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Freshwater management: policy options and possible actions to expedite implementation

Report of the Secretary-General

Summary

While some progress has been made towards the safe drinking water targets set out in the Johannesburg Plan of Implementation, a concerted and heightened effort is required from the international to the local level to ensure that safe drinking water is available to all. Strengthened government and donor commitment are needed in the elaboration of detailed investment plans to meet the targets set out in the Plan of Implementation, backed by adequate budgetary and aid allocations and strategies to raise additional low-cost financing. Resources are needed not just for infrastructure but also for strengthening decentralized water governance and institutional capacity-building. As main water service providers, public utilities are in need of support for strengthened governance, notably to achieve better cost recovery in order to maintain and upgrade existing systems while extending service to those, mostly poor, people who are not yet served. Tariff reform and better targeted subsidies are key areas for action. A public consensus could be sought on how best to involve the private sector in water services, including both large and small-scale private providers. Integrated water resources management can help reconcile conflicting water uses, address environmental and social concerns stemming from unsustainable water consumption and strengthen water-related disaster prevention. Adoption of low-cost technologies and demand management measures can enhance water use efficiency. Strengthened water monitoring systems, regulatory mechanisms and enforcement capacities will be essential to manage water quality concerns. Greater community involvement in water resources management can promote use of simple, easily maintained technology, facilitate cost recovery and help ensure equitable access.

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I. Introduction

1. At its twelfth session at Headquarters in April 2004, the Commission on Sustainable Development reviewed the state of implementation of the goals and targets relevant to freshwater management, as contained in Agenda 21, the Programme for the Further Implementation of Agenda 21 and the Johannesburg Plan of Implementation. Also at its twelfth session, the Commission identified constraints and continuing challenges to the implementation of these goals, including the targets set out in the Johannesburg Plan of Implementation on access to safe drinking water and integrated water resources management.

2. The focus of the present report is on policy options and possible actions to overcome these constraints and challenges. The report provides a point of departure for the discussions of the intergovernmental preparatory meeting. The outcome of those discussions will be considered by the thirteenth session of the Commission on Sustainable Development.

3. Findings of the present report are based on data and information from various sources and stakeholders, including UN-Water,[1] major groups and networks and secretariats of various United Nations conventions. The report makes reference to sanitation and human settlements insofar as there are clear policy linkages, indicating where specific options and actions are treated at greater length in the companion reports of the Secretary-General on those themes. It also addresses cross-cutting issues such as poverty reduction, health, gender equality and sustainable consumption and production.

II. Providing safe drinking water to all

4. The 2004 report of the Joint Monitoring Programme for Water Supply and Sanitation[2] concludes that, over the 12 years leading up to 2002, 1.1 billion people have gained access to an improved source of drinking water, with an increase in global coverage from 77 to 83 per cent. While gains in South Asia were the greatest, from 71 to 84 per cent, Asia as a whole still accounts for two thirds (675 million) of the world population lacking satisfactory access to safe drinking water. Sub-Saharan Africa has expanded coverage from 49 to 58 per cent, leaving 288 million people without access. The Joint Monitoring Programme reports a sizeable increase in numbers without access to an improved source in urban areas of East and South-East Asia, the result of rapid urbanization. Still, by far the largest number of people without access to safe drinking water worldwide remain in rural areas.

5. Governments that are lagging significantly behind in meeting the water goals and targets may wish to review their national (sustainable) development strategies, with a view to increasing the priority assigned to providing access to safe drinking water and basic sanitation. Some countries (for example, South Africa[3]) have chosen to enshrine a right of access to water in their constitutions, while others reflect this in national water legislation. Credible commitment would involve best efforts to mobilize the necessary financial and technical resources to meet water supply goals and targets, including through the creation of a strong enabling environment for sectoral investment and efficient service delivery by a range of providers. Given how far they lag behind, rural areas deserve special emphasis in government water investment plans.

A. Supplying safe drinking water in urban areas

6. The rapid urbanization of the developing world, with its expansion of informal settlements, poses a major challenge in water supply as in other infrastructure sectors.[4] While mega-cities continue to grow, roughly half of urban residents in the developing world live in cities of fewer than 500,000 inhabitants.[5] These settlements hold limited attraction for large-scale private water companies and may also escape the attention of donors prioritizing investment in rural water supply.

