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Overcoming Water Scarcity and Quality Constraints: Water Pricing and Cost Recovery Potentialities

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Abstract

In the Mediterranean region the development of appropriate water pricing systems, aimed at promoting efficiency and sustainability of water management as well as the cost of water services offers high potentiality to overcome water scarcity and quality constraints. However, a number of other considerations have to be taken into account, and it must be emphasized that water pricing alone is not enough. There needs to be a blend of other appropriate policies and actions: economic, financial, management process and integration*, including the prerequisite information and the promotion of public participation.*

Introduction

Water pricing and cost recovery policies has the potential to mitigate water scarcity. Because of its key role in managing water demand management and augmenting water supply, water pricing is an important policy instrument for creating incentives to conserve and allocate water efficiently.

By providing financial justification for developing additional supplies from conventional and non-conventional sources pricing policies can make more water available for users.

In most of the Mediterranean countries and, particularly, the developing ones, the amount of water allocated to the agriculture sector is approximately exceeding the 80% of the overall water use. The sustained development of those countries, is, in fact, heavily dependent on the

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availability of adequate irrigation water supply. This could be achieved through the conservation and efficient utilization of existing limited water resources to meet the steadily increasing water demand of the expanded irrigated areas.

Opposite to that is the situation, where, like in most irrigation schemes, the overall irrigation efficiency is of the order 30 to 40 percent due to improper maintenance of conveyance and distribution systems and incorrect water application practices in the fields. In addition, in most irrigated lands of the region, there has not been much effort to reduce wastage of irrigation through pricing mechanisms. Some countries of the region have only recently attempted to collect water fees for irrigation. Very few of the developing Southern Mediterranean countries have managed to recover the investments cost of irrigation projects in full, while some started the partial recovery of the investments, and in others their cost recovery is only limited to operation and maintenance cost, either fully or partly. Generally, we can clearly stress that the water pricing policies being pursued in most countries, due to faulty approaches and inappropriate institutions, failed in being an economic tool through which water could be used more efficiently with greater water savings.

Nowadays and for all the countries in the region it is well recognized the need and importance of charging appropriate fees for irrigation supply for the establishment and, particularly, the implementation of policies on irrigation water pricing; however, in spite of their potential role in overcoming acute water shortage and quality constraints many governments are facing difficulties to administer the price flexibility required to respond to the changing supply and demand conditions.

Water Pricing Policies: major roles

Water pricing policy has an important financial and economical role. Financially, it is the main mechanism for cost recovery. However, the identification and terminology of cost recovery is still under discussion, particularly when full cost recovery (FCR) is considered. Numerous authors have tried to define the term, but obviously a universal definition is not definitely suited. Depending on the underlying ideas in each case the focus of the definitions varies widely and none of the definitions include all the elements the FCR should have.

A complete definition of FRC could possibly contain: operation and maintenance cost; capital costs; opportunity costs; resource costs, social costs, environmental damage costs and long-run marginal costs.

This means that putting in practice the full cost recovery approach in a complete way with all the abovementioned elements is not easy, but rather difficult to be fully implemented.

The reason behind such difficulties can be attributed to the many variable economic costs to be considered; using the full cost recovery approach requires a precise evaluation of the water amounts to cover the cost of supplying water to users which is usually calculated by adding the operation and maintenance costs: transport, distribution, collection, treatment of supplied water/wastewater and the capital cost of constructing the system. In addition, *FCR* also requires water amounts to reflect the long-term marginal cost (the cost of supplying an additional unit of water including the social cost of externalities).

On the other hand, the economic and allocation role of water pricing requires water rates to capture the scarcity value (for the marginal productivity utility) and to equalize the opportunity costs (the value of water in its next best use) of the resource across uses. As water moves from least productive to most productive uses, places and time points for efficient allocation, there will be convergence of the scarcity value, opportunity cost and long-term marginal cost of the resource. Unfortunately, such a convergence is rarely seen in practice. Unrealized opportunities still exist and water rates can be designed to capture at least a part of these opportunity costs. For this to occur, technology to store, transport and deliver water is required, as are institutions to govern the development, allocation and utilization of the resource.

