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**SG/SD/RT(2004)1  
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## **Round Table on Sustainable Development**

### **Integrated Water Resource Management and Water Efficiency Plans by 2005**

**Some Personal Reflections by Ivan Chéret**

**9-10 March 2004**

*This document is a background paper for the Round Table on Sustainable Development meeting which has as its theme Water and Sanitation. The meeting will take place at OECD Headquarters, 2 rue André Pascal, 75016 Paris on 10 March 2004, starting at 9.30 a.m.*

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**English - Or. English**

## **Integrated Water Resource Management and Water Efficiency plans by 2005: some personal reflections by Ivan Chéret<sup>1</sup>**

### **1 Introduction**

The Plan of Implementation adopted at the World Summit on Sustainable Development in Johannesburg in 2002 called for countries to “*develop Integrated Water Resources Management and Water Efficiency Plans by 2005*”. Whereas some countries have started this process, many leaders in the developing world and elsewhere are questioning the practical significance of these plans and how they relate to their day to day struggles to try to promote economic and social development within their countries.

Such concerns have been heightened by the realisation that the richest countries of the world, while practising some integrated approaches in some regions, do not have country-wide plans of this nature. Developing countries are asking: What did we commit ourselves to? Does IWRM risk being an overly sophisticated, idealistic tool that is simply beyond our capacity to manage? Is it likely to divert resources away from the concrete life and death issue of providing access to safe water? Is there a danger of the target becoming a means of delaying action or, worse still, a substitute?

I have been personally advocating integrated approaches to water resources management for decades, since my first experiences in Senegal, Mali and other African countries where I lived for eight years, but I must recognize that the above questions are very appropriate ones. Bringing IWRM plans to the attention of political decision makers can highlight important interrelationships between human activities, linked by the common factor of water resource use. But a real danger exists that they may also become no more than bureaucratic hoops to jump through in order to obtain financial aid.

When we attempted to persuade a group of World Bank project managers of the benefits of the integrated approach, we could sense their apathy. Here was yet another time-consuming scheme to complicate their fieldwork, with new forms of data collection, new reporting systems, more discussions and controversies, all within the context of people suffering and dying because of these delays. However in response to these concerns it is important to stress that given the integrated nature of water resources, many pitfalls can be avoided and considerable amounts of money saved by trying, when studying a given project for a city, an industrial development or an irrigation scheme, to widen the scope of the discussion and look at the issue of water resources from a more global standpoint.

### **2 What is IWRM?**

In order to get a better feeling of the issues at stake let us first have a look at the practical meaning of the concept of IWRM.

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The Global Water Partnership (GWP) has issued the following definition of Integrated Water Resources Management:

“IWRM is a process that promotes the coordinated development and management of water, land and related resources in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.”

This certainly is a very wide definition of the concept, encompassing practically all types of human activity because they all need and use water one way or another. Is this a kind of hold-up - an attempt from the water community to take the lead right across the domain of economical and social development? Why did the experts come to such an all- encompassing recommendation?

If we try to analyse what happened in the past in the most developed countries, where this concept was born, it quickly becomes apparent that water resources were *not* managed in an integrated way. In these countries, water rights first related to land ownership. Then as soon as a new category of uses appeared such as mills, irrigation schemes, rapidly expanding cities, industries and hydroelectric schemes, special laws were enacted and special administrations were set up. Water management was, and in most countries still is, fragmented, without any real taking into account of the global picture. This situation has resulted in many disasters: intense pollution, overexploitation of aquifers, drying-up of portions of rivers, floods over densely inhabited areas, funds wasted on many inappropriate projects. This state of affairs could not continue indefinitely, and through various means and difficult experiences, a consensus progressively took form: all the users of a given water resource should work together in order to try and manage “their” water in the best possible way: IWRM was born.

Does this mean that each and every country in the world should immediately apply all the consequences implied by IWRM as defined by the GWP? This cannot be right and even the richest country should proceed step by step. So what could and should be done along these lines? It is useful at this stage to take a look at some very practical aspects of people’s daily lives.

### **3 Handling droughts and floods**

Water flows down a slope; it flows very fast down a steep slope; it does not flow at all on flat, horizontal ground. Everybody knows that. Why then do you find cities built on horizontal ground in humid areas such as Treichville, a suburb of Abidjan? Billions had to be spent there on sewers and pumping stations to avoid permanent flooding. Why are many “favellas” in Rio de Janeiro built on very steep slopes, where each tropical rainstorm creates a mini disaster? Why do peasants all too often plough down a slope instead of following horizontal lines, destroying by these actions the land which feeds them? Do people forget the existence of water and its essential characteristics? Do authorities care about these issues, or do they conclude that such problems can always be solved once they occur, forgetting or neglecting the hard work and cost of coming back later? Or do they simply lack courage, and real authority?