7. Public water utilities remain the predominant supplier of water to urban households throughout the world. In developing countries, they are frequently underfunded and poorly managed. Low tariffs, which do not permit cost recovery even from those able to pay, compromise service quality and reliability and service expansion. Thus, customers are reluctant to pay higher prices, which prevents service improvement, creating a vicious cycle. While in some instances encouraging private participation in water utility management may be an option to address these deficiencies, in others it is not, either because of an inability to attract private investors[6] or because of public reservations. The immediate priority in those instances would be to build stronger managerial capabilities within the public utilities themselves. Corporatization is a common approach that creates an arm's length relationship between Governments (as the regulators) and regulated public utilities, giving managers the independence and incentives to operate the utility as a commercial venture without forsaking its public service mandate. In many instances, greater reliance on competitive contracting for specific water-related services (including, meter installation, reading, billing and collection, repair and maintenance and computer services) has enabled public utilities to lower costs and improve the quality of service. A move in this direction would have the added advantage of stimulating local entrepreneurship and strengthening small-scale service providers.

8. Ensuring access to all and providing for the sustainability of water supply systems both depend on achieving a reasonable cost recovery from those who can afford to pay. In the short term, adjustments to the tariff structure could aim at recovering operation and maintenance costs of water supply systems, with gradual movement towards full cost recovery. In Senegal, for instance, the reform of the water utility was accompanied by an operating subsidy in the early years, with tariffs gradually rising to cost-recovery levels.

9. Experience suggests that a variety of approaches can be used to address the water needs of the poor, including a guarantee of free minimum service (as in South Africa, where the new water law provides every household with 200 litres of free water per day), increasing block tariffs (as in Côte d'Ivoire and Senegal), direct subsidies (as in Chile where they are means-tested and subtracted from water bills of eligible customers, or in Côte d'Ivoire and Senegal, where they go to cover connection costs), community service obligations, performance incentives and fiscal transfers to utilities.[7] Preferential tariffs and direct subsidies to the poor can weigh heavily on public finances where the majority of water consumers are poor, especially when the income elasticity of demand for water is low[8] and the scope for cross-subsidy from better-off consumers limited.[9] Colombia has developed a well-functioning cross-subsidy scheme for water and other public services based on assignment of each household to one of six residential strata, with the lowest receiving a sizeable subsidy and the highest paying a surcharge on full marginal

cost. In many countries, high-volume industrial and commercial water users cross-subsidize residential ones.

10. Participation of large private companies in the water sector is sought for a variety of reasons, from improved management of water assets and service delivery to injection of additional capital into the expansion of the water supply network. Such participation can take many forms, from management contracts, lease contracts and concessions, to greenfield projects (build-lease-own and build-operate-transfer, for example), joint public-private ownership and asset transfer through privatization, giving Governments considerable discretion. The range of options spans different contract durations and different mixes of public-private ownership, financing and risk bearing and operational responsibility. Where private participation is sought, wide public consultation is crucial to building consensus on the rationale for and the form of such participation. This can reduce political risk and thus the rate of return that prospective investors in the sector would be willing to accept.

11. Experience shows that small-scale private providers and community-based organizations can provide a valuable service in informal settlements not connected to the main piped network. Until Governments can connect slum communities to the piped network, for example through "last-mile" financing,[10] the contribution of such providers could be enhanced through easier access to credit, technical support and suitable regulations to safeguard water quality.[11] They may also be encouraged to form partnerships with larger enterprises, which may enjoy readier access to finance and certain economies of scale, while small firms may be more familiar with customer needs and have better knowledge of locally appropriate technologies such as low-cost piping.

