Water for living

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Preface

We all learn at school that water is essential for life. Our planet supports life only because, miraculously, it has water.

But how many of us are as aware as we should be that water is also essential for living? No matter how they differ in other ways, people all over the world use water to drink, to wash, to cook, to keep their homes clean, to nourish crops and livestock and to process these and other raw materials into products that earn them an income. Water is also used to generate another of modern life's necessities—electricity. And it plays a vital part in cleansing the wastes we produce.

> 'And we made out of water every living thing.'
>
> Qur'an 21:30.

The multifaceted role of water in our lives is something we easily take for granted. Until, that is, we run short of it.

For millions of poor people in developing countries, water scarcity is an everyday experience. In extreme cases, it brings suffering, illness, even death. Prolonged drought withers crops and weakens or kills livestock, forcing their owners to leave home to seek work or help elsewhere. More often, the seasonal shortage of good quality water is the cause of discomfort, inconvenience and risk—a thirst that cannot be quenched; clothes that cannot be washed; dirty floors, working surfaces and tools that harbour dangerous germs; inadequately boiled or rinsed food that could poison those who eat it. Water scarcity is also the cause of a monotonous chore—the daily or weekly trek to a distant water point to draw water and carry it home again. How much better it would be if the women and children who typically perform this chore could save their precious time and energy for other, more productive and profitable activities.

Easy access to fresh, clean water is often the single biggest improvement poor people wish for in their lives.

For more than a quarter of a century, the Islamic Development Bank (IDB) has been helping to make that wish come true.

Water projects have been part of the Bank's programme since it was founded. Indeed, the first project approved by the Bank's Board of Executive Directors, in 1976, was a hydro-electricity scheme, the Song-Loulou Hydropower Project in Cameroon. Since then the number of water-

related projects in the Bank's portfolio has risen steadily, reflecting our growing recognition of the potential of such projects to contribute to human well-being and economic development. Today, water accounts for nearly 20% of the Bank's financial commitments, with the main emphasis falling on domestic and irrigation water supplies.

IDB's increasing involvement in water is part of a pattern of growing concern over this resource worldwide. Over the past decade, water has risen to the top of the global development agenda. Under the United Nations' millennium development goals, adopted in 2000, 191 countries pledged to halve the proportion of people without access to safe and affordable drinking water by 2015. The Johannesburg World Summit on Sustainable Development, held in August 2002, reaffirmed this commitment, identifying lack of access to fresh water and sanitation as the most visible symbol of the growing gap between rich and poor.

This brochure tells the story of IDB's assistance to this vital sector. We take pride in what we and our partners have achieved. Yet we are not complacent, for we know how much more remains to be done. And we are eager to draw lessons from our past experiences, so that our future contribution can be still more effective.

Dr Ahmad Mohamed Ali
President, Islamic Development Bank

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At Last! Water in our Village

The village water point is a prosaic thing: a slab of concrete supporting a steel pump. Its poetry lies in the gifts it gives to people.

When the sun is high the pump is deserted, as people are at work in their fields and homes, or at market. But in the early mornings and evenings, when women and children come to fill the family's buckets, the water point is alive with the greetings, animated gossip and *badinage* that are the stuff of social intercourse in poor rural communities. As the adults talk, the children play—splashing one another with water, darting round the slab in a game of catch, building a miniature model of their village in moistened earth.

These are the intangible gifts that water brings. But what about the more material benefits? This is the moment at which to ask a family what having water in their village means to them.

Tahibou Ouedraogo, his three wives and their eight sons and daughters live at Poa, a large, dusty village strung out along a main road in semi-arid central Burkina Faso. It's a poor area, left behind in the race for development by the more prosperous nearby cities of Ougadougou and Koudougou. Villagers such as Tahibou have few opportunities to supplement the meagre and unreliable incomes to be had from rainfed farming.

In 1994, Poa became the first village in its region to benefit from a project to sink 400 boreholes and equip them with pumps. The project was funded by IDB and implemented by the Direction Régionale de l'Hydraulique du Centre-Ouest (DRH-CO), part of the national ministry responsible for water supplies.

For Tahibou, the new village water supply is a giver of life – not in an abstract sense but in a way that touches him and his neighbours

directly: 'It means we no longer get water-borne diseases,' he says, mindful of the many young lives in the village lost in the past to diarrhoea and other killers. Tahibou has also benefited economically, gaining an extra source of income by becoming the village's pump repair man, a job for which he was trained by the project.

For Azara Nana, Tahibou's first wife, the water has brought relief – a lifting of the physical burden she bore daily in fetching water for household chores, and a saving in time that takes the pressure off the rest of the working day. 'I remember with gratitude the day the pump worked for the first time,' she says. 'Having water close to our homes means less work for me, as for all women in the village. Now I have more time for activities that earn us an income, such as growing vegetables and trading. And I'm less worried that the children will get ill.'

And for the family's young children, the water means everything that is good about life. A drink when you're thirsty; a clean face and hands before meals; nourishing hot food to eat; clean clothes to wear to school. 'It all helps to get them off to a good start in life,' say their parents.

Asked to compare life before and after the village had its own water supply, Tahibou doesn't hesitate. 'It's much better now,' he says. Not only have the pressures on domestic life eased, but the water has opened up economic opportunities too. 'It's easier, now, to water a small plot to produce vegetables for market, to give water to the livestock we raise — donkeys for carrying things, sheep and goats for meat production —, and to find water for jobs such as repairing a spare tyre or making bricks.' Of course, things aren't yet perfect: more water points are needed so that further flung villages, in the deeper countryside, can also benefit. And, like other pump repair men, Tahibou wishes he had a more reliable source of spare parts and tools closer to hand. All the same, life in Poa is a lot better than it used to be.

Such are the gifts that water has brought to this Sahelian village—a village like thousands of others in the developing world. Gifts that most readers of this brochure will take for granted. Gifts that can, and must, be extended to many more of the world's underprivileged.

A Vital Resource

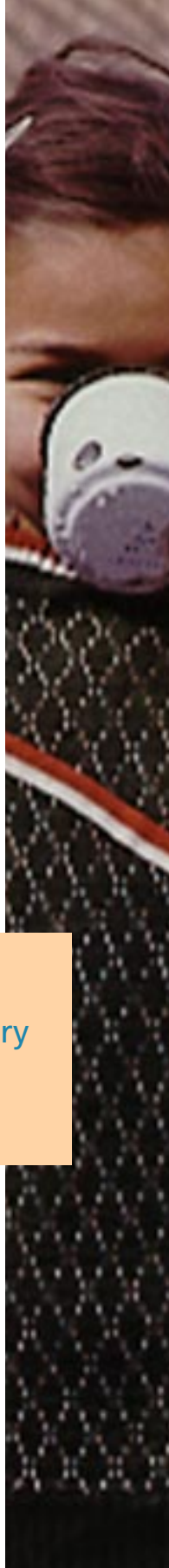
Too precious to waste

Water sustains all life on earth, including human life and the crops, livestock and fisheries on which we depend for food. At first sight, our 'blue' planet, 70% of whose surface is covered with water, seems blessed with an abundance of this element. Yet the way we have managed—and too often mismanaged—this vital resource in the course of our development has brought us to the brink of a crisis. The decisions we take now regarding the management of water resources over the next 25 years will profoundly affect our health, food security, prosperity and even our future survival.

The United Nations (UN) estimates that 1.1 billion people lack access to safe drinking water and 2.4 billion lack adequate sanitation. These bald figures conceal an enormous sum of human misery. The World Health Organization (WHO) estimates that more than 5 million people die each year from diseases directly associated with inadequate water supply and sanitation. Even when they do not kill, these diseases are debilitating. Wherever people lack piped water, women and children especially are condemned to the drudgery of drawing and carrying water when they could be engaged in more productive activities. The time currently spent in this way is estimated at over 10 million person-days a year, a colossal waste of human resources. And the cost of inadequate water supplies falls disproportionately on the poor. The poorest households in some cities spend almost one-fifth of their income on buying water.

> 'Just as the twentieth century was the century of oil, the twenty-first century will be the century of water.'
>
> Ishak Alaton, Turkish businessman.

People who do not have a reliable water supply often suffer from food insecurity and inadequate nutrition as well. Drought, flooding, dirty water and inadequate sanitation, poverty, ill-health, hunger and malnutrition are all closely intertwined, so that it becomes impossible to say which are the principal causes and which the effects.



The impact of water-borne diseases

At any given time, an estimated one half of people in developing countries are suffering from water- or food-associated diseases, caused either directly by infection through the consumption of contaminated water or food, or indirectly by disease-carrying organisms such as mosquitoes, that breed in water.

- The most serious water-related diseases: diarrhoea, malaria, bilharzia, dengue, worm infestations and river blindness.
- The risk: some 2 billion people are at risk from malaria, with 100 million affected at any particular time and 2 million deaths per year.

Source: UN (2001). Comprehensive Assessment of the Freshwater Resources of the World.

Human population growth increases the scale of the water supply problem year by year, while the movement of people from rural to urban environments progressively changes the nature of the problem. The first concerted global effort to supply adequate water and sanitation began with the United Nations Water Conference of 1977, which reported that 1.9 billion people, almost all of them in developing countries, were without access to safe drinking water and 2 billion were without adequate sanitation. In line with the conference's Mar del Plata action plan, the 1980s were declared International Drinking Water Supply and Sanitation Decade. Yet UN reports indicate that, by the end of the decade, 1.2 billion people were still without a safe water supply. After a second decade of effort, by 2000, an additional 835 million people had been provided with safe water and 795 million with sanitation. However, in the meantime the population of the developing countries had increased by 750 million, so the number without water declined only marginally, to 1.1 billion.

Within these broad trends, there were considerable differences among regions and between cities and countryside. With millions of people migrating to the cities, by the year 2000 there were almost 40 million *more* urban people without water in Asia and some 14 million more in Africa than there had been a decade earlier. Indeed, taking into account the considerable improvement in urban supplies in North Africa and Southern Africa, it is evident that cities elsewhere in the continent actually lost ground.

What is worse, even this relatively modest progress was achieved at great cost to the environment. With the emphasis falling on service provision, water has been drawn from the closest and least expensive sources, with little concern, initially at least, for the sustainability of the supply or for

what happens to the water after it has been used. The same is true of water drawn to boost industrial development for economic growth and, most spectacularly, of water supplied to agriculture to increase food production.

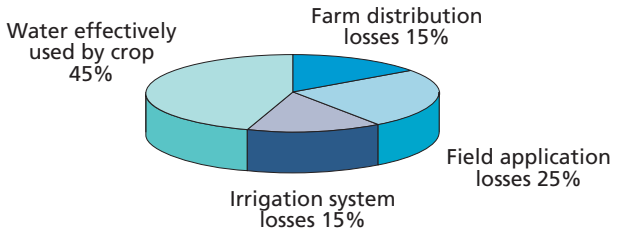
Industry consumes about 40% of the water supply in developed countries and about 10% in developing countries. But worldwide it is agriculture, not industry, that takes the lion's share. Irrigated agriculture supplies 40% of the world's food from only 17% of its cultivated land, yet accounts for 70% of all water withdrawals and as much as 90% in hot, dry countries. In many cases, water is being withdrawn from aquifers much faster than these are being replenished. Libya, for instance, uses each year four times as much water as it receives in rainfall. In many countries, groundwater levels are falling beyond the reach of the relatively shallow tube-wells that householders use for personal consumption and small-scale irrigation. Groundwater extraction has even caused the subsidence of land and the collapse of buildings in countries as far apart as Thailand and Mexico.

As a result of this haphazard approach to water development, more than half the world's major river systems are now seriously depleted or polluted. When water is drawn from a river system for irrigation or urban water supply, much is lost through evaporation or leakage. When water flow in a river is reduced, or its seasonal pattern of flow is changed by construction of a dam, all manner of downstream uses can be adversely affected, from local consumption and agriculture to river transport and fisheries. Even coastal marine fisheries may be harmed. And when wastewater is discharged back into a river system without adequate treatment, the problems are multiplied. Worldwide, it is estimated that less than 10% of sewage is adequately treated and in developing countries as much as 90% of wastewater is not treated at all. Inadequately treated sewage carries the micro-organisms that cause human and livestock diseases. Nitrates and phosphates entering rivers from human or livestock wastes, agricultural fertilizers and domestic detergents can

> 'More than 1 billion people are deprived of access to water of sufficient quantity and quality to meet minimum levels of health, income and freedom from drudgery.'
>
> International Water Management Institute,
> Water Issues for 2025: A Research Perspective.

provoke blooms of algae or bursts of microbial activity that use up available oxygen, killing fish and other aquatic life. Finally, many industries, including intensive agriculture, produce pollutants, such as heavy metals and organic chemicals, that are toxic either immediately or as they accumulate in habitats and food chains.