Let us take a look at a very telling example. The Loire River in France experienced two very severe floods in 1865 and 1875. Levies were built, some of them at a lower level, in order to allow a future flood of the same magnitude to overflow them and the excess flows to drown agricultural

land below them with minimal damage. Of course no construction was authorized in these areas reserved for flooding. The decisions were fantastically well thought through and implemented. But some decades later, the memory of the floods had receded, authorities could not resist the demands of the population who refused to go on accepting that their land remain worthless due to the construction ban; so houses were built and today hundreds of thousands of them exist in these areas prone to flooding. No dams could be built as protection because of the opposition from environmental groups. Damages will be in the range of many billions US\$ when the next high flood occurs.

In poorer countries the resultant disasters can be worse, because the damages are so large in relation to the country's GDP. Though the impacts of climate variability start with direct damage related to the loss of infrastructure and crops, they are often amplified through many areas of economic activity leading to widespread macroeconomic, financial and political consequences (Sachs 2002). In Kenya, for example, flooding during the El Nino event of 1997/98 is estimated to have cost some US\$880 million (10% of GDP) through the loss of infrastructure such as roads, pipelines and water treatment plants, while the subsequent La Nina drought, which lasted two years, cost US\$2.8 billion (16% of GDP in each of the two years), impacting most sectors of the economy ranging from tourism to agriculture and industry. Kenya's vulnerability to these events was exacerbated by a reduced response capacity caused by a decline in storage capacity per capita, deforestation, over-abstraction of river water, over-exploitation of groundwater and cutbacks in monitoring and assessment (Mogaka et. al 2002). This points to the need for city and land use planners, farmers and related authorities to integrate water into their strategic planning and stop behaving as if this "technical" aspect could always be dealt with at a later stage.

#### **4 Water for industry and agriculture**

Water is not only a vital commodity, which can be brought within people's reach at not too great a cost. It is also an incredibly strong and potentially destructive force. Not respecting this force can open the way to damage that may cost billions of dollars to repair.

People living in dry zones know what water shortage means and in the past have adapted their way of life to this reality. Population growth during recent decades and the resultant concentration of people in big cities has severed that link with reality. The same thing is happening elsewhere including in the richest countries of the world, notwithstanding their mostly temperate climates. Water is abundant in these areas, so much so that it has been considered by economists as a free public good, like air. The consequences of this abundance have been very significant: production processes which were devised in sectors such as heavy industry or agriculture, did not consider water as a determining factor and set about committing its use with out considering the potential costs. Furthermore when shortages occurred, it was easy to build a dam, to allow storage of abundant winter flows to be released in summer for everybody to use.

The alarm bell which showed that something was really wrong was the pollution of rivers and aquifers. That such pollution should have occurred is not really surprising given that water is frequently the medium in which waste is transported: in the home it is used for washing and the exportation of human waste, in cities to flush the streets, in industry to take away from the raw material what is not needed for the final product, in energy production to dispose of excess heat.

Even agriculture now, through the use of fertilizers and pesticides, is an activity which pollutes water.

When strict regulations started to be imposed, people were compelled to react. Industry for instance devised new processes which produced less waste, and at the same time used less water. The same reaction occurred in the agricultural world: traditionally water was simply spread on the soil and most of it was not used by the crops, but now innovations such as spray irrigation or even drop irrigation, which use far less water, allow us to produce many times more “crop per drop”. This brought about a revolution in the way water shortages could be dealt with: the authorities could not only try and increase the *supply* of water through dams, pipes and pumps, as was the case in the past, but could also now try to reduce *demand*, by encouraging the production of more efficient equipment and processes inside the users’ premises.

The fact that in order to solve a given difficulty in the water resources management field one can either enhance demand (by building a dam for instance) or influence demand in a way that will encourage consumers to use water more efficiently, raises the problem of which mechanism which should be used to choose the best solution. The question is more complex than it may seem at first, because in the first case the infrastructure is usually financed from taxes whereas in the second case, the user has to carry the financial burden directly - something the user is almost always reluctant to do! The way public authorities allocate budgetary funds or impose taxes plays a fundamental role at this stage.