12. Experience also suggests that communities are capable of mobilizing significant resources, in cash and in kind, for investing in water infrastructure, for instance through community savings schemes. Still, given the widespread poverty in slum communities and the extensive social benefits of having access to safe drinking water and sanitation, there is an important role to be played by Governments. This may involve construction grants, low-interest loans or loan guarantees. It may also involve well-targeted government subsidies to assist poor households that lack easy credit access to finance the upfront costs of water access. All such measures would be more effective if complemented, notably in the case of informal settlements, by the regularization of land titles and tenure security, which promote credit access and encourage investment in water, sanitation and other infrastructure.[4]

13. A key responsibility of the water regulatory authority is to ensure that contracts are properly executed and service obligations properly adhered to. While early experience with public-private partnerships in the water sector and in other infrastructure sectors was mixed, including instances of poor contract design, learning through experience should help in avoiding some of the pitfalls in future. In general, while not all contingencies can be fully anticipated and reflected in contractual terms, well-designed contracts can minimize disputes and demands for renegotiation at a later date. Having an effective arbitration mechanism in place with well-defined and enforced remedies for breach of contract can help to bring about prompt dispute resolution and create a predictable investment environment.

B. Supplying safe drinking water in rural areas

14. Roughly a third of the world's rural population remains unserved by improved drinking water sources. Expanding rural water supply, together with sanitation, can be viewed as integral to broader poverty reduction efforts. The rural poor generally do not pay for water with cash but spend their time and energy fetching water (especially women and girls). Thus, along with other measures, improving the accessibility to safe drinking water can contribute both in the near and long term to boosting rural welfare and incomes, which will be essential in order to generate the resources for maintaining water supply and other essential infrastructure.

15. The "top-down engineering" approach of the International Decade on Drinking Water Supply and Sanitation has shown its limits in terms of the sustainability of the installed water supply systems (including pumps and wells). Thus, even as Governments work to extend coverage to unserved rural communities through new infrastructure development, the rehabilitation of existing water infrastructure cannot be neglected. Rural water supply programmes would do well to rely more on a bottom-up approach, considering local communities as empowered stakeholders rather than beneficiaries, building on community institutions, know-how and resources in water system design and management, utilizing technologies that require a minimum of maintenance and ensuring that communities and local entrepreneurs have the skills and affordable materials and spare parts to perform necessary maintenance. A degree of design standardization would be desirable to achieve scale economies in parts and materials production or procurement and in training on system maintenance.

16. In managing local water-supply systems, community-based institutions such as water committees and user groups, with due involvement of women, can play a vital role in ensuring equitable access, operational efficiency, system maintenance and accountability to end users. They can also devise means of mobilizing resources, including through user fees, for construction and maintenance of community water infrastructure. These institutions may need to be given higher legal standing in national legislation and their capacities strengthened. Decentralization has limits and there may be situations where a single water source is shared by several villages, calling for joint management of the resource (one example being the Chandnapuri multi-village water scheme in Maharashtra State in India).[12] At a higher administrative level, regional water or river basin authorities have the responsibility of addressing spillovers across jurisdictions (for example, shared aquifers and upstream pollution of downstream water supplies) and they too would benefit from institutional capacity-building.

17. Where surface water is of good quality but seasonal in flow, small dams and reservoirs to store water both for household use and for agriculture may be an attractive option. Owing to the scarcity of clean surface water in many rural areas, groundwater resources will often need to be tapped for providing drinking water supply. Sustainable development and management of groundwater resources requires a strong regulatory or incentive regime to control aquifer depletion and quality deterioration. Use of brackish groundwater from mining of extensive aquifers may be an option in water scarce countries, using small reverse osmosis units, possibly driven by renewable energy sources.

18. Rainwater harvesting can also be an important water source in rural communities.[13] While the collection of rainwater by a single household may not be significant, the impact of thousands or even millions of household rainwater storage tanks can potentially be enormous. The harvested rainwater needs to be filtered or disinfected, however, before it can be used for drinking purposes. In Bangladesh, since 1997, about 1,000 rainwater harvesting systems have been installed, primarily in rural areas, as a viable alternative for providing safe drinking water in arsenic affected areas. Seventeen provinces in China have adopted the rainwater utilization technique, building 5.6 million tanks with a total capacity of 1.8 billion cubic metres, supplying drinking water for approximately 15 million people and supplemental irrigation for 1.2 million ha of land.[14]

III. Implementing integrated water resources management

19. Integrated water resources management is a well-recognized framework for pursuing wise and forward-looking management and the development of water resources, including their allocation among competing uses. Managing competing uses within this framework would allow adequate consideration of environmental flow requirements, variations in water quality from upstream to downstream and within aquifers, and the impacts of unregulated groundwater withdrawals. The development of guidelines on allocation between different use-categories can be made part of integrated water resources management plans.