Average losses of irrigation water



Source: FAO (1994). Water for Life.

Where has all the water gone?

In some senses, the abundance of water on earth is an illusion when it comes to assuring safe water supplies. Most of the earth's water is salty and the technology for turning it into freshwater remains prohibitively expensive, affordable only by high-income countries. At present the Gulf states possess around 60% of the world's desalination capacity, while Malta obtains about half its water supply in this way. The costs of desalination are gradually falling, making the long-term prospects for using salty or brackish water look somewhat more promising. But for the time being at least, most of us must continue to rely on fresh water.

At first sight, the figures suggest there is enough for everyone. An estimated 42 700 cubic kilometres of water

'Water, water everywhere,
nor any drop to drink'

Samuel Taylor Coleridge,
Rhyme of the Ancient Mariner.

The illusion of plenty

Although 70% of the earth's surface is covered with water, around 97.5% of all water on earth is salt water. Of the 2.5% that is fresh, 70% is frozen in the polar ice caps. Most of the remainder is present as soil moisture, or lies in deep aquifers which are, within current technological and economic limits, beyond our reach. Less than 1% of the earth's freshwater, or about 0.007% of all water on earth, is available, on a sustainable basis, for our use.

Source: Shiklomanov (1998). World Water Resources: A New Appraisal and Assessment for the Twenty-first Century.

flow each year through the world's rivers, enough to provide each person on earth with over 7000 cubic metres per year. As so often in managing natural resources, the challenge lies in the equitable and sustainable sharing of this unevenly distributed supply. Much of the surface water flows in a few huge rivers, such as the Nile, the Ganges and the Amazon. Moreover, the flow of these rivers, unless contained by dams, is very seasonal, causing floods during the rainy season and scarcity at other times. People and water are very unequally distributed around the globe. For instance, Asia receives the most rainfall of any continent but, because of its high population, has the lowest per capita availability of water. The arid and semi-arid zones of the world account for 40% of the land area but receive only 2% of the rainfall. Moving water from areas of surplus to those of deficit can be prohibitively expensive.

Despite the appearance of plenty, we may actually be approaching the absolute limits of the world's freshwater supplies. Experts have calculated that, adding together flows in accessible rivers, supplies in reservoirs and stocks in shallow aquifers that are replenished regularly, the world's total accessible, renewable water supply is approximately 12 500 cubic kilometres per year. In 1995 it was estimated that we were already exploiting about half that amount. Human population growth is notoriously difficult to predict, but if we estimate that the world's population will grow by 25% in the next 25 years, this does not leave much scope for increased consumption. According to World Bank estimates, global water consumption will continue to double roughly every 20 years. Water demands for agriculture and industry will inevitably increase, as people strive for increased food security and prosperity, yet sufficient water must be left in rivers to generate hydro-electric power, support fisheries and permit navigation. Moreover, we are finally becoming aware of the importance of freshwater ecosystems and the role they play in the 'life support' system of our planet. Ecologists estimate that, once the natural flow of a river is reduced by half, the functioning of these systems may be seriously impaired.

> 'By 2025, nearly one-third of the world's population—some 2.7 billion people—will live in regions that will experience severe water scarcity.'
>
> International Water Management Institute, Water Issues for 2025: A Research Perspective.

Some regions and countries are already experiencing severe water stress. Research shows that this occurs periodically, when the average supply falls below 1700 cubic metres per person

per year. By the mid-1990s, 22 countries already had renewable water resources of much less than this. Given the continuing growth of both population and per capita demand, it is estimated that by 2025 almost 60% of the population of the developing world will be living in water-stressed countries.

'The water stress index in West Asia (expressed as the percentage of water used to available water resources) is more than 100% in five of the seven countries of the Arabian peninsula and is critical in the remaining two. These countries have already exhausted their renewable water sources and are now exploiting non-renewable resources.'

United Nations Environment Programme, Global Environmental Outlook 3.

Looking separately at each region, it is evident that the Middle East and North Africa is by far the most stressed. Average internal renewable resources were already at only 1000 cubic metres per person in 1992 and, with demand growing in all sectors, are expected to fall still further over the coming years. In this region only two countries, Lebanon and Iraq, currently have a surplus of renewable supplies within their borders—and even Iraq is vulnerable to increased use of water upstream. Indeed, over a third of the region's renewable supplies of water are brought in by three big rivers that cross national borders: the Nile, Tigris and Euphrates. The major underground aquifers in the region, which make up the difference between renewable water supplies and consumption, are also shared among countries.

The chronic scarcity of water in this region should not blind us to the serious deficits that are opening up elsewhere in the developing world. In sub-Saharan Africa, and particularly in the Sahel, water stress is likely to become more and more serious as the region dries out in response to global warming—and this at a time when it will be seeking to expand both its agriculture and its industries, in addition to extending domestic water supplies to the many millions of poor people who continue to be excluded. Similar stresses are likely to occur in South and Southeast Asia, particularly in these region's rapidly growing cities. Problems of water scarcity are likely to be somewhat less severe in relatively well watered Latin America and the Caribbean, although even

here there will be dry areas and dry decades, especially where deforestation alters local climates and hydrologies.

Around the world, it is estimated that some 260 major river basins are shared by at least two countries. Even in areas of political stability, this must raise concerns about how best to mobilize resources and garner public support for the concerted action needed. And in areas of tension or strife, competition for water can become an explosive issue. Special concern focuses on the Middle East and North Africa, where all the major river basins and underground aquifers cross national boundaries.

> 'Water is the source of life, yet it is too often a source of conflict. There are more than 260 transboundary rivers in the world. The risk of hostilities will grow in proportion to the depletion of resources.'
>
> Mahmoud Abu-Zeid, President of the World Water Council, at the Eighteenth Congress of the International Commission on Irrigation and Drainage, Montreal, 21–28 July 2002.

Daunting though these challenges may be, we have no choice but to meet them if we wish to survive and improve living standards in the decades ahead. The archaeological record of the early civilisations that developed along the Nile in Egypt and between the Tigris and Euphrates in Mesopotamia (modern-day Turkey, Syria and Iraq) provides an object lesson in what can happen when water supplies fail or are mismanaged. Salt accumulates in soils, crops fail, hunger and thirst follow, leading to strife and eventually to civil collapse. A modern lesson in the ecological consequences of mismanaging water is provided by the disastrous fate of the Aral Sea, which has become a salty wasteland following the excessive extraction of water for intensive agriculture. We must all make better decisions about water resource management if we are not to share the fate of the ancient Sumerians in Mesopotamia.

The sea that vanished

Excessive extraction of water from the rivers feeding the Aral Sea has led to waterlogging and salination of intensively irrigated land and a two-thirds reduction in the volume of the sea itself. A healthy fishing industry has collapsed; groundwater has become contaminated with salt, fertilizers and pesticides; and salt blowing from the flats exposed by the retreating water is further blighting the crops that remain. Because of the decline in income from fisheries and agriculture, people in the surrounding area are left with scant resources to tackle their plight.

Source: Kobori and Glanz (1998). *Central Eurasian Water Crisis.*

Vision for a viable future

A concerted effort to tackle the world's water supply and sanitation problems began with the UN Water Conference of 1977. Progress has been documented in a series of UN reports and the proceedings of official conferences, such as the Global Consultation on Safe Water and Sanitation, convened in New Delhi in 1990. However, during the 1990s, the world community began to place increasing emphasis on water as a resource requiring ecologically sensitive management. The foundation of this new approach was laid by the UN Conference on Environment and Development, convened in Rio de Janeiro in 1992. The conference's Agenda 21 Action Plan, while emphasizing the 'paramount importance' of the 'holistic management of freshwater' in the development agenda, speaks of water as 'an integral part of the ecosystem, a natural resource and a social and economic good'. The International Conference on Water and the Environment, held in Dublin in the same year, struck a similar note, describing water as a 'finite and vulnerable resource' and stressing the need for better planning across sectors, more stakeholder participation and greater equity in water development.

'If we are to achieve a water-secure world, we need to make water everyone's business.'

HRH Prince Willem-Alexander, the Prince of Orange, opening the Second World Water Forum, The Hague, 16 March 2000.

The Dublin Principles

1. Freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment.
2. Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels.
3. Women play a central part in the provision, management and safeguarding of water.
4. Water has an economic value in all its uses, and should be recognized as an economic good.

If the present crisis has been brought about by an ill-coordinated scramble for water among different sectors and users, the solution must lie in better planning and closer cooperation. But how can this be achieved? In 1997, experts meeting at the first World Water Forum, in Marrakech, agreed that a massive awareness-building effort was needed to alert decision-makers and the general public to the precarious state of the world's water resources. A period of intense international discussion followed, as the various interest groups brought together by the World Water Council sought to achieve consensus on a World Water Vision for the new millennium. At the same time, the Global Water Partnership (GWP), a broad-based coalition of interest groups, embarked on an ambitious process of consultation to develop a Framework for Action for realizing the vision. This intensive participatory planning bore fruit at the Second World Water Forum, when over 4500

delegates met in The Hague, in March 2000. The Ministerial Declaration at the close of the Forum declared a deceptively simple common goal: to provide water security in the twenty-first century.

Principal challenges facing the search for global water security

Meeting basic needs: to recognize that access to safe and sufficient water and sanitation are basic human needs and are essential to health and well-being, and to empower people, especially women, through a participatory process of water management.

Securing the food supply: to enhance food security, particularly of the poor and vulnerable, through the more efficient mobilization and use, and the more equitable allocation, of water for food production.

Protecting ecosystems: to ensure the integrity of ecosystems through sustainable water resources management.

Sharing water resources: to promote peaceful cooperation and develop synergies between different uses of water at all levels, within and, in the case of boundary and trans-boundary water resources, between the states concerned, through sustainable river basin management or other appropriate approaches.

Managing risks: to provide security from floods, droughts, pollution and other water-related hazards.

Valuing water: to manage water in a way that reflects its economic, social, environmental and cultural values for all its uses, and to move towards pricing water services to reflect the cost of their provision. This approach should take account of the need for equity and the basic needs of the poor and the vulnerable.

Governing water wisely: to ensure good governance, so that the involvement of the public and the interests of all stakeholders are included in the management of water resources.

Source: Ministerial Declaration on Water Security in the Twenty-first Century. The Hague, March 2000.

The seven principal challenges identified in the declaration, which closely follow the analysis developed in the Framework for Action, encapsulate the daunting complexity of the water supply problem. How do we provide for basic human needs while protecting the environment? How do we value water and put a price on it, so that it is not wasted and so that it is economically feasible to provide it, while ensuring that the poor and underprivileged can afford their fair share? Fortunately, several guiding principles emerge repeatedly from the discussion documents, while the Framework for Action even proposes a detailed 'toolbox' for integrated water resources management. This is currently undergoing further development by GWP.

New image:

Sourou Valley_Women watering

Successful integrated water resource management starts with a planning process that brings together representatives of the broad spectrum of water users: urban planners and consumers, agriculturalists, fishermen and ferrymen, conservationists and leisure users. It is vital that those who supply the water are also represented, as well as those who will finance the necessary investments. It is easier to advocate a broad-based, participatory planning process than it is to practise one, especially in the face of political tensions and competition for resources. Nevertheless, experience has shown that an entire river basin, from its catchment area to its outflow to the sea, is the logical unit for planning and subsequently managing water resources sustainably—even, or perhaps especially, when this unit cuts across administrative or national boundaries. A growing understanding of ecology is helping both planners and the general public to perceive the connection between ill-considered action and its distant consequences, such as the deforestation of a highland watershed that causes silting of a hydro-electric dam or flooding on a coastal plain. Fortunately, there are now a number of successful examples of integrated river basin management—such as the Murray-Darling Basin Authority in Australia and Germany's Ruhrverband—that can serve as practical models to be followed elsewhere.

'Our Vision is a plural vision; our strength is that we work together.'

HRH Prince Willem-Alexander, the Prince of Orange, opening the Second World Water Forum, The Hague, 16 March 2000.

A key theme in the new approach to water resource management is the need to move the emphasis away from merely providing new supplies towards comprehensive management. This includes education and economic incentives to encourage consumers to reduce waste and to moderate demand; adopting new technologies to increase efficiency; developing coherent policies across all sectors that are significant users of water; and establishing a sound framework of governance, within which the needs of suppliers, consumers and the environment can be balanced and sustained.

