be considered a statistical information depending of the context in which is analysed. For instance, if we say that the contribution of women to irrigated agricultural production is 18 % in itself is a statistical data but if the same data is analysed within the context of an irrigation project where women were not considered to participate in these activities it becomes an indicator as is reporting a situation that was not foreseen. In this respect many of the “indicators” referred in this second part can be considered statistical information or indicators depending of the context.

Much of the information required will be obtain normally through the use of questionnaires and as said earlier the selection of the information to be gathered becomes much more relevant when framed in the identification of the development actions that may follow the questionnaire. When questionnaires are repeated at regular intervals of time the information obtained become indicator of the processes that are taking place.

The multiplicity of development situations that can take in the field are large and therefore the information or indicators earlier mentioned do not intend to be a complete set but a useful reminder of minimum information that should be collected at field level with due consideration to the purpose pursued.

REFERENCES

Bellache, 2006. *Rôle de la femme dans la gestion de l'eau et plus particulièrement dans l'irrigation en Algérie*. Réunion d'experts sur « Le rôle de la femme dans la gestion des ressources en eau, cas particulier du secteur irrigué ». Hammamet, Tunisie, 18-20 Avril 2006.

FAO, 1999a. *Agricultural censuses and gender considerations. Concepts and methodology,* Women and Development Service. Women and Population Division and Statistic Division, FAO. Rome, Italy.

FAO, 2002b. *Aquastat database*. Land and water development Division, FAO, Rome, Italy.

FAO, 1999b. *Filling the data gap. Gender sensitive statistics for agricultural development.* Statistic Division and Women and Population Division, FAO, Rome, Italy.

Gender and Water Alliance, (GWA) 2003. *The Gender and Water Development report 2003: Gender Perspectives on Policies in the Water Sector.* WEDC, Loughborough University, Leicestershire, UK. A reference copy of this publication is also available online at : www.genderandwateralliance.org

Ibrahim, S. 2006. *Brief Overview on the Current Situation on Gender and Water Management In Egypt.* Special Session Mainstreaming Gender in Water Resources Management, Monitoring and Evaluation, 3rd Arab Water Regional Conference Research Advancement in Managing Limited Water Resources, Cairo.

ISTAT, 1999 *La Presenza Femminile In Agricoltura* by P. Perini. Extracted from the volume "Struttura e produzioni delle aziende agricole” - Anno 1999" Collana Informazioni ISTAT, Rome Italy.

IWMI, 2002. *A gender Performance Indicator for Irrigation: Concepts, Tools and Applications*. Research Report 59.Colombo, Sry Lanka.

Raad, 2006. Le r*ôle de la femme dans l'irrigation au Liban*. Réunion d'experts sur « Le rôle de la femme dans la gestion des ressources en eau, cas particulier du secteur irrigué ». Hammamet, Tunisie, 18-20 Avril 2006.

Sagardoy, J.A. 2004. Measuring Gender Progress in Integrated Water Resources Management by use of Indicators: review and proposals Working document of the INGEDI project CIHEAM/MAI, Bari, Italy.

Sagardoy Alonso J.A. 2006. *Gender Indicators for Monitoring Progress In Water Management.* Special Session Mainstreaming Gender in Water Resources Management, Monitoring and Evaluation, 3rd Arab Water Regional Conference Research Advancement in Managing Limited Water Resources, Cairo.

UNDP, 2006. *Human Development Report*. Available at the UNDP web site: www.undp.org

Vermillion and Sagardoy, 1999, Transfer of Irrigation management systems. Guidelines. Land and water development Division, FAO, Rome, Italy.

World Bank, 2006. *World Development Indicators 2002*. World Bank, Washington. available at: http://devdata.worldbank.org/wdi2006/contents/cover.htm

World Economic Forum, 2006. *The Global Gender Gap Report 2006.* available at the WEF website: www.wef.org

WWC and CONAGUA, 2006. *Local Actions for a Global Challenge, Regional Document: Middle East and North Africa*. 4th World Water Forum, Mexico 2006. available at: www.worldwaterforum4.org.mx

Zrira, 2006. *Rôle de la femme dans le secteur irriguée au Maroc*. Réunion d'experts sur « Le rôle de la femme dans la gestion des ressources en eau, cas particulier du secteur irrigué ». Hammamet, Tunisie, 18-20 Avril 2006.