20. Fostering international cooperation on international watercourses, based on legal instruments and pragmatic measures and programmes, can contribute to both sustainable development and peace and security. Such cooperation, whether bilateral or regional, can include sharing of information and experience, cooperative monitoring networks, joint infrastructure development, shared training programmes, and technology transfer and adaptation. Strengthening capacities of international river basin organizations is viewed an important condition for promoting such cooperation, while partnerships and dialogues involving local authorities, communities, civil society and the private sector have also proven useful.

A. Preparing integrated water resources management and water efficiency plans

21. In the Johannesburg Plan of Implementation, the target date for the preparation of national integrated water resources management and efficiency plans was set at 2005. While there are no official data on progress towards this target, surveys suggest that implementation is uneven. It is hampered in many instances by limited understanding of what integrated water resources management means in practice, lack of a common methodology for plan formulation, limited technical capacities and insufficient financial support for plan preparation and stakeholder resistance to an approach that may threaten the status quo, for example, with respect to the allocation of responsibilities for water resources management. Given that some countries are late in starting the process, a reasonable expectation is that most countries will have commenced plan preparation by the end of 2005, with an appropriate institutional responsibility and financing in place, if need be with donor support.

22. Despite difficulties, experience in plan preparation is accumulating in this field, with countries following approaches tailored to their water management objectives and institutional capacities. Some have taken the route of developing comprehensive plans covering basin-wide assessment of surface and groundwater resources, water demand projections, water management analysis to balance supply and demand among different uses, a framework for stakeholder participation, investment requirements, and enabling policy and institutional frameworks. Others have chosen to start with a step-wise approach, considering the elaboration of key policy principles or establishment of water management institutions as an important first step. Advancement in the process in many countries falls somewhere in between these two extremes. The following are emerging as key elements of the integrated water resources management plan preparation process:

(a) Setting up a high-level national mechanism for the preparation of the plan, for example an inter-ministerial committee[15] that delegates technical responsibility to an existing water management institution or, if necessary, a newly created one. The committee could define lead institutional responsibilities, intersectoral coordination arrangements, the nature and extent of stakeholders' participation, broad needs of water user sectors, information and data requirements on water resources and the socio-economic status of users and the time frame for preparing the plan;

(b) Aligning national water management objectives and priorities with national socio-economic development plans and national sustainable development strategies, and with global commitments translated into the national context;

(c) Assessing national capacities required to prepare the plan. If existing capacities are limited, seeking external assistance for training to strengthen the process;

(d) Evaluating baseline conditions, including supply and demand trends, and identifying the main challenges and constraints to be overcome in order to meet the targets set out in the Johannesburg Plan of Implementation and other water sector objectives;

(e) Launching a multi-stakeholder dialogue to define priorities and inform the preparation of the plan and enhancing mechanisms for information sharing;[16]

(f) Defining strategic options together with time-bound activities and concrete actions; their estimated costs; institutional responsibilities for execution; monitoring and evaluation mechanisms; and other measures to secure plan implementation;

(g) Securing political and budgetary support during the preparatory process and ensuring endorsement of the plan at the highest political level since it encompasses actions that go beyond the administrative jurisdiction of a particular water institution;

(h) Defining minimum performance thresholds for various elements of the plan, and providing for regular plan updating.

B. Enhancing water use efficiency and productivity

23. In the case of agriculture, which accounts for 70 per cent of global water withdrawals, raising water use efficiency and water productivity is often crucial to sustained improvements in farmers' incomes. In some contexts, the principal challenge is to make more efficient use of water that is already being extracted for irrigation. In others, the challenge is to harness more effectively available water resources for irrigation and other uses whether surface water, groundwater or rainfall, always mindful of natural flow requirements. Measures that have worked for improving water use efficiency in irrigated agriculture with varying degree of success under alternative socio-economic conditions include: economic incentives to encourage investments for enhancing water productivity; reform of irrigation water subsidies; decentralization of infrastructure management; structural improvements to water conveyance infrastructure (for example, lining of irrigation canals); modernization of irrigation management; sustainable farm management practices; and implementation of institutional arrangements that enhance the role of local authorities, operators and water users associations. Reform to certain energy subsidies may also create incentives to limit pumping for irrigation.