'In the absence of protective institutions, the environmental use of water is priced at zero: every other use will have a prior claim.'

World Bank, World Development Report 2003.

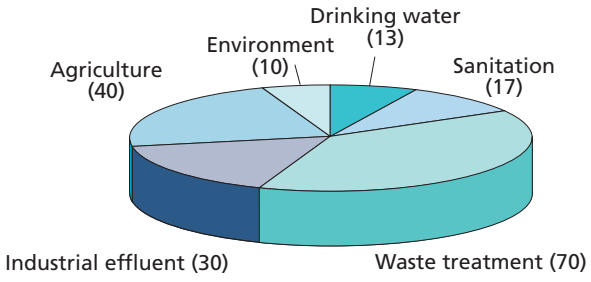
Financing the vision

The value to be placed on water is a central issue in the search for global water security. In the early days of the Drinking Water Supply and Sanitation decade, water was widely regarded as a free resource and it was generally the business of governments and the international public sector to ensure that it was adequately supplied to people. Many governments and international organizations did indeed invest quite heavily in water, yet a World Bank report in 1994 found that cost recovery on water supply projects was only a little over 20%, far less than that in other infrastructure sectors. Too often, water supplies and sanitation were provided without adequate plans for maintaining the infrastructure or covering the basic recurrent costs of supply and treatment. As many developing countries were forced to take painful measures to restructure their economies, the cost of water supply and wastewater treatment became even harder to sustain. In many cases infrastructure deteriorated or even fell into disuse.

The scale of the financing problem is enormous. At present, some US$ 70–80 billion are invested each year in the water sector in developing countries. To achieve water security by 2025, the Framework for Action estimates that this sum needs to be more than doubled. Of this, a relatively modest US$ 13 billion each year will be needed to assure access to drinking water, about the same as is spent at the moment. A similar sum, US$ 17 billion, will be required for improved sanitation and hygiene but may be harder to mobilize, despite the links to health and well-being. The US$ 40 billion required to boost agricultural production, through more irrigation and greater efficiency in water use, should earn a good return on investment through increased productivity and thus should attract support quite readily. The biggest challenge will be to improve wastewater treatment. Even to reach the rather modest target of treating 20% of municipal wastewater before discharge will require an investment of US$ 70 billion per year—approximately equal to the entire current investment in the water sector.

If the vision of global water security is to be realized, new sources of investment will have to be mobilized and the current pattern of investment will have to change considerably. At present,

Where the resources need to be invested
(figures in parentheses are billions of US$ per year).



Source: GWP (2000). Water, A Millennial Priority.

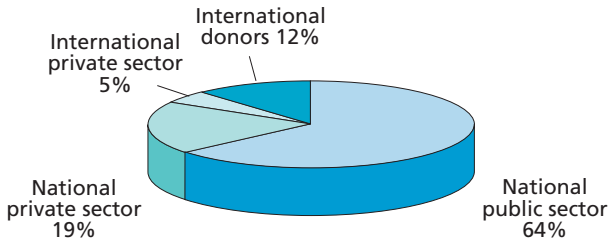
‘Distribution of water is often a “natural” monopoly.... Consequently, the single service provider is in a dominant position, making it necessary to protect the consumer against monopolistic behaviour.’

Mahmoud Abu-Zeid, President of the World Water Council, opening the Workshop on Public–Private Partnership on Water Management.

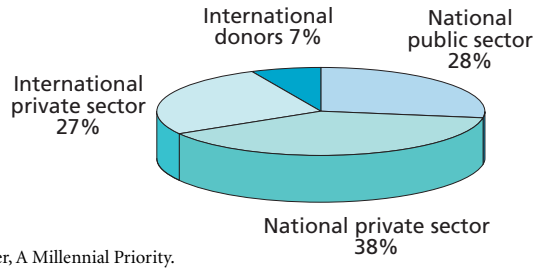
developing country governments cover almost two-thirds of the total annual investment in water. The private sector within developing countries (ranging from individuals and small-scale water vendors to sizeable urban utilities) meets a further one-fifth of needs. The balance comes from international, mostly public, sources.

In future, the in-country private sector will make the largest contribution. Experience in many developing countries has shown not only that people are prepared to invest in their own water resources but that, having done so, they tend to look after these resources better. For instance, they may voluntarily reduce consumption and communally maintain infrastructure, through village water committees. However, the greatest increase in investment (from US$ 4 billion to US$ 48 billion per year) is likely to come from the international private sector. Multinational companies are already the major suppliers of water in many industrialized countries. Their greater involvement in developing countries is constrained on the one hand by public concerns that they may take unfair advantage of consumers and on the other by companies’ fears for the security of their investments. Governments must continue to provide a major share of water investments, but their role will increasingly be to assure good governance, by establishing a legal and financial framework that instils confidence in investors and consumers. This is an area where effective models are still being developed, but it certainly looks as though private-public partnerships will play a key role in achieving the vision of water security for all.

Where the investment comes from now (total: US$ 75 billion per year)...



...and where it will need to come from (total: US$ 180 billion per year).



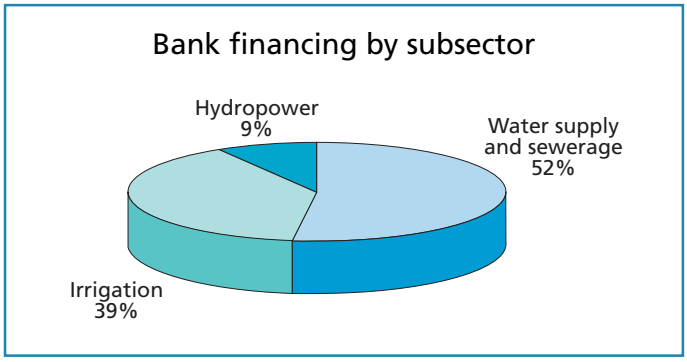
Source: GWP (2000). Water, A Millennial Priority.

A Helping Hand

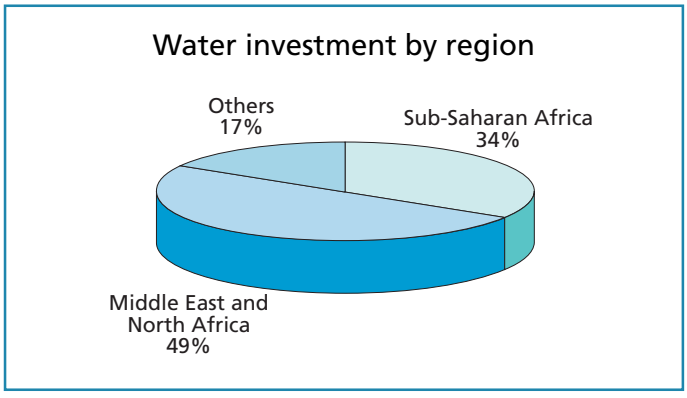
Islam, like other world religions, teaches us that the wealthier members of society should help the less fortunate. IDB practises this principle across the global community of Islamic states, helping to provide the infrastructure that improves poor peoples' lives —power, roads, bridges and, perhaps most precious of all, water.

IDB was founded in 1975 to foster economic development in accordance with the principles of *shari'ah*, or Islamic law. The Bank has since grown substantially, so that by mid-2002 it encompassed 54 member states and had provided direct financing of some US$ 7.7 billion to projects in member countries. A clearly defined and systematically applied cycle of project development, approval and monitoring ensures that the activities financed are technically, economically and environmentally sound.

In the arid countries that were the cradle of Islam, water has always had a special significance. Accordingly, developing water resources has received high priority in the Bank's agenda. Between 1976 and 2002, IDB dedicated almost one-fifth of its project financing, amounting to just over US$ 1.5 billion, to water-related projects. Of this sum, 60% went to water supply and sanitation, while 31% was devoted to irrigation and 9% to hydro-electric power. Over the years, the relative importance of these subsectors has changed in response to changing demand and other factors. There has been a shift from supporting irrigation projects to developing water supply and sanitation. This has been especially so in the Middle East and North Africa, where the demand for domestic water is increasing rapidly and the potential for expanding irrigation is limited. And within the water supply subsector, increasing concern for the environment has led to greater emphasis on conserving water, treating wastewater and preventing pollution.



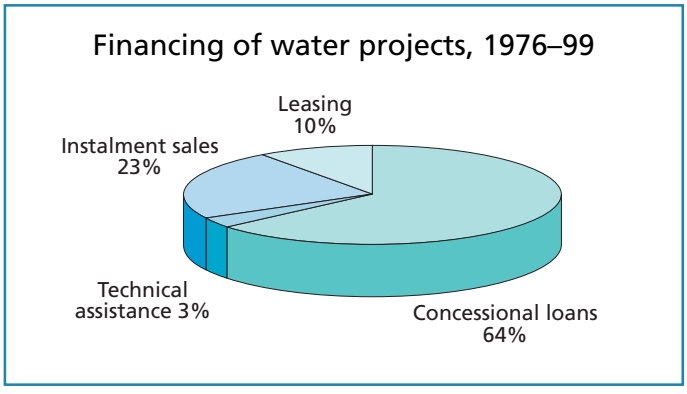
The geographical focus of IDB's water development projects is also changing. Over the period 1976 to 2001, over half (52%) of the Bank's water investments went to the Middle East and North Africa, and a further third (32%) to sub-Saharan Africa. Recent years have seen increased support for the countries of the former Soviet bloc, with some 20% of water financing going to members of the Commonwealth of Independent States (CIS) and to Albania. The projects financed are tailored to the needs of each region and country. For example, Egypt and Sudan together received just under a quarter of the Bank's financing for irrigation projects, reflecting the dependence of these countries on irrigation for food production. Almost half the investment in hydro-power went to sub-Saharan Africa, where electricity supplies lag far behind those in the world's other developing regions. As urban populations have expanded, there has been a progressive shift in emphasis from rural to urban water supplies. This shift has accelerated recently, as the Bank and its partners have become increasingly aware of the looming urban water crisis facing many of the developing world's rapidly growing cities. And it has been particularly marked in North Africa, where the crisis is most acute.



A new challenge taken up by the Bank is to tackle the problem of water and soil salinity, which threatens the long-term viability of existing irrigation schemes while preventing the development

of irrigation on new land, particularly in coastal areas. Almost one-fifth of the world's irrigated area is now thought to be adversely affected by salinity — the accumulation of salt in the root zone of growing crops which initially reduces yields and eventually can prevent crop production entirely. IDB has taken the lead in establishing the International Center for Biosaline Agriculture (ICBA) in Dubai, United Arab Emirates, which has a mandate to develop new approaches to the problem.

Good planning and careful implementation are essential for a successful development project, while systematic evaluation allows the lessons learned in one project to be applied in others. Through more than 25 years of experience, IDB has developed and refined a project cycle that covers the life of a project from identification, through preparation, appraisal and implementation, to follow-up and evaluation. Guidelines for the Bank's involvement in a given member country are developed through an initial Country Assistance Strategy Study, which establishes the level and composition of the support to be provided, taking into account national development policy and IDB's own strategic objectives. The need for a particular project may be identified initially by the government, an IDB mission, another financial institution, a UN agency or a private sponsor. However, all projects must have the support of both the government and the Bank, and pass a basic test of feasibility and cost-effectiveness, before they can be prioritized and included in the Bank's 3-year rolling work programme. The subsequent steps in the project cycle are summarized overleaf.



IDB supports its projects through technical assistance and a range of financial mechanisms. Technical assistance, mostly financed through direct grants, is usually provided for preparing projects and building capacity. The financial mechanisms, which come into play at the

The IDB project cycle

Identification

- A new project must be approved by government and be in line with both national priorities and IDB's own strategic objectives.
- A preliminary evaluation indicates that the project is technically feasible and will be cost-effective.

Preparation

- The executing agency prepares a Project Document, translating the idea of the project into a detailed proposal that covers all relevant technical, economic, financial, social, institutional and environmental aspects.
- IDB provides various forms of technical assistance to facilitate project preparation (feasibility studies, engineering designs, etc) and capacity building. The aim is to ensure that the government and the beneficiary are fully committed to the project.

Appraisal/negotiation

- The Bank carries out a detailed appraisal of the proposal, including financial and legal aspects, and concludes an agreement with the government and executing agency intended to cover all the practical arrangements needed to ensure the project's success.
- The appraisal specifically takes into account the technical, institutional, economic and financial viability of the project and includes an assessment of expected social costs and benefits, including the environmental impact.
- The outcome of the appraisal is encapsulated in a Memorandum of Understanding concluded between IDB and the beneficiary.