FRC and environmental improvement

Nowadays, water pollution is already a serious problem in the majority of the developing countries in the Mediterranean. The rapid degradation in water quality is now considered to be a major cause that will effectively and directly aggravate the water scarcity that most countries are already facing. There is no question that a very high proportion of untreated domestic and industrial effluents are directly dumped into water courses, irrigation canals and drainage ditches; if this practice is allowed to grow without checking, certainly it will reduce the amount of water available for various purposes in the future.

Globally, the Rio Declaration on Environment and Development (UN, 1992) recommended that National authorities should endeavour to promote the internalization of costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear

the cost of pollution with due regard to the public interest and without disturbing international trade and investments.

In this regard, it is quite clear that the full cost recovery is desirable from an environmental point of view; however, the remaining question is to what extent it is possible to implement this principle. To answer this question one has to consider a variety of issues:

- making the full costs of water use clear to the users by integrating into the water price and water pricing policy the main items supposedly by concurring to the national environmental policy;
- significant proportions of water charge must be allocated for environmental improvements;
- water pricing should be seen as an incentive to users and suppliers not only for fulfilling the environmental objective, but also for fulfilling all the water and environment-related issues.

In this case water charges may be used for securing sustainable land-use practices, restoration of degraded areas and so on and thereby *FRC* will enhance the achievement of sustainable development.

The fact is that the *FCR* is a potential tool to promote the prevention of environmental damage; in the same time, it should provide the users with the necessary incentives required to avoid the release of polluting substances as well as to accept the principle that users pay for any pollution they might create.

Full cost recovery including environmental costs: difficulties and constraints

Calculation of *FCR* including environmental costs is very sophisticated and very difficult to be identified. There are different ideas on how to calculate environmental cost, but they are apparently not largely in use as it is not clear how to identify all possible damages. Even those damages identified can't always be quantified and those quantified can't always be transformed into a price. Such difficulties are emerging due to the fact that water not only has environmental functions but also it provides us with ecosystem services which are difficult to price and are not marketed.

Additionally, there are always irreversible effects involved in environmental damage like, for example, the loss of species. To include these into feasible pricing system alone can thus never be sufficient to reach the desired environmental objectives. Moreover, if it is theoretically possible to include all kinds of environmental costs into water price, the

feasibility of implementation of such a price would need further regulations and special considerations.

This might lead to social problems which could be worked out in an appropriate pricing scheme, but the inclusion of environmental externalities would lead to enormous regional and national variations in price level depending on how fragile and valuable the respective eco-system is. This will result in social and economical implications concerning equity problems and marked distortions arising.

Water pricing policies and the way to judge

There are always two sides to everything, so it should not be surprising that in spite of the direct positive effects of water pricing, it has also its negative impacts on the society.

Regarding the positive effects, first of all, it should be stressed that a comprehensive water pricing scheme conveys a signal to water users on the value of water and their response to it. As long as water and wastewater treatment do not have a cost or the price is negligibly low or charges are included into general taxes we shall have difficulties in finding sustainable solutions to water scarcity, water pollution and its quality degradation. Reducing water losses, increasing water use efficiency, more water saving and overcoming water shortages and quality constraints require not only technical tools, but equally so the economical ones.

However, the point which should be emphasized here is not concerning water pricing as a concept, but the water pricing dilemma: cheap water undermines environment whereas higher prices create conflicts.

Generally, it could be stated that freshwater is under-evaluated the world over. The World Resources Institute (WRI) recently (2001) reported that low water prices all over the world lead to both growing water scarcity and an alarming decline in biodiversity. The study recommends that water prices should reflect not only the cost of supplying water, but also of protecting watersheds.

This is in contrast with what most Governments are practicing. Most of the States in developing countries provide many irrigation and domestic water supply systems at subsidized rates because doing so they secure water and food supplies and protect public health while avoiding opposition from farmers and urban poor against raising water prices.

Minimum charges, flat fees tariffs and prices below cost recovery may prevent users from appreciating the value of water. This could be also the case when the coverage of water costs is done through general taxation revenue or when water use is charged per surface of irrigated area.

Both methods act as disincentives and can even promote high consumption. In addition, such low tariff levels will play a minor role in achieving the desired environmental objectives of water pricing.