24. Patterns of water demand are changing in many developing countries, with industrial and urban uses increasingly competing with agriculture, making accustomed free or low-priced irrigation water in many countries less and less tenable. Water user fees have been used extensively for rationalizing water use in all economic sectors. Where irrigation fees reflect water scarcity, they tend to induce water conservation measures as well as changes in cropping patterns that favour less water-demanding crops. With respect to water-efficient irrigation, a number of small-scale irrigation options are becoming increasingly affordable to low-income farmers, including small drip irrigation kits (the Chapin bucket-kits in Kenya), micro-irrigation kits using low-grade plastic tubes (the Pepsee kit in India) and foot-operated treadle pumps.[17] Experience suggests that, if supported by microcredit and farmer training programmes, the adoption of such methods could advance at a rapid pace.

25. With respect to improved crop varieties, biotechnology research has yielded positive results in terms of enhanced crop yields per litre of water consumed, but there is scope for significant progress. Switching to less water-demanding crop varieties may depend on changes in consumer preferences if they are principally for domestic food consumption. This approach is being introduced experimentally in Africa, utilizing the experience of several local and regional institutions to produce an improved food-barley variety using sustainable management practices. Complementary measures are warranted in soil and land management to enhance water infiltration and retention in different types of soil as well as a proper balancing of water and nutrients. In the event that a switch is made to cash crops, while there is a potential to raise farmers' incomes in the long term, support from agricultural lending institutions in the form of low-cost credit and agricultural extension services may be critical to smooth the transition, especially where the new crops (for example, certain tree crops) take several years to mature.

26. Improvements in water savings and water quality can also be achieved through the use of more efficient and cleaner technologies in the industrial sector. Inducing their adoption would call for a combination of water user fees and water pollution charges/penalties. In household facilities, techniques such as low-flush toilets and

low-flow showers have shown positive conservation impact. Demand for these technologies can be stimulated through appropriate incentives to water users, including usage-based water tariffs and the incorporation of water conservation standards in building codes. Governments may also be able to stimulate local supply of such technologies through directed credit to local entrepreneurs who might otherwise be unable to finance the necessary investments. At the same time, Governments can encourage efforts, whether through government-sponsored research or incentives to private enterprises, to find improved, low-cost technological solutions to tapping non-conventional sources of water such as rainwater, recycled water, grey water, storm water, fog water and, in some instances, desalination. In many instances, more widespread metering and more effective bill collection have contributed to reducing the amount of unaccounted-for water in urban distribution systems by generating revenues for improved operation and maintenance.

C. Managing competing water uses

27. By 2025, 1.8 billion people will live in countries or regions with absolute water scarcity.[18] Even with effective policies and programmes to improve water use efficiency and productivity, the challenge will remain to allocate water efficiently and equitably among competing uses. Recognizing the economic, environmental and socio-cultural values of water is fundamental to making water allocation decisions. In most cases, the main allocation decision is to strike a balance between water for agriculture and water to maintain ecosystem services, although in some countries rapid industrialization also constitutes a significant demand for water. Achieving equitable and efficient allocation will require more effective inter-sectoral coordination, greater stakeholder participation, realigned economic incentives and strengthened capacity for decentralized water resources management.

28. If unchecked, excessive water extraction for agriculture can have major disruptive effects on ecosystems, as attested to by numerous examples from around the world (for example, the Aral Sea and the Murray-Darling Basin (in Australia). In those cases where damage is not already irreversible, ensuring long-term sustainability of supplies calls for restricting overall extraction rates within a water basin, whether a river basin, an aquifer or another common water source. Experience suggests that this can be done through application of the “user-pays” principle, restriction of quantity extracted or both. If policy makers choose to impose time-bound extraction limits, then within those limits fair and efficient allocation rules and the institutions to apply them would need to be in place. In some instances, customary rights already function well as the basis for water allocation. Where they do not, and where extraction rates are excessive, formal rules may need to be devised. Stakeholder participation is crucial to rule-setting if the resulting allocation of water rights is to have force of legitimacy. In general, it is desirable to allow for some transfer of water rights between uses and users, subject to certain constraints, including a system that would ensure fair compensation to those forfeiting their rights. Water markets are one possible mechanism for effecting such transfers, with compensation to sellers dictated by the market price for extraction permits. Where they are not already well-functioning, however, a cautious approach to their introduction would be advised in order to avoid problems arising from asymmetric information between prospective buyers and sellers and

market power.[19] A balance is desirable between market forces and government regulation to address these concerns as well as to protect third-party interests, including that of safeguarding ecosystem services.