Board presentation

- The appraisal mission prepares an Appraisal Report and the Report and Recommendation of the President. These documents set out the mission's findings and recommend the level and conditions of IDB financing. They are carefully reviewed within IDB and the beneficiary's agreement with the terms of financing is obtained.
- The documents are submitted to the IDB Board of Directors for final approval.
- On approval, the Financing Agreement is finalized and signed, marking the end of project preparation and the beginning of implementation.

Implementation and follow-up

- Implementation of the project is the responsibility of the beneficiary. Progress reports are provided to IDB at intervals specified in the Financing Agreement.
- The Bank's main responsibility during project implementation is to follow up on the procurement of goods and services specified in the Financing Agreement and to work with the beneficiary and executing agency to resolve any problems that may arise.
- When the project is physically complete, the beneficiary submits a Project Completion Report, which is reviewed by the Bank's relevant Country Operations Department.

Evaluation

- Projects are usually evaluated within 2 to 5 years of completion to assess their impact.
- The completed evaluation provides feedback to improve the design of new projects.

implementation stage, consist of loans, instalment sales, leasing arrangements and a special form of financing developed by the Bank, known as *istisna'a.*

The majority of water projects, especially those in the irrigation and drinking water/sanitation subsectors, have traditionally been supported through loans, which account for around 64% of the Bank's financing of the water sector. These loans are provided on highly concessional terms, making it possible to extend infrastructure and services to people who have been marginalized by development in the past. Indeed, it is the Bank's policy to support rural water supply projects through soft loan financing. Loans are long-term, with the repayment period usually totalling 25 years. Because Islamic law does not permit the charging of interest, a small fee is applied to cover the Bank's administrative expenses. Instalment sale and leasing arrangements, which are used mainly for hydro-power projects, are based on the principle that IDB purchases the necessary equipment or materials and the operator then repays the cost in instalments or rents the installations. *Istisna'a* financing is a form of advance funding extended by the Bank to the manufacturer at a fixed price, again in accordance with Islamic law. It is being used increasingly in the Bank's water-related projects, mainly to fund major civil works for the construction of water and wastewater treatment plants. Eighty percent of the water projects approved in 2000 and 2001 were financed through the *istisna'a* mechanism.

'Access to water is a common goal. It is central in the social, economic and political affairs of the country, the continent and the world. It should be a lead sector of cooperation for world development.'

Nelson Mandela, former South African President,
at the Johannesburg World Summit on Sustainable Development, 2002.

New image:
IDB Kompienga, BF
(pic of dam)

Two recently launched initiatives are further sources of IDB support to the water sector. The first is the IDB Infrastructure Fund, established in 1998 with a capital of US$ 1.5 billion. Using equity and equity-related instruments, the Fund aims for long-term capital appreciation by investing in a range of infrastructural projects, including those related to water and the environment. The second is the Islamic Corporation for the Development of the Private Sector (ICD), which was established in November 1999 as part of the IDB Group. Based in Jeddah, the ICD has a capital of US$1 billion, of which half was subscribed by IDB. Intended principally to promote private-sector development in member countries, the Corporation could become a major channel for developing commercial water services, particularly in rapidly expanding urban markets.

The support provided by IDB through these mechanisms has already improved the lives of poor people around the world. The projects described on the following pages show how.

Safe Drinking Water for All

Tahibou Ouedragao and his family have already testified to the benefits of a year-round supply of safe drinking water (see p. 1). Over the past 25 years, their story has been repeated in thousands of villages across the Sahel and other parts of the developing world as development banks and donor agencies have teamed up with governments to meet this basic human right.

IDB has been a partner in this endeavour. Most of its lending for village water supply projects has taken the form of highly concessional loans, which have been extended to some of the world's poorest countries, especially those of sub-Saharan Africa. The Bank's project in Guinea provides a good example of the impact these loans can make on living standards.

Guinea: Achieving sustainability

Project profile:	***Village water supplies (Guinea)***
Executing agency:	Service National d'Aménagement des Points d'Eau (SNAPE)
Consultant:	Dorsch-Consult (Germany)
Contractor:	Geomechanik Gmbh (Germany)
IDB contribution:	Loan of US$ 6.4 million, repayable over 25 years (including a 5-year grace period)
Other contributions:	Government of Guinea (US$ 0.6 million)
Status:	Completed, May 1990.

In 1979, an estimated 30% of Guinea's rural people had to walk over 2 kilometres to reach a water source.

Improving this statistic was the challenge facing the Service National d'Aménagement des Points d'Eau (SNAPE), when it was founded in 1980. By 1985, when IDB was asked for its assistance,

the service had developed an ambitious programme to provide 22 000 new water points in rural areas, including a sizeable emergency component targeted to 2600 critically deprived villages in the driest regions. But a shortage of capital meant that the programme was falling behind schedule. IDB agreed to join with other agencies in helping it catch up.

IDB was asked to focus on three districts—Duinguiraye, Dabola and Faranah—that form a north-south transect in the remote and poor interior of the country (Upper Guinea). This area has a long dry season, lasting up to 9 months. Most of the traditional wells from which people draw their water run dry by January, well before the rains begin in June. People resort to distant rivers and ponds, which are often stagnant and dirty. As the temperatures climb into the high 30s, they long for cool, clear water, close to home.

But providing village water points wouldn't merely quench thirsts and wash the dry-season dust off bodies and clothes. A survey conducted by SNAPE before the project began showed how urgently clean water was needed to improve human health. In several villages fewer than half of all children lived beyond the age of 5, a shockingly high level of mortality caused mainly by water-borne diseases.

IDB's appraisal mission, conducted in July 1985, concluded that a water points project focused on the three districts would be immensely beneficial both socially and economically. It recommended a loan worth US$ 6.4 million to sink boreholes and install pumps in the districts' 350 largest villages. The loan was agreed in September 1985 and the project began about a year later. SNAPE, as the executing agency, was joined by two German firms, the consultant Dorsch-Consult and the contractor Geomechanik Gmbh.

The three partners implemented the project on time and below cost. The main cost savings were due to the devaluation of the Guinean franc, which fell sharply in 1987-88. A further factor was that water was found closer to the surface than had been expected, reducing the time required for drilling as well as its costs. And there was a lower rate of failure than had been anticipated, due to the judicious choice of drilling sites by the consultant. As a result, the project was able to install 20% more pumps than had been planned, while still underspending by US$ 2.1 million.

Nine years after the project had ended, IDB staff returned to the three districts to find out whether the project could be rated a success. They visited a random selection of villages, where they interviewed the inhabitants and inspected water points to see whether the pumps were still working.

Everyone interviewed agreed that the project had brought substantial benefits. All villagers now had year-round access to fresh water—a change they said had transformed their lives. The consumption of water had gone up sixfold.

Women especially appreciated the shorter time it now took to collect water—reduced from 1–2 hours to a few minutes. This freed up their time for other, more productive tasks, such as growing crops, tending livestock, cooking food or going to market. They also welcomed the fact that fetching water was physically easier, since they now had to carry their full containers much shorter distances. Their shorter working hours and lighter loads made them feel less exhausted, they said. Another advantage was that fetching water was less dangerous, because they no longer had to walk through forested areas where they might be set upon by thieves or rapists.

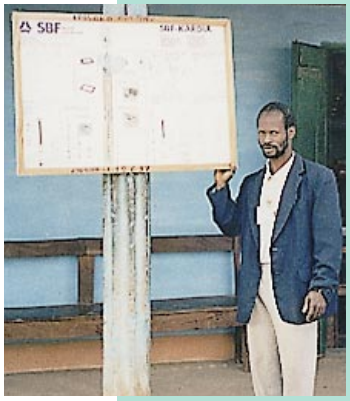
Respondents also emphasized the project's health benefits. They reported reduced incidence of diarrhoea, once a major killer of children. Intestinal worms and skin diseases had also become less frequent. Because women were no longer so exhausted they were more resistant to disease and so more productive in their work. They also had the time to prepare hot meals instead of cold, reducing the risk of infection from food and providing all members of the family with a healthier, more digestible diet to fuel their daily activities. As well as being felt immediately, these health benefits had increased with time.

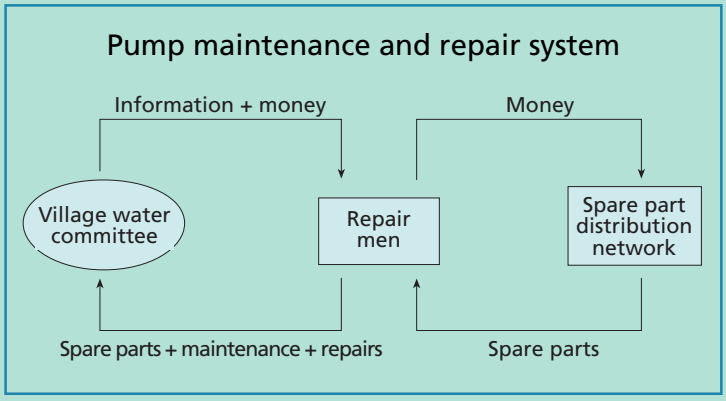
When the IDB team inspected the water points, they found that, even though 9 years had elapsed since the end of the project, only 2% of pumps were out of order and no major breakdown or stoppage had yet been reported for the rest. For a predominantly rural country whose people had little experience of technological innovations, this was a major achievement. The reasons for the high success rate lay in SNAPE's effective policy for ensuring the maintenance and repair of pumps. In addition, the service had played a major part in ensuring the project's continuing success through its public awareness campaigns.

Why the project proved sustainable

By the time the IDB project began, SNAPE had instituted a first-rate system for keeping village water supplies flowing (see Figure). The system has four main ingredients:

- **Village water committees**. These committees, launched and sustained through public awareness campaigns, are responsible for collecting and managing villagers' financial contributions to the costs of pump maintenance and repair. They also contact a repair man when breakdowns occur and clean and maintain the borehole and other structures. Lastly, they ensure that access to water is equitable and that hygiene recommendations are observed.
- **Repair men**. Contractors are responsible for training and equipping a team of repair men, each of whom assumes responsibility for regularly servicing around 20 pumps and carrying out emergency repairs when needed. The repair men are paid by village committees.
- **Spare parts**. Contractors must also set up a national network of spare parts suppliers. This ensures easy access to spare parts as soon as these are needed.
- **Standard pump models**. The pumps installed countrywide are limited to a few standard models. This makes it easier to motivate pump and spare parts suppliers and to train repair men. It also means that neighbouring villages can more easily share knowledge and experiences.





Around 90% of the villages sampled by the evaluation team had a water committee, indicating widespread adherence to this management model. 'The committee has become part of village life,' one respondent said. Nearly all committees were fully active, a status reflected in the good condition of their pumps and water points. Over 70% of them had at least one female member. This is important because women are the main users of the water points and are therefore likely to value them highly.

With findings like these, it is not surprising that the project was rated a resounding success. In 1993, IDB approved a further project to spend the money saved. This second project built an additional 90 water points in the same three districts.

Learning the lessons

Despite the project's overall success, the evaluation team did find some problems. These fell into two categories—problems relating to the institutions and technologies needed to sustain the water supply over the longer term, and problems relating to human health. Such problems are typical of rural water supply projects and therefore carry important lessons for the design of the Bank's future projects.

Several problems were associated with village water committees. Some committees were failing to collect water dues from villagers, presaging difficulties in repairing the pumps when the need arose in a few years time. The safe boxes containing villagers' contributions that are at first so proudly displayed to visitors by committee chairmen can later earn the mistrust or even the resentment of villagers, who cannot see the point of continuing to contribute when the money is not being used. As a result the flow of contributions, regular at first, tends to dry up as time goes on. 'Saving is not a part of our culture,' one villager explained, 'our people are too poor.' Committees often lend out money, allowing the fund to dip to dangerously low levels. In a few cases, committees were suspected of embezzlement. '*Cela a été mangé*,' said one man, shrugging his shoulders when asked about the fate of the fund: 'Somebody ate it.'

One way round these problems could be to manage the fund as a micro-credit scheme. 'The money gets lent anyway,' says one IDB official, 'so why not formalize the process?' Micro-credit has become a popular form of financing for poor rural communities worldwide since the Grammeen Bank pioneered the model in Bangladesh during the 1980s. Repayment rates tend to be high and are sustained by peer pressure, because lending is to groups rather than individuals and the group cannot extend its credit if any member defaults.