Furthermore, it should be obvious that a well worked-out water pricing scheme can indeed have very positive effects on demand levels which is naturally a desirable outcome as far as the environment is concerned.

Another positive, economical aspect of water pricing can be the reduction of budgetary pressure on the state like, for example, in the case where capital for large new infrastructure projects is not readily available.

The shift to an adequate pricing policy will ensure that any economic gains from allocating water more efficiently will have a positive impact on the society as a whole. This will lead to a significant gain in equity probably outweighting some problems of affordability concerns, considered as one of the negative effects water pricing could originate.

Water Pricing: negative effects

It is acknowledged that the attempt to create a cost covering water price might raise equity problems. This is the case with the poor people who are not economically able to afford the increase of water prices above a certain level. Nonetheless, a really adequate pricing policy can solve these possible problems if the achievement of environmental objectives is combined with an increase in social equity. This could be also the case when inequality is caused by the internalization of environmental externalities due to the subsequent regional differences in the water price.

Equally, practicing full cost recovery pricing could have indirect effects on the society due to the equity problem it could manifest.

Other negative effects which several voices against water pricing are demonstrating regard the interest of certain enterprises (industrial as well as agricultural), especially the smaller ones. They claim that, as water price rises such enterprises might face profitably problems. They argue that, while bigger firms can even out losses by installing technology to save water or avoid polluting effluents, such technologies will not be affordable for some of the smaller enterprises, especially in the agricultural sector. Such situation can cause high losses to society as smaller farms are often

family owned, which gives them considerable social value.

To be fair and to answer to what was claimed above, it must be stressed that in reality the question of modernization of technology might not be as urgent for small farmers as it is for the really big ones. Moreover, the affordability problems of possible solutions could be easily overcome by settling an appropriate pricing scheme whereby possible conflicts could be avoided.

Another inconvenient of water pricing is that it will reduce subsidies to water sector. However, this seems true only when a rigorous cut of subsidies is done which could lead to pronounced negative impacts, particularly on the environment. In fact in some countries compliance with existing environmental standards (the EU Directive on urban wastewater treatment) cannot be at all afforded without subsidies. The implied costs of huge investments in necessary infrastructures cannot fully be put on the shoulders of water users. If subsidies are fully cut, water price would rise too steeply and might not be accepted and the consequence would be a social hardship. This is a very clear alarming signal indicating that if water pricing policies are not designed carefully enough might lead to a deterioration in water quality and worsening the environmental conditions.

On the other hand, if subsidies have to continue under certain conditions and for certain projects, they should be done in a way that the whole process of subsidization is made in complete transparency. This is the way to keep subsidies at a minimum level without any disturbance to environmental policy objectives. This once again evidently declares that negative effects and expected problems lie not in water pricing as such but in the way the pricing scheme is conceived.

Concerning the agricultural sector, another negative consequence of putting a price of water is possible.

In the agricultural sector, water is often used inefficiently with major losses exceeding 50%. Moreover, irrigation water is undervalued and in some cases it has no value and given free of charge.

Under the acute water scarcity conditions hindering seriously development progress most developing countries are now facing, drastic actions are needed to change such attitude and to bring to irrigation water its realistic value through an appropriate water pricing. This implies in the majority of cases a higher price for irrigation water than the farmers are accustomed to pay. The consequences of increasing the price of water for irrigation could be seen from different points of view. Some are favorable

and others are against the price, depending on the possible advantages and disadvantages that could be achieved under irrigation water pricing. The advantages due to irrigation water pricing are numerous, among them the following are to be highlighted:

- water pricing is an appropriate tool for increasing water use efficiency, reducing losses and overcoming the existing conflicts among the different sectorial water uses;
- it promotes the introduction of new technologies and modernization of irrigation systems for a better water use, i.e. producing more with less water;
- it is an effective tool to stop rapid land degradation productivity due to waterlogging and widespread salinization problems;
- it eliminates water originated pollution, both surface and underground;
- it is an appropriate approach to find sustainable solutions for water scarcity problems and their complex challenges.