D. Protecting water quality and ecosystems

29. Poor water quality combined with inadequate hygiene practices is a major source of ill-health and life-threatening diseases in developing countries.[20] In addition, the capacity of inland and coastal water ecosystems to support biodiversity is often highly degraded as a result of pollution. Agricultural chemical runoff is one of the most difficult sources of water pollution to control, but the problem is exacerbated by subsidies to fertilizer and pesticide use or to output that weaken incentives for efficient chemical use. Together with a review and, if appropriate, reform of such subsidies, Governments would do well to consider how agricultural extension services could assist farmers in the more effective use of less harmful chemicals and alternative methods of pest management. In the case of industrial effluent and effluent from municipal sewage systems, an important policy objective would be to strengthen regulations and penalties for discharge of non-treated effluents into watercourses. In the interests of greater economic efficiency, Governments may also wish to consider, in the case of non-toxic pollutants, the wider use of effluent charges instead of, or in addition to, discharge standards. Raising investment in wastewater treatment facilities is also likely to be a crucial part of any effort to improve water quality, especially in the case of large population and industrial centres.[2]

30. External costs of pollution often need to be addressed at the river basin level; a river basin agency is best placed to achieve this goal. Raising public awareness at all levels about water quality's implications for ecosystem functions and services and about the social and economic costs of water pollution can help in water quality management. To the extent feasible, the valuation of multiple water use and ecosystem benefits can be utilized to complement other information available to decision makers for making rational policy choices. Promoting understanding of issues such as water flow requirements of river ecosystems and sustainable yield from aquifers can help in protecting these natural assets and encouraging wise use. Similarly, disseminating experiences of cooperation between upstream and downstream communities, including through use of innovative economic tools such as payment for environmental services, can contribute to sound ecosystem management.

E. Preventing water-related disasters

31. Integrated water resources management can provide a useful framework for prevention and mitigation of floods, droughts and other water-related disasters by ensuring protection of wetlands, forests and other ecosystems that regulate water flow and retention. Experience shows that protection of the water flow regulation function of catchment areas can be a highly efficient method of flood prevention. Adequate investment in water-related infrastructure is also crucial to flood and drought prevention, including dams, reservoirs, dikes and canals. Even with such an investment in infrastructure, not all disasters are entirely preventable. Governments need to put policies and programmes in place to mitigate losses. The vulnerability of

different human settlements and population groups would need to be assessed, and early warning systems set up, with well-rehearsed contingency plans for reinforcement of dikes and embankments, evacuation of vulnerable populations and other emergency response measures.

32. In devising response strategies, it is advisable to tap traditional and indigenous knowledge accumulated over years of coping with disasters. In the case of floods, there is a growing appreciation of the need for balance between structural measures (flood prevention infrastructure and improved building codes) and non-structural measures (land use regulation, insurance schemes and improved community participation). The linkage between disaster reduction and poverty alleviation necessitates the involvement of all stakeholders at the local, national and regional levels. Regional cooperation would be useful for disaster reduction and response in shared river basins, ranging from information sharing to coordinated disaster mitigation planning.[21] Confronting climate change also requires international cooperation, including resource transfers, to help vulnerable countries adapt and mitigate risks of water-related disasters.

IV. Strengthening water monitoring programmes

33. Strengthening of water-related monitoring programmes is essential both for monitoring progress towards internationally agreed goals and for supporting integrated water resources management and water resources development, including effective planning to reduce risks from water-related disasters. Because most countries lack reliable water monitoring programmes, limited information exists on both water quantity and water quality. Countries could use the opportunity provided by the commitment to prepare plans for integrated water resources management by 2005 to assess current deficiencies in existing datasets and monitoring networks in order to define a strategy and methodology to make these more reliable. Carrying out a national water quality and quantity inventory for surface and groundwater resources, creating baseline data and identifying water “hot spots”, is an essential step in the formulation of integrated water resources management plans. Increased budgetary allocations are essential to make monitoring programmes and networks financially sustainable. In some countries, rehabilitation of existing hydro-climatic and groundwater measurement stations is a priority. In most, there is a need to install new stations.