For instance, in the north of France near the city of Lille, industries and cities have been taking too much water from an aquifer which was dangerously depleted. The city authorities and all the urban businesses and industries claimed they could not reduce their consumption without the closure of businesses. For these groups the solution was to build a dam on a river 30 miles away and bring the water to the city through a huge pipe. Alternatively, a desalination plant could be built some fifty miles away at a cost of US\$1 billion to tax payers.

In the event, another solution was adopted which was made applicable by a new law based on the “IWRM” concept. A small tax was imposed on each cubic meter of water taken out of the aquifer. The industry operators then made their economic calculations. What had been impossible beforehand became financially viable when compared with the burden of the tax. Water processes were modernized, consumption was reduced and the water table went up again. This happened in the 1960s and nobody has since raised the question of the dam or the desalination plant.

Agriculture frequently poses water resource choices. Plants evaporate the water they use and take it away from the water resource, while practically all other users return it to the river after they have taken it out. So if an irrigation network is situated upstream of a large city for instance, the irrigation water is used only once and it is lost to the city. Should this network be situated downstream, the water used by the city, once purified, can be used a second time by the irrigation network. It could be used twice. The relative placement of various users along a river system is important to consider when irrigation schemes are planned.

Cities today are growing very fast indeed, and they develop on land which is used by peasants to grow their crops. Underneath these soils there are often water resources which have been tapped by agriculturalists for centuries. Abstraction of water for the expanding cities can seriously

deplete this resource. As industries tend to spring up around the suburbs of the city, pollution is introduced and often contaminates the aquifers. These activities may increase slowly over a long period of time, frequently without any planning or consideration for water supplies leading in time to very serious problems.

The case of Cochabamba in Bolivia is very telling. This is a city which found itself facing exactly the type of problem described above. Many studies were performed and different solutions suggested. The World Bank was consulted and gave its advice. Unfortunately the government chose a solution which did not take into account the needs of all parties concerned. A private company undertook to take on the risk and make the significant financial investment in the project, provided the price of water was raised pretty quickly. The reaction was a riot and the ruin of the project, resulting in a great loss of time, money and credibility.

All the examples I have provided stem from practical experience on the ground and can be identified in respect of virtually any city, industry or agricultural zone. The lesson they present is simple: one cannot focus solely on individual projects such as the planning of a new suburb, the location of a new factory, or increasing crop production, whilst taking for granted the water supply as if water is a free and inexhaustible public good. Water has to be seen as an essential input to the economy and as integral to social welfare in the same way that energy, mineral resources and manpower are viewed. The interrelationship between users is obvious and cannot be ignored. The need to take this view into consideration is not some extraordinary scientific discovery of the twenty-first century, it is plain common sense. It is the same common sense which leads us to understand the need to allocate water resources at the level of complete catchments around each tributary as well as within the entire area of a river basin, and between all the users of underground aquifers.

## **5 Water and governments**

Let us turn briefly to the national level where the strategic decisions concerning the future of the country are taken. This is the level at which one looks at the available resources of the country - energy, minerals, agricultural land, forests, manpower, education etc. Water resources are seldom considered at this stage, unless there is a serious lack of water. But even in such cases, strategic decisions are often geared towards extending the traditional trend of activities.

As the majority of populations in many developing countries are often employed in the agriculture sector, it is perhaps understandable that governments often choose to finance projects to increase the available water resources, in order to allow more peasants to grow more food. But is this really the best strategic approach for a country with insufficient water resources when agriculture is often the human activity which requires the highest level of water consumption?

Now let us go a little further. What is the main goal of economic development? If we consider that it is to give people decent jobs, it seems logical – especially when water is a limiting factor - to consider how best to use the available water to produce the maximum number of jobs. When we look at how many jobs a unit volume of water can create in various human activities, we find that agriculture is by far the least job rich activity! How many countries with water shortages take this fact into real consideration when formulating public policy? Of course these changes are not easy

to implement and inevitably require a lot of effort, manpower and funds. However ignoring such issues will never yield a solution.

## 6 Introduction and dissemination of IWRM

With all these considerations in mind, given the practical importance of introducing “water integrated” approaches to the choice of development strategies and investment programs, how can these concepts be introduced and disseminated in a given country? What could these IWRM and water efficiency plans look like? A group of experts which met very recently made the following recommendations, taking into account the experience of countries that have recently started on work in this area:

“An IWRM plan is a blue print that **adapts IWRM principles to country conditions** to permit a change from fragmented ways of managing water resources to an integrated way, applying the new approach to both on-going and new investments.