Regarding the opinions of those against introducing water pricing in irrigation sector, they are mainly based on the assumption that if we are looking to achieve fairness and equity in agricultural sector water pricing is not the recommended tool.

Irrigation Water Pricing and the advantages it is expected to provide could favour the rich farmers having relatively large areas and a good income whereas the poor ones will be in troubles. They are worried that water pricing for irrigation could have the following negative sequences:

- in the majority of developing countries most farmers are holding very small areas and their income is fundamentally depending on what they are earning from their fields and thereby pricing of water even at minimum charge could create for them several problems. In this case, we have two major risks:
  - the first, is that farmer will not sufficiently supply the actual water requirements to the crops, which will be reflected negatively on the production, lowering the farmers income. This will be a major constraint to development, severely affecting the national economic progress;
  - the second, is that the farmer to reduce the production cost diminishes the area under irrigation and concentrate it on certain crops. This option, beside its negative social and economic consequences could lead to a further loss of natural habitats and thereby a further decrease in bio-diversity;
- furthermore, what should be considered seriously there is the risk of having water with a price level difficult to be afforded by the poor

farmer. This could be a motivation pushing the farmer to abandon the productive land, leaving the agricultural activities and searching another activity for survival. Here is the real danger of increasing poverty, increasing criminality, effectively disturbing the economic development and increasing the unemployment problems.

Balancing advantages and disadvantages

Anyway through an adequate water pricing in the irrigation sector, it is possible to avoid risks. The positive impacts for water pricing in the agricultural sector receiving the lion share of the available water are enormous compared to the negative ones, not only on the agricultural and natural resources development, but also for the environmental improvement.

The desired expectations for efficient water use and water saving as a result of a well tailored water pricing policy could put an end to the over-exploitation of aquifers and the entailed destruction of wetlands. Problems of eutrophication and pollution hazardous substances could be extremely lowered.

Increasing the efficient use of water means that less water will be used or in other words that crop water productivity will be increased, i.e. more crop/drop.

Practically, this will lead to less infrastructures for water supply especially relatively big constructions like dams, diminution of the food gap and alleviation of poverty. However, achieving such goals require major efforts for improving our capability in managing our water more efficiently, with continuous improvements in our water pricing policy which should be more dynamic and less static.

This is the way towards sustainable solutions to overcome water scarcity and its quality degradation.

Finally, water pricing can be a powerful tool to ensure a sustainable use of water with a good quality.

However, to fully understand the issue, it is necessary to take into account other necessary basic factors to establish the environmental conditions needed to facilitate the water pricing implementation process.

Water Pricing and Irrigation Water Demand in the Mediterranean

Economic incentives based upon cost recovery of irrigation water supply may play a major role in improving irrigation water demand by creating incentives for farmers to save irrigation water. In the majority of developing Mediterranean countries, irrigation water supply is provided either free or for less than the full cost providing irrigation services.

Most irrigation projects are being subsidized in order to support agricultural production, but, due to recent budgetary constraints, the increasing water scarcity and the increasing water demand, some countries are moving towards reducing such subsidies in order to generate enough revenues for operation and maintenance of the irrigated schemes, reducing the burden of the government; and at the same time they create direct or indirect incentives for farmers to invest in irrigation saving technologies and to shift cropping patterns out of high water consuming crops.

The introduction of irrigation charges is a very important prerequisite to a good management of irrigation demand because despite the observed water shortages misuse of water in agriculture is widespread in irrigation management as currently practiced.

The most obvious reasons, that make irrigation water pricing an issue of great importance in water management in the arid and semi-arid countries of the Mediterranean, are that conceptually it could affect: water allocation between competing use and users; water conservation; generation of additional revenue which could be used not only for improving the operation and maintenance of the systems, but also in repaying some of investments cost; cropping patterns; income distribution, efficiency of water management; reducing environmental degradation and overall implying both efficiency and equity objectives. Due to the severe water scarcity coupled with arising environmental problems as a result of increasingly water pollution, most of the countries in the region have now recognized the need and importance of charging appropriate fees for irrigation water supply. However, the establishment and particularly the implementation of policies on irrigation water pricing are facing numerous constraints and difficulties. In those countries the criteria on which water charges should be based is still a major constraint. In this regard, several questions are under discussions, but without precise, different answers.