There were also practical problems in repairing pumps. A few repair men did not have the right tools for the job and were not knowledgeable enough about the pump model. Some found it difficult or insufficiently rewarding to travel to water points in remote villages. Others were vague about the number and whereabouts of the pumps for which they were responsible. The rates of pay for repair jobs were highly variable.

Although the health of all villagers had improved, some poor health practices remained. Water was still carried and stored in open containers, so contamination was still a threat. Hygiene was

especially compromised when livestock—an important 'user group'—came into contact with pumps or drank in buckets brought to the pumps by human beings. Children still swam in dirty ponds, where they caught skin and other infectious diseases. And, to reduce the pressure on drinking supplies, women still washed the family's clothes and did the washing up in ponds, even though they did not need to.

SNAPE had acted promptly to tackle some of these problems by launching a training and awareness raising campaign. This had visited each village, bringing audiovisual and other educational materials in addition to a theatre group. The campaign had rejuvenated moribund village committees, which are now better sustained by villagers. It had also improved the lot of the repair men, equipping them with motor bikes and new tool-kits in addition to retraining them.

Most of the problems associated with village water projects can be overcome through training and education activities of this kind. However, campaigns need to be repeated at frequent intervals and should be more intensive than the short visits often carried out at present. And they must cover all the relevant issues: the health hazards of poor water and hygiene, the organization and functions of village committees, the importance of the fund and of maintaining contributions to it, how to contact the village mechanic, the names and functions of essential spare parts—and so on.

IDB will play its part in overcoming these problems in the future. The widely scattered nature of water points in dispersed, often remote, rural communities makes it difficult for implementing agencies to monitor the fate of village water points and to follow up their operations with regular training and education activities. The Bank will help by devoting more of its resources to supporting these crucial project components.

'Physical completion of a project does not mean the project has ended, nor that it has met its objectives. We must alter our mind-set away from financial and operational criteria alone to a broader definition of what constitutes impact.'

IDB official.

Towards Food Security

Water for irrigation is essential for growing the food needed by the rapidly rising human populations of the developing world. Despite alarm today over the high proportion of the total water supply consumed by irrigated agriculture, the provision of water by the international development community to farmers in irrigable areas over the past 50 years is a real success story. In Asia, the resulting food surpluses have been a major factor underlying the region's accelerated economic growth. In Africa, much remains to be achieved, but the region is at last showing signs of following in Asia's footsteps. IDB has contributed to irrigation projects in both regions.

> 'Seventeen per cent more irrigation water will be needed for the world to feed itself in 2025.'
>
> International Water Management Institute, Water Issues for 2025: A Research Perspective.

Asia: Revitalizing Indonesia's Green Revolution

Project profile:	***Maloso irrigation project (Indonesia)***
Executing agency:	Directorate General of Water Resources Development, Ministry of Public Works
Consultant:	P.T. Virama Karya, in association with P.T. Necon and Sinotech
Contractor:	P.T. Pembangunan Perumahan
IDB contribution:	Phase I, US$ 13.6 million (lease financing); Phase II, US$ 19.1 million (part loan, part *ist isna'a* financing).
Other contributions:	Government of Indonesia (Part I: US$ 30.7 million; Part II: US$ 5.5 million)
Status:	Phase I completed, Phase II under way.

In Indonesia, IDB is a partner with government in building the infrastructure needed to expand irrigated agriculture in Sulawesi, one of the country's outer islands. This project's contribution to food security and poverty eradication will be all the more valuable in the light of the country's recent economic woes.

In the late1960s and early 1970s, scientists at the International Rice Research Institute (IRRI) in the Philippines developed the first generation of high-yielding dwarf rice varieties adapted to the tropics. This technology, combined with irrigation and the use of fertilizers and pesticides, triggered the transformation of agriculture that became known as the Green Revolution. Irrigation was critical to the success of the revolution: it made water available to farmers throughout the year, enabling them to grow up to three crops annually instead of the one crop a year possible under rainfed conditions; and it gave farmers the confidence to invest in other yield-increasing technologies without fear that their crops would fail due to drought. Southeast Asia was the cradle of the Green Revolution in rice, its centuries-old tradition of irrigation providing the basis for strong growth in yields and the rapid spread of multiple cropping as the irrigated area was expanded.

Indonesia's achievements in rice production are one of the region's classic Green Revolution success stories. In the mid-1970s the country was the world's largest importer of rice, yet by 1986 it had become self-sufficient. The combined efforts of the government and the donor community brought together all the vital ingredients, including a package of high-yielding varieties and chemical fertilizers, the provision of these inputs to farmers through a strong national extension service, a favourable pricing policy to encourage farmers to produce a surplus, and large-scale investment in irrigation infrastructure. By the late1990s, Indonesia had expanded its irrigated area to over 7.5 million hectares, spread over some 19 000 irrigation schemes.

Many of these schemes were built in the archipelago's outer islands, which became the

home of thousands of settlers relocated under the government's transmigration programme. The idea was to bring rapid economic growth to these islands, which had traditionally lagged behind Java and Bali in per capita incomes as well as exploitation of the natural resource base.

In 1994, the Government of Indonesia asked IDB to become a partner in its plan to bring year-round water supplies to the left and right banks of the Maloso River, in South Sulawesi. The project envisaged the construction of a weir at Sekka-Sekka, a village near the mouth of the river. The weir would raise the water level in the river, making it possible to divert supplies down two main canals, one on each bank. The canals would support a network of channels that would bring irrigation water to an estimated 5900 households farming some 11 750 hectares of land. The aim was to bring the yield-increasing technology of the Green Revolution to a large irrigated area settled by transmigrants.

The project offered an array of benefits that lay at the heart of the Bank's mandate. By supporting the production of high-value fish as well as rice and other crops, it would provide jobs and raise

The benefits that flow with water

The 'before' and 'after' profiles of the project area indicate the substantial impact that will be realized once the new irrigation infrastructure comes on-stream.

Before the project, rice production on the Maloso River's right bank was entirely rainfed. It was limited to one crop a year and the cultivated area fluctuated greatly, sometimes falling as low as 150 hectares. Although farmers used improved varieties, unreliable water supplies depressed yields, which were a mere 2.5 tonnes per hectare. Yields on the left bank, which already had some irrigation, were higher, reaching 5.5 tonnes per hectare, but the irrigated area was only a fraction of its potential. On both banks, fish production was limited to a few ponds near the coast, where freshwater ran scarce during the dry season. The output consisted mostly of milk-fish, a low-value product sold locally.

Once the project is completed, the production of rice should double or treble to around 66 000 tonnes annually, with yields reaching 5.5 tonnes per hectare on both banks and the cropping intensity rising to 220% from its current level of 100–160%. More farmers will be able to diversify into additional crops, such as maize, soybean, green bean or perhaps vegetables for market. The average yield of milk-fish will rise from 100-200 to around 1500 kilogrammes per hectare. And more producers will enter the lucrative export market for high-value shrimps and prawns, providing a welcome boost to incomes.

The additional production of fish and crops made possible by the project will eventually be worth an estimated US$ 64.7 million annually. This compares with total project costs of US$ 68.9 million, giving a handsome return on the investment.

incomes among poor rural people at the same time as contributing to food security. The additional rice produced would save Indonesia valuable foreign exchange. The project's beneficiaries and location—poor transmigrant families in one of the underdeveloped outer islands—added to its appeal from an equity viewpoint. And there would be an important additional benefit to human health: by clearing and draining what was at present a mosquito-infested swamp, the project would greatly reduce the incidence of malaria—still a major killer in Indonesia's outer islands.

IDB's appraisal mission, conducted in 1995, recognized the project as being important for Indonesia and in keeping with the Bank's objectives. In 1996, the Bank's Board of Executive Directors agreed to finance the construction of the weir under a leasing arrangement.

The government agency responsible for implementing the project was the Directorate General of Water Resources Development, which brought to the task a quarter century of experience in irrigation development and management. Design and construction were entrusted to a well-known consultant, P.T. Virama Karya, while the contractor was one of the country's leading civil engineering companies, P.T. Pembangunan Perumahan. With this formidable team in place, construction of the weir ran ahead of schedule.

This rapid progress enabled the project to move quickly into its second phase, construction of the irrigation network. IDB appraised and approved Phase II in 1998, with financing this time consisting of a mix of loan and *istisna'a*. The partners agreed to retain the same efficient team as for Phase I, hoping to push forward to early completion.

The sense of urgency that imbued the project was well founded. Discussions for Phase II took place against a background of deepening crisis that underscored the importance of the project to Indonesia's future.

By the early 1990s, Indonesia's Green Revolution had begun to run out of steam—providing an early warning of the economic troubles that lay ahead. Continuing population growth and a platform in yields meant that production dipped below self-sufficiency, with the result that, in 1996, imports once again became necessary. The gradual liberalization of the economy had made it expensive to use imported inputs such as fertilizer and pesticides. Many farmers had left the land in pursuit of more lucrative employment in other sectors of the economy, which was by then growing dangerously fast.

Then, in mid-1997, came full-blown economic crisis. The Indonesian rupiah suffered the most spectacular currency collapse of all time, losing 80% of its value against the US dollar. The collapse triggered a steep rise in the cost of imports, leading to widespread bankruptcy in addition to failures in the banking sector. An estimated 20 million people lost their jobs. The IMF pledged a rescue package worth US$ 43 billion, but the price exacted was a tight monetary policy that made it impossible to protect the purchasing power of the poor. Compounded by drought, the crisis pushed an estimated 50 million people below the poverty line—an extent of poverty not seen in the country for 50 years. Food self-sufficiency suffered massive setbacks, with 3.3 million tonnes of rice, in addition to maize, soybean and cassava, being imported in 1998. As food prices rocketed, many of the poor went hungry.

The social and economic benefits of the Maloso dam project will be immensely valuable to Indonesia as it struggles to emerge from this crisis. IDB is proud to be the country's partner in the project.

Africa: A tradition in the making

Project profile:	***Manantali dam (Senegal, Mali and Mauritania)***
Executing agency:	Organisation pour la Mise en Valeur du Fleuve Sénégal (OMVS)
Consultants:	Rhein Ruhr, Tractebel, SONED and Stucky
Contractors:	A consortium including Zublil, Byckeross-Vidmann, Sagecom and Losinger
IDB contribution:	Loan of US$ 20.2 million, repayable over 25 years (including a 5-year grace period)*
Other contributions:	Co-financing by 15 institutions (US$ 659.8 million)
Status:	Completed, 1988.
Project profile:	***Energy project (Senegal, Mali and Mauritania)***
Executing agency:	Organisation pour la Mise en Valeur du Fleuve Sénégal (OMVS)
Consultants:	Coyne et Bellier, Fichtner and Tecsult
Contractor:	Necso Entrecanales Cubiertas SA
IDB contribution:	Loan of US$ 21 million, repayable over 25 years (including a 7-year grace period)*
Other contributions:	OMVS, World Bank and Banque Ouest Africaine de Développement (BOAD) (US$ 42.1 million)
Status:	Under way.

* Total for the three countries

Africa was bypassed by the Green Revolution of the 1970s and 80s. Lacking a tradition in irrigation, its farmers were unable to use the package of high-yielding rice varieties and fertilizers that was central to the revolution in Asia.

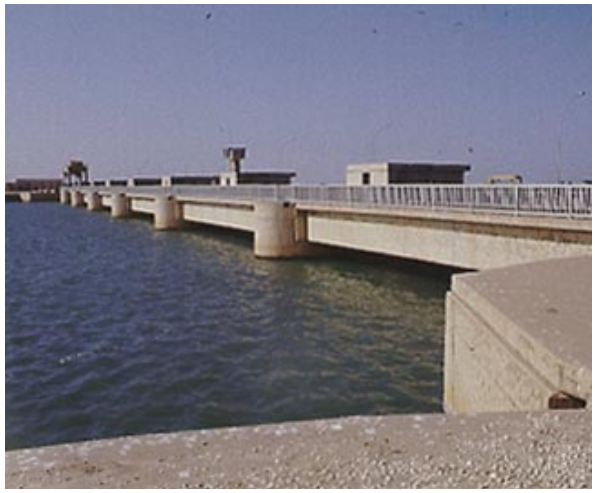
Some areas of the continent are nevertheless suitable for modern irrigation development. In West Africa, the Niger and Senegal rivers both have extensive floodplains with fertile soils, ideal for irrigated rice and other crops. Under natural conditions these plains are flooded annually, as the rainwaters that fall in the rivers' upper watersheds collect and move downstream. This creates an area of rich grassland that is important to traditional livestock producers during the dry season, when alternative grazing is scarce. It also allows farmers to raise a traditional grain crop, such as sorghum or pearl millet, on residual soil moisture as the floodwaters recede. But the productivity of the plains—and the profitability of farming—would rise greatly if the water levels could be controlled, allowing year-round irrigation and a switch to crops such as rice, groundnut and vegetables, which can be sold in urban markets.