An IWRM plan addresses the management system (broad sense) of the water sector and:

- Takes into account the situation today (Management system A)
- Provides a description of where we want to be tomorrow (Management system B =IWRM)
- Provides a strategy / roadmap / program to move from Management A to Management B, including the setting up of monitoring and evaluation mechanisms”

The water related sector does not “stop” during IWRM planning, it continues as per decisions taken by the current management system (following current plans etc), and is “gradually put in line with the new approach”

The scene being set, what difficulties await the actors? It is a fact of life that circumstances differ from country to country, and from region to region within any given country, that the histories of countries and their cultures vary widely, and their approach to governance and management may also be very different. It is not easy under these conditions to go beyond generalities. However, let me suggest those steps which I consider vital when starting down the road of “integrating” the various components of water resources management.

Usually the stakeholders in the field are competing between themselves for water and related financial advantages provided by the state or the country. The bureaucracies in charge of each economic sector tend to consider it their duty to defend their “protégés”. They all know the existing rules of the game and inevitably tend to resist change through fear of losing part of their water resources, or their financial advantages or of sanctioning an increase in the powers of the administration.

In order to ease the change process, one option for a given government is to experiment first in a region where the water-related problems are obvious and undeniable. One or two regions could be selected according to the available funding. For each experimental area, it would be necessary to appoint a small team of civil servants who would carry out an initial “audit” of the situation, by consulting existing documents, the administrative agencies concerned and general stakeholders.

Ideally, the members of the team would come from different backgrounds in order that collectively they might be able to gain a good understanding of the intricacies of the situation. This team would also need good interpersonal skills as they would have to gain the confidence of many actors in the field. They should not have been involved in any controversies in the past in order to guarantee their independence, should be open minded to change, and ambitious.

Once the team have prepared an analysis of the existing situation, they should share it with the various stakeholders and discuss their responses. The presentation and discussions should be done in front of the representatives of all the stakeholders concerned, so that their reactions can be checked by their colleagues and so that they are compelled to express their views in public rather than solely during closed interviews. In this way the comments concerning the results of the audit would be made public to all concerned. This preliminary stage accomplished, a decision would have to be made as to the next steps. The auditing team would probably have made a few suggestions, and the question may arise as to whether there is or is not a real need for a permanent regional structure for instance.

Once the “new” approach had demonstrated its usefulness in one or two cases, it would be easier to roll it out across an entire country, or at least to the regions where the problems are most pressing. The strongest obstacle at this stage would be to find enough good people capable of leading such a task, and of obtaining a positive result. Ambitions would have to be adapted to the available means. The most important action would be to spread information about the advantages of a more “integrated” approach. This has to be presented in a very clear and practical way, so as to be easily understandable for all the local stakeholders. There is no need to use complicated acronyms, no need to present IWRM as an all encompassing new structure or new line of decision making and command. It is to begin with, and most importantly a state of mind and a tool. Once this is understood clearly, especially by those people who are assigned the responsibility of introducing such concepts into a country, IWRM can in time be taken up and accepted by others.

It would be wrong to try and rush this process. It is important to think of those who need to be convinced of the benefits of the project. Such people inevitably have their own constraints and may be facing a wide range of problems such as insufficient personnel, equipment or financial means. The simpler the recommendations, the more useful and welcome they will be in terms of helping to explain the benefits they offer to all concerned. This will also inevitably increase the chances of implementation.

## **7 The role of the international community**

In this respect, the international community has a very important role to play. The advocacy phase for the idea has been carried out according to the Johannesburg decision, but very few people, particularly in terms of stakeholders on the ground, know what this is really all about and this remains the case even in the richest countries in the world. A few years ago a group of experts gathered by the Global Water Partnership wrote a booklet on IWRM. It started in a simple manner, but as discussions wore on it became more and more inward-looking, academic and difficult to read by outsiders. I am not apportioning blame, - I was a member of the group myself – but wish merely to underline that it is doubtful that such rhetoric will appeal on the ground in developing countries. So donor agencies and countries, the banks, financial



organisations and insurance companies, need to consider that for the sake of efficiency they should remain as pragmatic as possible. They should not seek to impose the production of unrealistic, though apparently sophisticated, reports. It is clear where information is needed, it takes time to acquire it. Starting to “integrate” water resources management is not a free lunch, but it brings so many rewards.