Among the questions under discussion, the following are of interest:

- the first concerns principle No. 4 of the Dublin Conference that states: "Water has an economic value in all its competing uses and should be recognized as an economic good" . The point is that the recognition of water as an economic good is not accepted by the developing countries of the region as most of them are Muslim ones and for them it is difficult to reconcile the concept of water as an economic good with the traditional idea of water as a basic necessity and human right.
- On the other hand, if the concept of water as economic good is accepted, what will be the economic value we are talking about? Is it limited to the value of the resource per se as a utility or input to production or it includes also other components, the cost of service meaning cost of development and supply? In other words, should the beneficiaries pay the operation and maintenance costs of the water system? Or are they expected to pay total investment costs as well? Should such economic value (pricing) include external costs such as the environmental and social damages? If so, how should these costs be calculated?

  All those are difficult issues and the reasonable solutions are surrounded with several complexities.

  The selection of a pricing mechanism suitable for different individual countries of the region is influenced by a number of factors such as sectorial use, the level of subsidies, the irrigation water conservation, the ability to pay and the social welfare.

  Therefore, it is not easy to set up a pricing mechanism that can respond satisfactorily to the wide variations in the factors affecting water pricing among the individual countries of the region.
- Local Governments, decision makers in the region are under pressure to implement water pricing mechanisms in the irrigation sector, however progress to date in most of the countries of the region and, in particular, the developing ones regarding the design and introduction of water pricing strategies has been rather limited. Therefore, a lot of work has to be done in this area to create the enabling environment needed for smooth implementation of the proposed water pricing strategies.

  In this regard and to overcome the weakness and the obstacles in formulating the water pricing policies into actions, it is needed to decide on the guidelines and the necessary elements and factors that should be considered for the establishment of irrigation water pricing policies and structures for the Mediterranean.

Necessary elements for a Mediterranean water policy

In order to make water use more sustainable in the Mediterranean countries, particularly in the arid and semi-arid ones, water pricing policies with some necessary elements and principles should be carefully considered, including the following:

- water must not be considered an economic good like any other, but, as an eco-social asset. Most objections to the notion "to treating water as an economic commodity" relate to questions over ensuring fair and equal distribution and access, particularly where water has been treated as a "basic good" that has been provided by the State. How can the poor, it is argued, gain access to enough water to meet their basic requirements, if the supply and provision of water is left to full force of the "free" market?

This objection based on the wider conception of water as one of the fundamental human rights, is seemingly un-pragmatic, however, somebody must bear the costs incurred for water provision and treatment and it cannot continue to be the environment through loss of ecosystem functioning nor hidden subsidies. In theory, while water is a renewable source, we are not treating it as such, no other product scores higher on the scale of human needs- it is therefore demand assured and, unlike other commodities, it is not substitutable and, therefore, not subject to standard market forces.

Such comparison between water and other economic goods, evidently, prove that water is very different from other commodities and therefore exceptional strategies and instruments need to be developed in order to manage its pricing effectively.

Social considerations and provided issues

The social consideration should be clearly highlighted and correctly estimated.

In the Mediterranean and for most developing countries, users have become accustomed subsidized charges for water, particularly in the agricultural sector.

There is often a strong cultural or social belief that water is "sent from God" and that everyone has the right to use it, perhaps also for free. A vast majority of water users have a concept of fairness in distribution in mind when thinking about water and not the picture of the cost behind supplying water. In addition, strong political lobbies oppose the

introduction of water pricing. Furthermore, economic difficulties in many countries make even the imposition of only costs of water per se and not full cost recovery problematic.

The water pricing mechanisms should be so elaborated that vulnerable social groups must be protected from excessive and unaffordable water charges. This could be assured through different ways among them to avoid cross-subsidizing sectoral uses, for instance it will not be acceptable that domestic users should subsidize those of agriculture.

Other useful strategies include the provision to users of "block" or quota of water supplied at a very low cost or for free, above and beyond which charges are required. Beside these approaches, many other pricing strategies can be introduced, such as the "Rising Block" system of charging. This system encourages the reduction in water demand and the enhancement in water savings, hence, as consumption increases, so does the per unit cost of water supplied. Thus a sparing user pays less per unit of supply than does a more intensive user.