In 1972, Senegal, Mauritania and Mali came together in an ambitious enterprise—the integrated, large-scale development of the Senegal River valley for irrigated agriculture, power generation and navigation. The three countries formed an intergovernmental body, the Organisation pour la Mise en Valeur du Fleuve Sénégal (OMVS), to plan and implement development. Based in the Senegalese capital, Dakar, OMVS is chaired on a rotating basis by one of the heads of state of the three countries. It also has a council of ministers and a high commissioner, who oversee the organization's activities.

Left to its own devices, the flow of water in the Senegal River varies drastically, both within and between years. In September, when the rains are at their height, it may reach up to 4000 cubic metres of water per second as the floodwaters surge downstream. But the levels fall off rapidly once the rains are over, often declining to a mere trickle—less than 10 cubic metres per second—

in May. After a run of relatively wet years in the 1960s, the Sahel droughts of the 1970s and 80s brought repeated crop failures to the floodplain as the annual flood failed to materialize.

Flowing through a vast area with few all-weather roads, the Senegal River should be a major artery of regional trade and communications as well as a resource for agriculture. In the nineteenth century, sailing boats plied the river for hundreds of miles inland, transporting people and goods up and down the valley. But in recent times the combination of drought, silt buildup and extreme fluctuations in water level has made the river unnavigable in most years.



With foreign aid, OMVS has built two large dams on the river. The first, completed in 1986, is at Diama, near the mouth of the river. This dam keeps back the seawater that used to penetrate the lower delta during the dry season. It also raises fresh water levels in the upstream river bed. The combined effect is to allow the irrigation of large blocks of land developed for rice production. The second dam is at Manantali, over 1000 km further upstream, in western Mali. By regulating the flow of water throughout the entire downstream length of the river, this dam greatly expands the irrigable area and opens up the possibility of once again travelling by boat from Saint-Louis to Kayes, a port in western Mali. The Manantali dam has also created a large reservoir on its upstream side, permitting the generation of hydro-electric power and some additional pump irrigation on the reservoir banks. It was completed in 1988 with funding from a consortium of donors, among them IDB.

Progress in making effective use of this resource for agricultural development has been slower than expected. One of the reasons is the high cost of developing land for irrigation in West Africa —up to US$ 20 000 per hectare. Another is strong competition from rice imports, particularly in Senegal and Mauritania, whose Atlantic seaboard facilitates delivery at low cost to the major urban markets of Dakar, Saint-Louis and Nouakchott. But the third and most important reason is that the three countries have had to start from scratch in building a tradition in irrigated rice production, together with the institutions, policies and technologies that make for efficiency. Even on land that has been developed, yields have remained

New rice plants boost production

When scientists began developing rice varieties for irrigated production in the West African Sahel, they turned to the Asian rice species, *Oryza sativa*. Short-stemmed, high-yielding varieties of this species had been a key ingredient of Asia's Green Revolution. During the 1980s and early 1990s, a joint team from the Institut Sénégalais de Recherches Agricoles (ISRA) and the West Africa Rice Development Association (WARDA) screened over 1000 *O. sativa* varieties at the Saint-Louis research station.

Crops that produce high yields in the moist, humid conditions of Southeast Asia do not necessarily do so in the Sahel, which has drier, harsher environments. Even if they performed reasonably well during the rains, most of the varieties screened at Saint-Louis failed during the dry season, when a combination of cool night temperatures and strong, dust-laden winds make growing conditions particularly difficult.

An exception was Sahel 108, a shorter-duration variety that proved ideal for dry-season cropping because it matures early in the season, before conditions deteriorate. Released in 1994, this variety has been instrumental in increasing double cropping in the Senegal River valley. It has also proved popular with consumers, who appreciate its long, slender grains and good taste and cooking qualities. At the same time as Sahel 108, the ISRA-WARDA team identified two improved medium-duration varieties for use during the main rainy season. The team's work was conducted in close collaboration with national institutes in Mauritania and Mali, both of which have released a similar range of new materials.

The next generation of improved varieties will tap the genetic potential of indigenous African rices belonging to the species *O. glaberrima.* This species is not particularly high-yielding, but it is a rich reservoir of resistance to stresses, including weeds, insect pests and diseases. By crossing *O. glaberrima* and *O. sativa,* the scientists hope to come up with new varieties that can cope with the unique stresses of the Sahel while still providing higher and more stable yields.

Source: WARDA (1997). Annual Report.

Easing the learning curve

Some of the farmers of the Senegal River valley are old enough to remember a time when they did not grow rice. As they saw their land transformed by the introduction of irrigation canals and structures, they have had to learn a completely new kind of farming. Other farmers are new to agriculture altogether, having come from poor urban backgrounds.

Responsibility for providing advice to farmers on the Sengalese bank of the river lies with the Société d'Aménagement et d'Exploitation des Terres du Delta du Fleuve Sénégal et des Vallées du Fleuve Sénégal et de la Falème (SAED). SAED fulfils this responsibility by organizing 1-day seminars, called *journées de restitution,* in different parts of the valley. The seminars familiarize farmers with all aspects of irrigated rice production, including land preparation, water management, the choice of variety to use, the appropriate rates and dates of fertilizer applications, and the importance of timely operations if reduced yields or outright crop failure are to be avoided.

Farmers say that the knowledge they gain through the seminars is helping them improve their practices—and hence their yields and incomes.

Source: WARDA (1997). Annual Report.

relatively low—often under 2 tonnes per hectare—and most farmers still grow only one crop a year, missing out on the opportunity to double crop.

The countries have acted vigorously to combat these problems. Along with the rest of their economies, they have liberalized and privatized their rice sectors, squeezing out inefficient producers and processors. Yields and double cropping are on the increase as rice farmers work with research and development organizations to learn the skills of irrigated agriculture and to develop and deliver the necessary inputs. Improved, better adapted rice varieties have become available and farmers are being trained in the use of these and other technologies.

Changes in the global economic environment have helped too. Rising world food prices, combined with currency devaluations, are starting to make rice production in West Africa look more competitive. The result is that donors are expressing renewed interest in helping the region expand its irrigated area.

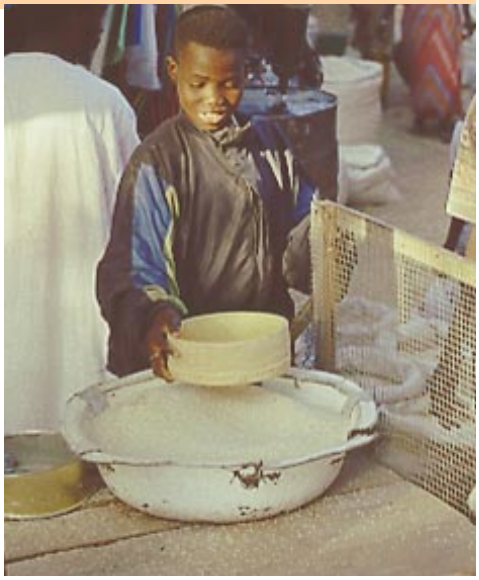
To boost navigation on the river, the OMVS countries have built or refurbished two ports—at Saint-Louis and at Ambidedi—and seven landing stages. They have also dredged a channel in the riverbed for use by light sailing vessels, motor boats and barges. As a result of these works, it is now possible to travel upstream to Bogué, in the middle delta, year-round, and all the way to Ambidedi for five months of the year, during the rains. At last, landlocked Mali has regained its route to the sea.

> 'Endowing poor women with irrigation assets and water for their own farm businesses is an effective way to alleviate poverty.'
>
> International Water Management Institute, Water Issues for 2025: A Research Perspective.

All three countries face a massive and rapidly growing demand for electricity. At present, black-outs occur frequently in all three capital cities and in major towns, while few rural areas are yet even connected to the national grid. Rural people have largely exhausted their alternative fuel resource, firewood, leading to widespread environmental degradation. In 2002, with assistance from IDB and other donors, a hydro-electricity generating station and two substations will come on-stream at Manantali. Water from the reservoir will be used to generate some 200 megawatts of power, increasing supplies by about 50% over their current level. A network

'Our ambition is to turn the Senegal river basin into a hive of enterprise, a place that welcomes the private sector as a partner, a place that believes in international and Arabo-Islamic cooperation.'

OMVS President, Mohamed Salem Ould Merzoug.



of transmission lines will deliver the electricity to the capital cities, towns and rural areas of the three partner countries.

Arab donors have funded OMVS's infrastructural projects generously, yet few Arab firms have participated in the projects as consultants or contractors. In May 1999, OMVS and IDB held a 'round table'—an informal meeting to promote the participation of these firms in the region's further development. The meeting re-affirmed the need to accelerate irrigation development and the use of the river for navigation. Public-private partnerships were seen as the best way forward to meet these objectives.

The OMVS provides an outstanding example of cooperation between the organization's three member states. It has replaced the potential for conflict over the Senegal River valley's natural resources with a forum for negotiating their shared exploitation. Through cooperation, all three countries have secured the benefits of development at considerably lower cost than if they had 'gone it alone'. Much remains to be done before these benefits materialize in full. IDB will continue to be a partner with OMVS and other donors in working towards that end.

Instituting Change

Development challenges often need an institutional or political response rather than a purely technical one. IDB has been instrumental in creating or supporting two institutions with mandates related to water resources: the International Center for Biosaline Agriculture (ICBA) and the Comité Inter-Etat pour la Lutte contre la Séchéresse au Sahel (CILSS).

Saline water, the last great frontier

Project profile:	***Biosaline agriculture***
Major partner:	Ministry of Agriculture and Fisheries (UAE)
IDB contribution:	Project initiation and funding worth US$ 22 million (US$ 4 million for capital investment plus US$ 18 million towards operating costs during the first decade)
Other contributions:	OPEC Fund for International Development (US$ 1 million) Arab Fund for Economic and Social Development (US$ 1 million) Municipality of Dubai (100 hectares of land, site development)
Status:	ICBA operational since 1999.

Irrigation schemes should be the powerhouses of modern agriculture, producing yields well above those achieved in rainfed production systems. But many schemes in the developing world are fast running out of their life-blood—the freshwater without which crops will fail. Where irrigation is from wells or boreholes, water tables have fallen dramatically; where it is from canals, farmers at the tail end of the system regularly suffer shortages.

Closely associated with water shortage is another and equally serious threat to irrigated crop production: rising levels of soil and water salinity. Salinization may occur naturally, through the intrusion of seawater in coastal areas, but on established irrigation schemes it is more likely to be

> ‘Ninety-seven-and-a-half per cent of the world’s water is unusable because it is full of salt.’
>
> Ismail Serageldin,
> former Vice-President, World Bank.

man-made, caused by poor drainage of the groundwater pumped to compensate for dwindling canal or river supplies. In either case, when salt accumulates in the root zone of growing crops, it can have a devastating effect on yields. Farmers in the Senegal River Basin in West Africa, for example, have had to abandon their rice fields due to a combination of waterlogging and salinization. In Central Asia, vast areas cultivated to irrigated cotton during the Soviet era now lie waste, their tell-tale patches of salt glistening white under the sun. Globally, an estimated 10 million hectares of irrigated land are lost each year in this way.

While salinity undermines the sustainability of crop production on established irrigation schemes, it prevents irrigation development altogether in many of the world’s coastal plains and other marginal arid to semi-arid areas. Home at present only to a few salt-tolerant grasses and shrubs, these vast sandy wildernesses are one of the world’s last great agricultural frontiers. If their salt-laden soils and brackish waters could be effectively exploited, they could support productive livestock or cropping enterprises.

The use of freshwater for irrigation takes supplies away from the domestic and industrial sectors, compounding the world’s overall shortage of water. The situation is worst in North Africa and the Middle East, where some 90% of water is now used for agriculture, compared to 70% elsewhere. This high ratio could be greatly reduced if saline water could be used instead of fresh. Another opportunity to save freshwater in this region lies in the potential to substitute it for saline water in the greening of highwaysides and city parks.

It was to address these challenges that IDB and its partners established ICBA. The centre’s mission is to ‘demonstrate the value of saline water resources for the production of environmentally and economically useful plants and to transfer the results to national research services and communities in the Islamic world and elsewhere.’