34. Sustainability of monitoring networks could be enhanced by decentralizing their management to institutions (such as basin agencies) involved in regional or local level water resource planning. Institutional cooperation within Governments as well as cooperation with other stakeholders (e.g., local authorities, industry associations and water-user groups) is needed to improve data availability and reliability and to consolidate and reconcile all the relevant data within the framework of a national water information system. With further methodological refinement and improved data availability and quality, integrated national water accounts may prove useful in providing a rough indication of the value of water for different uses, including non-extractive uses.[22]

35. Improving the global monitoring of water and sanitation goals requires mobilizing political support for the process. The methodology of the joint monitoring programme could be improved by including data on variables such as

efficiency, quality, regularity, affordability and convenience of services. Aligning national-level initiatives with the methodology and deploying more resources to support national monitoring and data collection efforts could begin to address these deficiencies.

V. Meeting the financing challenge

36. Current annual investment in the water sector in developing countries and countries with economies in transition is an estimated $75 billion, of which about $13 billion goes to drinking water supply and $2.5 billion to sanitation.[23] In recent years, $2 to 3 billion of official development assistance (ODA) has gone into the water and sanitation sector, representing around 5 per cent of total ODA.[24] By general agreement, investment in the water sector will need to rise significantly, by one estimate, double, over the next decade in order to meet the targets set out in the Johannesburg Plan of Implementation.

37. High-level commitment by Governments to meet the water and sanitation targets as part of national poverty reduction strategies would send a strong signal to donors. A national-level assessment of investment needs to meet those targets could be undertaken in conjunction with preparation of integrated water resources management and water efficiency plans, with results feeding into national budget preparation. In investment programming, the "software" side of the equation, including institutional and human resources development, deserves attention alongside hardware investments, following a "learning by doing" approach.

38. The efficiency and effectiveness with which resources are used can influence the flow of ODA. In some instances, the capacity of the water sector may constrain effective use of increased inflows, so that managerial and technical capacity would need to be scaled up along with investment. Improved institutional and financial governance can prevent financial leakage and maximize impacts on beneficiaries. Experience shows that strengthening national level coordination among donor programmes in the water sector, in close consultation with the relevant national water management institutions, can help to rationalize use of resources.

39. Where donors and multilateral development banks are willing to provide grant financing, this would be the preferred option, although financing would have to be targeted to investments where other sources are not readily available, notably to serve poor rural and urban communities. To undertake the investments required in the water sector, Governments may have to turn to sources of long-term finance, whether domestic or international. In doing so, they will want to consider how capital can be raised at the lowest cost, since ultimately the users of water services and/or the general taxpayer will have to repay those costs. Evidence suggests that equity finance for water infrastructure in developing countries is in generally short supply and is likely to prove particularly expensive because of investor concerns about non-controllable risks.[25] This suggests that in many instances Governments would choose to rely principally on debt financing.

40. Decentralization of relevant decision-making authority and command over resources can aid improved water sector governance. In some cases, fiscal transfers from the central Government will provide the bulk of local authorities' resources; in others, a degree of fiscal autonomy would permit local authorities to raise financing on their own for local water and other infrastructure investment. One example of capital grants from the national Government to state/provincial authorities is the system of revolving funds created in the United States of America to help finance

investments in clean drinking water. All types of water providers, public, private and community-based, are eligible to borrow from the fund. Each state has the option to set aside up to 30 per cent of its capital grant to provide preferential financing to disadvantaged communities, including through lower-interest-rate loans, principal forgiveness and negative-interest-rate loans.[26]