From the previous discussion, it is clear that there are several approaches which could be followed to solve the problem of granting access to minimum volume of water to everybody. The solution that is so far mostly in place is a general low price for every consumer, but this is not the solution which leads to efficient water use.

For the Mediterranean countries and, particularly, those suffering water scarcity, it is therefore necessary to create appropriate pricing schemes in order to ensure that also less well-off people can afford their basic water needs.

In this regard, what should be clearly stressed is that the pricing scheme with its variable approaches and mechanisms must be decided in view of the existing local socio-economic conditions as well as the availability of water resources, which widely vary from one country to another.

Regional characteristics: pedologic and climatic factors

The consideration of regional characteristics is of great importance for the elaboration of an efficient water pricing policies.

On the top, pedologic and climatic factor greatly vary from one country to other and even among the regions of the same country. Both have a considerable influence of the feasibility of water pricing policies. The occurrence of flood and/or drought conditions determined by climatic factors will have a vital role not only on the way we are managing the water

but similarly on the determination of water costs. In addition and above all, the availability of water resource is closely linked to the existing climatic conditions or to the changes it could be subjected to.

Therefore, to establish appropriate pricing schemes, both water assessment and water origin (whether ground or surface water) will make a major difference as far as the cost of water supply is concerned. For instance, the criteria of full cost recovery could be one of the motivating factors that can provide rise to the most efficient and productive use of groundwater for irrigation.

Institutional dimension and regulatory framework

A very important factor influencing water pricing policies that varies from country to country is the institutional and regulatory framework.

In the Mediterranean countries there is growing recognition that a realistic water pricing policy that ensures full cost recovery can be politically feasible only when it is designed to perform well in its economic and allocative roles. Also notable is the growing realization that institutional reforms to enhance the effectiveness of water pricing policy are indispensable. Pricing reform does not end with raising water rates, but, it should also involve concurrent changes in pricing methods and approaches and the creation and strengthening of supportive institutions.

In the Mediterranean region we are looking for a pricing reform that is effective and practical, however this can only be achieved through the necessary institutional and technical conditions that enable cost recovery and allocative roles for water pricing policy. These institutions include an independent water pricing agency to supply water, clearly defined water rights, transfers of management to user organization and more involvement of the private sector. Technical conditions include delivery measurement structures and infrastructures to move water over space, type of use and time. Such institutional and technical conditions to set up an effective practical water pricing reform are unfortunately not properly functioning and are in need of effective changes, which to some extent is costly, but, in the meantime, the present bureaucratic system of water administration is equally costly.

Water management: switch from supply to demand side

Water has to be treated as a finite resource and decision-makers, including politicians in favor or opposed to water pricing, need to be persuaded to consider it as such.

In arid and semi-arid countries of the Mediterranean, already facing acute water scarcity, it is apparent that it is cheaper, easier and more equitable to improve efficiency of current uses as a means to achieve sustainability of water resources than to try to continually increase supplies to meet inefficient demands. Following the increasing water supply approach, even assuming that water resources are available, besides the huge investments required for the infrastructures which cannot be afforded by the country budget, will not result in any water saving. On the other hand, encouraging the demand driven management approach through water pricing is an effective economic instrument for proper implementation.

However, beside the economic incentives, demand management requires a fundamental change in societal and individual behavior: such changes cannot be brought about avoiding social problems, by economic instruments alone.

Water pricing policy must ensure sustainable and not just efficient water use

Technically and politically, in most countries of the Mediterranean it is well recognized that appropriate water pricing policies provide incentives for users to use water resources efficiently.

In the Mediterranean region, water use efficiency, in particular that of agricultural sector, needs to be increased to overcome water scarcity in most of the Southern and Eastern countries of the region. In this regard, water pricing of irrigation water can play an effective role. However, in such countries, efficiency should not constitute the ultimate aim of water pricing policies, as highly efficient water use does not necessarily imply sustainable use. For example, there are places in Southern Mediterranean countries where irrigation schemes are around 80% efficient, but over-abstraction of water has put the sustainability of many aquifers at stake. Therefore, for those countries water pricing should be used to ensure (long-term) sustainable use of water resources rather than simply (short-term) efficient use.