The new centre’s gestation period began in the late 1980s, when scientists worldwide

> ‘Salinization of soils, compounded in many cases by increasingly saline or poisoned groundwater, will continue to seriously affect land that has been highly productive in recent decades.’
>
> International Water Management Institute,
> Water Issues for 2025:
> A Research Perspective.

'Our goal is to make ICBA a centre of excellence for applied research and technology development in saline irrigated agriculture.'

Dr Mohammad H. Al-Attar,
Director General, ICBA.

started increasing their research on saline agriculture. In 1990, IDB signalled its interest in the subject by hosting a workshop on it. This was closely followed by an international conference, held at the University of Al Ain, in the United Arab Emirates (UAE). At these meetings it became clear that, although relevant research was being conducted in several institutes around the world, a new institute based in the Arabian Gulf region could achieve significant impact by drawing this work together, conducting or commissioning new research and disseminating the results. In 1992, after a series of expert consultations, IDB's Board of Executive Directors approved financing for ICBA's establishment and initial operations.

The Bank commissioned SAGRIC International, an Australian consultancy company, to undertake a feasibility study for the centre and to develop a detailed plan for implementation. It also formed a Technical Advisory Committee (TAC), with members drawn from a range of countries with relevant experience. The feasibility study found that little was known about salt-tolerant plants for use in arid environments and that existing research facilities for the task of finding out more were inadequate. It also identified the major salinity and irrigation problems and opportunities facing countries in the Arabian Peninsula. TAC, meanwhile, provided inputs into the development of the centre's initial programme and early networking activities. Consultations between the Bank and the General Secretariat of the Gulf Cooperation Council led to the choice of the UAE to host ICBA, which was formally constituted by an agreement signed in 1996 between IDB and the Government of UAE. In 1997, the Municipality of Dubai gave ICBA 100 hectares of land at Al Ruwayyah, 23 kilometres south of the city. By 1999, the centre was fully operational at this site, where it has built attractive modern offices and laboratories in addition to creating a large experimental area.

ICBA pursues two main routes to the improved use of saline water. The first is to select and breed more salt-tolerant plants, including forage, food and greening crops. To this end, the centre has set about acquiring germplasm of relevant species, from both the Gulf region and further

afield. The second route is the development of new or improved production systems—both for areas underexploited at present and for those where irrigation is already practised. The plants and the production work come together in ICBA's own purpose-built irrigation system, which allows scientists to mix water of different salinities and apply it at precise rates to study its impact on different crop species and varieties.

The potential is there

Research elsewhere has already demonstrated the advantages of salt-tolerant plants and the potential for their genetic enhancement.

Widely grown as an animal feed is the salt-bush, *Atriplex*, which not only tolerates saline soils but can be irrigated using saline water or even seawater. Some species of *Atriplex* also serve as human food, being grown for their spinach-like leaves. *Salicornia*, a highly salt-tolerant plant that can also be irrigated with seawater, has shown considerable potential as an oilseed and fodder crop. A few traditional food cereals, such as barley, pearl millet and rice, show some tolerance to salinity. Rice varieties are being screened for their tolerance at a research station in Senegal.

A commercial company in the USA has developed and marketed an improved cultivar of Palmer's saltgrass, a wild cereal once harvested by Yuman Indians on the west coast of America and, until recently, thought to be extinct.

Around 1500 plant species worldwide are thought to exhibit at least some tolerance to salt. These plants represent a major resource for ICBA and its partners.

Source: ICBA (2000). Biosalinity News.

This research will not be enough by itself, however. Once improved materials and practices become available it will be vital to disseminate them to farmers, who will need to be trained in their use. Also needed will be institutional and policy reforms to improve the incentives to develop or re-develop land in saline areas. Support activities in these areas also form part of ICBA's programme.

The new centre has notched up a busy first 2 years. One of its first tasks was to write a strategic plan. It has also begun the task of collecting germplasm and launched its first experiments on the research station. ICBA was recently added to the list of consulting partners in the Global Water Partnership (GWP), a step that will enhance its participation in the global debate about the future of water resources. It has also launched collaborative activities with leading global and regional

agricultural research institutes, such as the International Center for Research in the Dry Areas (ICARDA) and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). And it has developed its own website, on-line data bases and collaborative Internet-based activities.

ICBA's strategic choices

Core business:	• Developing sustainable management systems for irrigating forage and food crops and greening plants with saline water • Providing germplasm of salt-tolerant plants to partner institutions worldwide • Providing training and information on saline irrigated agriculture and associated technology
Focuses:	• Conservation and use of plant genetic resources • Development of production and management systems
Geographical coverage (phased):	• Countries of the Arabian Gulf • Other regions of the Islamic World • Global
Agro-ecosystems:	• Arid • Semi-arid • Mediterranean • Subtropical
Land and water resources:	• Marginal and coastal land • Saline water
Crops:	• Forage • Plants for greening and ornamentals • Food crops • Selected cash crops, including date palm
Target audiences:	• Plantation managers • Forage producers • Livestock producers • Municipalities • Government policy- and decision-makers • Entrepreneurs • Resource-poor farmers • Scientists
Partners:	• National public-sector research institutes • Ministries of agriculture and water resources • Universities • Regional and international research centres • Development agencies • Private-sector companies.

'The new information technology presents ICBA and its partners with an exciting opportunity. We have already taken steps to develop an effective global network of scientists working on saline agriculture.'

Dr Mohammad H. Al-Attar, Director General, ICBA.

Learning to make better use of saline water in agriculture will provide a tremendous boost to food production in developing countries. It will also protect and create jobs on the land, curbing migration to cities. And it will release scarce freshwater supplies for domestic and industrial use. ICBA and its partners plan to make a major contribution to all these goals. By helping to found the new centre, IDB has been instrumental in making that contribution possible.

A powerful coalition for development in the Sahel

Project profile:	***Emergency aid and cooperation programmes***
Executing agency:	Comité Inter-Etat pour la Lutte contre la Séchéresse au Sahel (CILSS)
Partners:	• CILSS's nine member countries: Burkina Faso, Cape Verde, Chad, Gambia, Guinea-Bissau, Mali, Mauritania, Niger and Senegal • Arab donors coordinated by the Organization of the Islamic Conference (OIC): IDB, the Arab Bank for Economic Development in Africa (BADEA), the Kuwait Fund, the Saudi Fund
Contributions (all partners):	Three programmes over 25 years, worth a total of US$ 330 million
Status:	First and second programmes complete, third programme under way.

The statistics of poverty in the Sahel make grim reading. At 48, life expectancy is 10 years lower than in the world's other low-income regions; fewer than half of all children receive primary education; and there is only one doctor for every 24 000 people.

One of the key factors keeping the region poor is the failure of agriculture to fuel economic growth. Mainly to blame is the Sahel's severe climate, which makes it one of the most difficult parts of the world in which to produce food. Crops are subject to a daunting catalogue of natural hazards including low and unpredictable rainfall, strong winds, sand blasting, poor soils, pest and disease outbreaks and extreme variations in temperature. Livestock fare little better, their numbers being periodically decimated by drought.

Between 1968 and 1973 the Sahel was gripped by a prolonged and severe drought that brought impoverishment and starvation to millions of its people and animals. CILSS was founded in 1973 as a direct response to this crisis. Its task was to promote regional cooperation in attracting and allocating both emergency aid and funds for long-term research and development. One of the new agency's top priorities was to tap the region's ground and surface water supplies to irrigate crops, water livestock and provide drinking water for the rural poor.

IDB and its partners in the Arab world have supported CILSS generously, through three major aid programmes spanning nearly a quarter of a century.

The first programme, launched by the Organization of the Islamic Conference (OIC) soon after CILSS's foundation, consisted of emergency food aid and financial assistance to help the region get back on its feet. Included in the rescue package was a major push to develop rural water supplies, which received funding worth US$ 141 million over the decade to 1983. Although it did much to relieve human suffering, this programme ran into difficulties caused by delays in mobilizing funds, lack of coordination between the partners and a failure to monitor activities and ensure efficient implementation.

In 1983–84 drought struck again, with consequences that were even more devastating. This time IDB led the recovery programme, which again focused mainly on emergency aid. Grants and loans totalling US$ 50 million were extended to eight CILSS countries (Cape Verde was excluded because it was not an IDB member). This second programme learned the lessons of the first and established a central office in Niamey, Niger to coordinate activities in the region. The donors too were better coordinated this time round: the OIC summit of 1982 had seen the establishment of a new mechanism, the Committee for Islamic Solidarity with the Peoples of the Sahel, to ensure more effective support.

In 1991, IDB, OIC and CILSS came together to launch a third programme, this time with the emphasis on long-term cooperation rather than emergency aid. The change of emphasis reflected the region's recovery from disaster, but also the long way it still had to go to catch up economically and socially. Support from IDB during the programme's gestation enabled CILSS to develop proposals for funding worth some US$ 431 million, US$100 million of which was raised at a round table hosted by IDB in 1998. Major partners other than IDB include the Kuwait Fund, the Arab Bank for Economic Development in Africa (BADEA) and the Saudi Fund.

Water remains a major component of this third programme, with the priority going to village water supplies and small-scale irrigation. Almost every country now has projects under way, although political instability has delayed progress in some cases. Activities in Senegal provide a powerful example of how the Arab donors are working together to scale up the delivery of this critical resource for the Sahel's future.

Thanks to the support provided by the Islamic community, CILSS has become a powerful instrument for promoting economic recovery and development in the Sahel. Recently the region's economies have begun to grow again and agricultural production has increased, particularly around major cities. It looks as if better times lie ahead.

Scaling up in Senegal

Rural water supplies are a priority in the Senegalese government's drive to eradicate poverty. The following proposals are being implemented under the OIC-IDB-CILSS special cooperation programme:

- Dams and small-scale irrigation development in the Niayes area (IDB and Kuwait Fund)
- Development of 16 irrigation schemes in the central groundnut basin (Kuwait Fund)
- Irrigation development of the Anambé valley (BADEA)
- Provision of boreholes benefitting 75 villages in the Kaolack and Tambacounda regions (Saudi Fund).

Several other proposals eligible for IDB funding are under consideration, including the extension of rural water supplies, pump maintenance, modern well development and tank irrigation in small watersheds.

What About the City Dweller?

The sheer scale of the water-related challenge in the developing world's rapidly expanding urban areas is daunting enough. By the year 2000, around ten times as many people lived in cities as had done in 1950. And the numbers are set to rise rapidly over the next quarter century, from around 3 billion today to over 5 billion in 2025.

Added to that, the challenge is one of great complexity. The task of providing water and sanitation services is half, or less than half, done, with many millions of poor urban migrants living in slums or squatter settlements whose growth has outpaced that of the existing infrastructure, much of which was installed in colonial times, and is creaking or breaking down completely under the added pressure. We must, therefore, continue to provide these services, both renewing and expanding infrastructure to keep pace with rapidly evolving needs. But we must do more than merely provide; we must also protect. By this we mean protect the quality of the water resource both upstream and downstream of cities, not only ensuring that the water supplied to people is safe but also cleaning the wastewater that leaves people's homes and factories. A shockingly low proportion of the world's sewage,

> 'The battle for the conservation of water will be won or lost in the megacities of the world.'
>
> Klaus Töpfer, Executive Director, UNEP.

> ‘Most rivers in and around cities and towns in developing countries are little more than open, stinking sewers.’
>
> Ismail Serageldin, former Vice-President, World Bank.

probably well under 10%, is treated at present. The task of protection also involves safeguarding the quantity of water available, by stopping leaks and illegal connections and by educating urban populations to be conservative in their use of water.

Among IDB’s water-related projects, those that focus on rural areas have so far outnumbered those located in cities. But this does not mean that the needs of city dwellers have been neglected. Indeed, recent years have seen a growing emphasis on supplying water and sanitation to densely populated urban and peri-urban areas, accompanied by a corresponding increase in the emphasis on treating wastewater. Both trends reflect the Bank’s response to the changing balance of demand for services between rural and urban areas. It is worth pointing out, too, that some projects that are physically located in rural areas actually benefit urban consumers. The large-scale dams and hydro-electric schemes supported by the Bank bring power, as well as water, to thousands of urban homes and factories.