## 8 The economic consequences of implementing IWRM

I have outlined the nature of the damage that has been sustained in many countries by taking decisions without due consideration of the water resources situation, and constraints of other users. The following analysis examines what information is available on the economical consequences of implementing IWRM. In a recent report entitled ‘Water and Poverty in a macro-economic context’, Stein Hansen and Ramesh Bhatia<sup>2</sup> make this statement about the “macro economic visibility of water resources mismanagement” :

“The main challenge where irrigation mismanagement has taken place is then to increase water productivity in order to achieve *“more crop per drop”*. The typical situation is one where the irrigating farmers is charged only a tiny fraction of the operating and maintenance costs for water supply and none of the capital costs. Cost recovery in irrigation systems is only 10% in the Philippines, 13% in Pakistan, and 25% in China, according to the World Bank (2002) which has estimated that developing countries spend as much as US\$ 10 – 15 billion per year on irrigation subsidies and poor farmers are the primary beneficiaries of such subsidies. This amount equals 20-25% of global official development assistance. Not only does this represent inefficient use of government revenue; it also results in lack of system maintenance, poor irrigation and drainage services, substantial leakages and losses of valuable water, and severe environmental damages followed by loss of soil fertility in the affected areas.

In India alone, almost US\$ 5 billion of government revenue a year is spent on water subsidies for irrigation. This equals 10% of overall government tax revenues in India and represents a very significant drain on the budget by diverting funds away from alternative uses much more in line with a poverty reduction strategy. In the Indian state of Rajasthan, for example, the state pays 75 % of the operating and maintenance costs of irrigation, and these costs amount to 18% of the state’s recurrent budget, see the World Bank (2003b). Clearly, there is considerable scope for efficiency gains in the irrigation sector and at the same time considerable scope for reallocating significant amounts of state funds to recurrent expenditures and or investments either in the water and sanitation sector or to other tasks defined as priority areas in the PRSP.

China is the largest of all developing countries with some 20% of the world population. It is therefore of interest to see if recent attempts at estimating such external water pollution costs are significant in a macroeconomic perspective.

It is estimated that 1.5% of all deaths in China, or 64,000 persons per year, can be attributed to water pollution related to diseases. However, having valued these

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<sup>2</sup> Water and Poverty in a macro-economic context. Royal Norwegian Ministry of Environment. January 2004.

premature deaths moderately in economic terms, the highest costs of water pollution damages appear to come from IQ loss in children from ingestion of water and food contaminated with lead, mercury and other heavy metals. It is estimated that each year 7 million children are affected, losing on average 6.5 points on the IQ scale. Two other major water pollution impacts are non-fatal

Regional studies attempting to assess the environmental cost of water pollution have been undertaken. One example is a study to assess the environmental cost of water pollution in Chongqing, China. A team of Chinese and Norwegian researchers estimated the resources cost, i.e. real resources spent or production possibilities foregone because of water pollution. The study concluded that the cost of water “pollution equalled 1.2 percent of Chongqing’s GDP (Yongguan et. al).”

## **9 Conclusions**

It is unnecessary at this stage to cite further examples of assessments. The case is clear, the world has to manage its water resources better, which means that not only water people have to work better, through the step-by-step introduction of more integrated approaches, but also and above all, that all actors, at all levels, must look at the water-related aspects of their activities. This stage cannot take place after strategic decisions have been made, resulting in demands for more water and criticisms of the government if this does not materialise, but must happen first, before such decisions are made. The Johannesburg recommendation, wisely implemented, will be of great use to all the countries concerned, and is worth the ante.

But how shall the world know what progress has been really made on the ground? Above all, how will individual governments know what progress its people are making? Checking the number of plans prepared by 2005, though necessary, would be no real reflection as to what is happening on the ground.

This question of monitoring is not a new one. It is fundamental to most areas of development policy. In the water field, a considerable effort has been made by the Joint Monitoring Program to improve the way local, regional, national and international authorities and stakeholders, record the increase of the number of people served with safe drinking water, or gaining access to basic sanitation. Outcome indicators and processes have been agreed upon, with a range of data adapted to world wide needs, and with more flexibility for each country’s own policy needs. The problem in the water management field is that progress cannot be measured by following the evolution of simple figures, such as a number of people. This is an area which undoubtedly requires reflection. The difficulty lies in the fact that the main change has to happen in people’s minds, they have to think about water in a different way, whether their job be water-related or not; and specially in the latter case. Strengthening laws, reinforcing regulation, developing water administrations is all very well, but the ideal solution would be to induce people to take initiatives to achieve better water management. And how? Perhaps by asking each investor when they devise a project to show that they have looked at various alternatives related to the impact of water on their project and equally the impact of their project on water? In each case the related financial expenditures both for the investor and the state should be spelt out.

This is merely a first suggestion. Obviously more brainpower has to be put to the challenge!