Public awarenes

Information on the price of water itself is vital. Lack of awareness of the real cost of water means that users are uncommitted to improve use

efficiencies. Price increases will meet hostility and reluctance to pay: only if water users fully understand the charging scheme, they have the chance to react rationally to it. This implies that they will try to use water more efficiently. However, if information on such possibilities is not available to water users, they will not know how to react best to the incentives given by progressive pricing schemes.

Another side of information, which is not usually available in most developing countries, is that concerning available water resources since data is usually unavailable on withdrawals and use patterns: part of such lacking information is directly related to the charging scheme.

Such data are the fundamental basis for setting appropriate water pricing policies and the necessary charging schemes. If such data are misleading and not available for designers, planners and users, the successful implementation of water pricing policy in the region will be very far away from being realized and complete failure can be expected.

Public participation

Closely connected to the need for public awareness, is the need for public participation. The public participation through the organizations often termed civil society is crucial for the development of water pricing policies and strategies. In the region, the participation of such civil society is not at the requested level, in spite of the valuable role it could play in introducing water pricing mechanism in all sectorial water use and in smoothing and overcoming the difficulties and obstacles that could appear with the implementation process. Furthermore, such organizations, being independent customer bodies, are qualified to work together with the regulator body, the water industry and the public authority. This is still lacking and needed in the region. The consumers participation through their organizations in the process of water pricing can have its positive effects. They help to devise and implement water pricing policies that are acceptable to customers, promote sustainable water use and deliver benefits for the water environment as well as to support the integration of different policies.

By comparing the availability of water resources in the Northern Mediterranean region and developed Northern countries with those of the developing Southern and Eastern regions, it should be expected that in the developing countries, due to their acute water scarcity, water pricing and its implementation mechanisms are more advanced with respect to the Northern ones.

However, the opposite is true for the majority of the countries, since the process is running very slowly and at a very weak progress rate, being difficult to evaluate.

In those countries, it is needed an open and transparent strategy towards water pricing, based on a continuous and effective dialogue through the establishment of a regional network for water pricing, including experts, water officials, private sector, NGOs and a significant public participation. Such network must be responsible for designing and planning the water pricing policies, the regulations, guidelines and all the necessary factors related to implementation as well as suitable water charges and its implementation mechanisms.

Concluding Remarks and Recommendations

Water pricing is an indispensable tool in the progress to achieve a high level of efficiency in the use of water resources and in protecting the environment and its adoption deserves encouragement in spite of a number of economic, social and institutional problems. However, water pricing must be based on principles of fairness, transparency and equity. In this regard, to achieve this, it is recommended the following:

- flexible rules must be adopted in determining reasonable tariffs closely related to farm economies, such that farm activity results encouraged rather than limited; tariffs should be determined on the basis of farm net profit, in such a way that the burden does not become excessive to the point of obliging the farmer to abandon or reduce the activity;
- tariffs can be based on a fix, flat, very low rate common to all, plus a variable rate depending for example on progressive water volumes (with unit cost increasing with volumes) and/or on the period of the year (with unit costs increasing in the peak consumption period);
- tariffs must be based also on water quality: if it decays along the season (e.g. for a progressively higher salt content), a parallel decrease in price must be associated to it;
- the farmers have a right to get a premium price for the use of primary or secondary- treated domestic wastewaters, since so doing they polish wastewaters and avoid their release in watercourses, protecting the environment and reducing treatment costs to the community;
- it is unreasonable to expect that farmers pay for the amortisation of existing structures, designed and implemented without their participation and often with optimisation criteria different from those of farmers themselves;

- it is unfair that farmers be called to participate in the expenses to maintain overstaffed administrative offices, with armies of people hired without their consent, from persons extraneous to the agricultural world;
- an intense action of information and formation should precede and follow the introduction of water pricing;
- participatory water management is of a paramount importance to stimulate farmers awareness for the necessity of a wise water use, their willingness to participate in the expenses and their acceptance of constraints in water allocation.

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