Most of IDB’s urban water projects are concentrated in the Middle East and North Africa, where the pace of urbanization is fastest and the problems of water scarcity are most acute. In Aleppo, Syria’s rapidly growing second city, the Bank has had a long-standing commitment to increasing and improving water supplies by expanding the distribution network and installing pumping stations for groundwater. Its project there began in 1981 and is now in its fourth phase. Also in Syria, the coastal cities of Latakia and Tartous have been the subject of sanitation projects that should greatly benefit the urban and marine environments.

The needs in North Africa are even greater than in the Middle East. The Bank has seen urban water supplies and sanitation in this arid and populous region as an urgent priority, concentrating its efforts in the crowded coastal areas of Tunisia and northern Morocco. In Tunisia, no less than 26 towns and cities have benefited from a project to improve their sewerage systems, among them the large coastal cities of Sfax and Mahdia and the densely populated greater Kairouan region in the centre-north. Morocco has been the recipient of some 10 dam projects providing water to towns and their surrounding areas. In addition, the Bank has helped bring water to poor urban consumers in the large northern city of Taza, while the town of Oulad Moussa has seen an all-round improvement in its electricity supplies as well as its water distribution and sewerage networks.

'In most Middle East and North African countries, reallocation of water from agriculture will be inevitable.'

Jeremy Berkoff, A Strategy for Managing Water in the Middle East and North Africa.

Elsewhere in the developing world, and particularly in sub-Saharan Africa, IDB is gradually becoming more active in the urban sector. This trend should accelerate further in the future as urbanization in these regions catches up with North Africa and the Middle East. In Sudan, the major cities of Khartoum and Port Sudan have been the recipients of drinking water projects, as also have Ougadougou, the capital of Burkina Faso, and Mokolo-Mora, a city in dry northern Cameroon. The Bank also supports urban projects in Central, South and Southeast Asia, where a number of densely populated urban and peri-urban areas have benefited from a range of projects. The provision of drinking water in coastal Bangladesh is an example; the

overhaul of the sewerage system in the greater Hyderabad region of Pakistan is another.

Large-scale investment by the private sector will be needed to tackle the huge challenge of providing and protecting urban water supplies and sanitation in the twenty-first century. The newest member of the IDB family of institutions, the ICD, should be able to play a major role in securing such investment.

Rising to the challenge

Providing water to rapidly rising numbers of users in multiple sectors is perhaps the single greatest development challenge facing the international community in the twenty-first century. How can IDB best play its part in meeting that challenge?

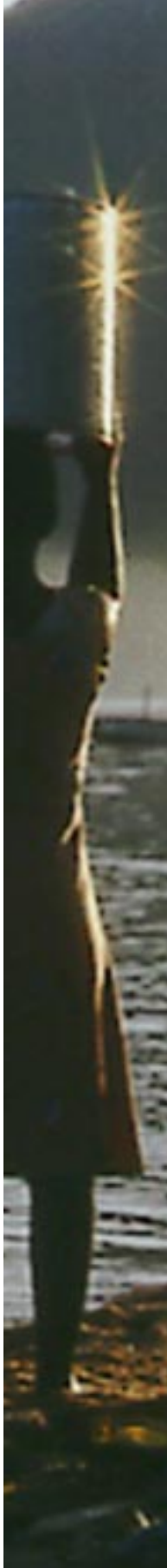
New image: IDB: Sourou Valley_Irrigation channel, to be cropped similar to the image in the pdf file

To answer this question, the Bank needs to do several things. First, it must critically evaluate its past experience in lending to the water sector. This phase of self-examination needs to be followed by a process of looking outwards—at the water-related needs and opportunities of the Bank's constituency, both now and in the future; at the changing global agenda in water resources management; and at what others are doing in the sector, especially the policies and procedures of other multilateral and bilateral funding agencies and the new modes of financing that are evolving in emerging markets for scarce resources. Lastly, the Bank will need to synthesize the inputs from all these sources as a basis for formulating, then implementing, a new policy to guide its future water-related activities.

To pursue these activities, the Bank has formed an in-house working group. The group's deliberations are supported by external consultancies to conduct specific studies where necessary.

What can we do better?

Like all other development agencies, IDB seeks to learn from its experience so as to improve its assistance in the future. An initial examination of the Bank's record in the water sector, made by the in-house group, has revealed several important lessons:



- Most projects have focused narrowly on the provision of specific services, such as drinking water or irrigation water, rather than on the resource itself. In future, the Bank's projects will need to treat water holistically, as a resource shared between different sectors.
- The fact that there have been too few multi-purpose projects means that some broader-based development opportunities have been missed.
- Although many projects have had an environmental component, the assessment of environmental criteria and impact has not been rigorous enough.
- There has been insufficient commitment to the collection and treatment of wastewater. The Bank has recently increased its involvement in this area, but it needs to go much further if its allocations are to reflect the scale of the problem.
- Stronger criteria are needed to guide the Bank's future financing. The Bank has so far adopted a demand-based approach to its allocations to the water sector. In so doing it has responded well to the expressed needs of its clients, but the result has been some inconsistency and a lack of overall focus in its water-related activities.
- Projects supported by the Bank have insufficiently exploited the potential of water user groups and committees. Poor maintenance, caused by low user charges, poor payment rates or inadequate accountability, still undermines the sustainability of too many water supply projects.
- Greater use should be made of the private sector, especially to raise the capital needed to finance urban water supplies and sewerage systems.
- More emphasis should be placed on participatory approaches and public education campaigns. Stakeholders should be invited to participate in all activities related to the water sector, including policy making, programme planning and implementation. Public education should cover the full spectrum of water-related issues, especially conservation, health and the need to pay for water.
- Closer cooperation is needed with other partners in the international donor community. This applies both to the planning and implementation of specific projects and, more broadly, to the sharing of ideas and experiences.

The way ahead

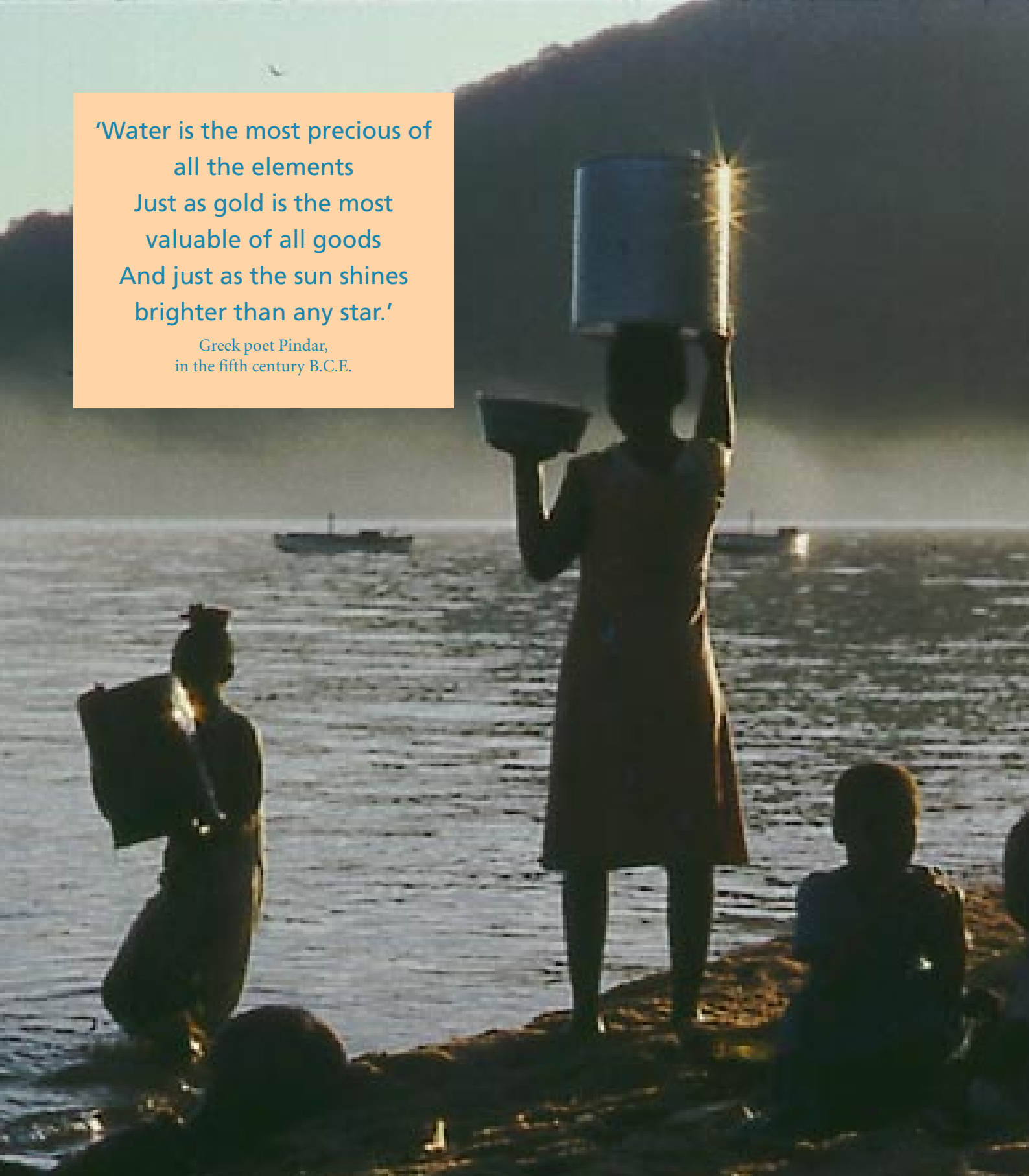
In 1995, Ismail Serageldin, then Vice-President of the World Bank, called for a radical re-think of the way the world manages its water resources. Since then, the many organizations active in the water sector have joined the World Bank in a global debate on this subject. That debate continues, but one of its first outcomes is a new set of principles on which to base future interventions. These principles, which chime with IDB's own thinking, include:

- A comprehensive approach to planning and management
- Increased participation by stakeholders
- The decentralization of responsibility for managing and delivering water
- Better management of the demand for water, through user groups, water pricing and other mechanisms
- Better protection of water quality and preservation of acquatic ecosystems.

Provided it adopts these principles and applies them wholeheartedly in its future projects, IDB will be well paced to build on its already impressive achievements in the water sector. In so doing, it will make a valuable and lasting contribution to the well-being of the millions of people in its constituency who still lack this most precious resource, as indispensable for living as it is for life itself.

'After decades of waste, pollution and inability to provide basic services to the poor, we must fundamentally change the way we think about and manage water. The lessons of collective experience demonstrate that we must make a decisive break from past policies to embrace a new approach that is comprehensive, market-orientated, participatory and environmentally sustainable. Implementation of the new approach will require difficult decisions on the part of all of us. But one fundamental point is clear: we have no choice. At stake are our health, our economies, and the life of the planet itself.'

Ismail Serageldin, former Vice-President, World Bank.



‘Water is the most precious of
all the elements
Just as gold is the most
valuable of all goods
And just as the sun shines
brighter than any star.’

Greek poet Pindar,
in the fifth century B.C.E.

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Acronyms

A.H.	Anno Hegirae
BADEA	Arab Bank for Economic Development in Africa
B.C.E.	Before the common era
BOAD	Banque Ouest Africaine de Développement
C.E.	Common era
CILSS	Comité Inter-Etat pour la Lutte contre la Séchéresse au Sahel
CIS	Commonwealth of Independent States
DRH-CO	Direction Régionale de l'Hydraulique du Centre-Ouest (Burkina Faso)
FAO	Food and Agriculture Organization of the United Nations
GWP	Global Water Partnership
ICARDA	International Center for Research in the Dry Areas
ICBA	International Center for Biosaline Agriculture
ICD	Islamic Corporation for the Development of the Private Sector
ICIEC	Islamic Corporation for Insurance and Export Credit
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
ID	Islamic Dinar
IDB	Islamic Development Bank
IMF	International Monetary Fund
IRRI	International Rice Research Institute
ISRA	Institut Sénégalais de Recherches Agricoles (Senegal)
IWMI	International Water Management Institute
OIC	Organization of the Islamic Conference
OMVS	Organisation pour la Mise en Valeur du Fleuve Sénégal
OPEC	Organization of Petroleum Exporting Countries
SAED	Société d'Aménagement et d'Exploitation des Terres du Delta du Fleuve Sénégal et des Vallées du Fleuve Sénégal
SDR	Special Drawing Right
SNAPE	Service National d'Aménagement des Points d'Eau (Guinea)
TAC	Technical Advisory Committee
UAE	United Arab Emirates
UN	United Nations
UNEP	United Nations Environment Programme
WARDA	West Africa Rice Development Association
WHO	World Health Organization

Credits

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