41. Local authorities may either turn to bank loans or to the capital markets to raise debt finance for water, sanitation and other local infrastructure investment. In many countries, municipal development banks specialize in servicing the investment and other banking needs of local authorities. Municipal bond banks, which began in Canada in 1956, offer a form of credit enhancement to local authorities by selling their own securities and relending bond proceeds to local governments, enabling them to pool their borrowing requirements and thus lower finance costs through a wider distribution of fixed costs and a wider market. In some states in the United States, specialized bond banks have emerged for water and sewerage, backed by partial grant funding that enables them to offer lower interest rates. Another approach is for a public sector financial institution to rediscount a sizeable portion of commercial bank loans to municipalities for infrastructure financing, as with Colombia's programme, *Financiera de Desarrollo Territorial* (FINDETER). In this case, commercial banks assume all the credit risk and lending is not influenced by political pressure, which helps to explain the very low share of non-performing loans. Over time, as municipalities demonstrate creditworthiness, they rely increasingly on direct bond market financing, with its lower potential costs. Where local capital markets are relatively well-developed, Governments may choose to issue local currency infrastructure (or utility) bonds. In some instances, they may also be able to access international bond markets, though in so doing they assume the currency risk.

42. Financial sector reforms could open up new financing options by strengthening domestic credit markets. Elements include establishing a legal framework for securities issuance and trading, including regulations for underwriters, brokers, dealers and other entities providing supporting services for the securities market. Municipal-level reforms that would facilitate local resource mobilization include strengthened local tax collection and authority to levy user charges, both of which would improve the revenue side of the budget and enhance the creditworthiness of borrowing institutions. Establishing a clear and comprehensible set of municipal accounts, independently audited with results published, would help in gaining access to capital markets. Municipalities could also benefit from strengthened capacity for generating commercially viable projects, sound financial management and regulatory enforcement.

43. National Governments may be willing and able to provide a partial guarantee for subnational public debt, but only if they are reasonably confident of the ability of provincial or local authorities to repay. In the water sector, that ability depends on a combination of the water utility's expected revenue stream from user fees and the local authority's expected incremental tax revenues as a result of a stronger local economy. Donors may also find such a partial guarantee, whether for loans or bonds, an attractive option, since it is a means of leveraging private resources, lengthening maturities and reducing the cost of funds. Where such guarantees are not available, raising long-term municipal finance depends crucially on strengthening confidence in local financial markets and creating mechanisms that allow financial instruments to be traded.[27]

44. In rural areas and urban informal settlements, experience shows that mobilizing community-level resources. both in cash and in kind, can be an important option to expand water and sanitation infrastructure. Microcredit schemes and revolving credit funds can serve a dual purpose: on the one hand, helping households finance water connections; on the other, financing small-scale water service providers, whether NGOs or private entrepreneurs, to expand and upgrade their services.[28] Beyond a very small-scale investment, however, microcredit would not prove adequate, and other financing facilities would be needed to serve the multiple small-scale water projects that are likely to account for a sizeable share of water investment in rural areas and smaller towns and cities. A promising approach supported by a regional development bank is that of the Chinese Water Infrastructure Financing Facility, under which loans are made, without sovereign guarantee, to a Shanghai-based investment holding company for use in financing small-scale municipal water projects that the Asian Development Bank would not find economical to process individually.[29]

VI. Moving ahead: towards a framework for action

45. **The preceding sections have outlined wide-ranging policy options and actions to overcome the obstacles impeding the achievement of water goals and targets agreed in the Johannesburg Plan of Implementation. They are by no means exhaustive. Given that circumstances and priorities can differ, often dramatically, across countries and even across regions within countries, there is clearly no one-size-fits-all solution, and Governments will want to craft their own strategies, learning from experience, but also charting new directions with innovative approaches.**

46. **National Governments, in partnership with municipalities and local governments, bear principal responsibility for water resources management and supplying safe drinking water to their people, but not all can achieve this goal without the close cooperation of the international community. Each has a vital role to play. At the national level, strong political commitment could be demonstrated in a number of ways: by recognizing access to water as a basic right in national legislation; by including water provision in national poverty alleviation strategies and programmes; by allocating larger resources in national budgets to water investments; by targeting ODA to meet the most pressing water needs in rural areas and urban informal settlements; and by creating a strong enabling environment for raising low-cost, long-term financing for the water sector, including by encouraging public-private partnerships.**

47. **The international donor community can support the efforts of national Governments by: significantly increasing the overall volume of ODA and the amount devoted to water supply and sanitation and to water resources management; securing a sizeable component of grant financing for water supply to serve poor rural and urban communities; better coordinating donor water initiatives at the national level; supporting capacity-building of water-related institutions and organizations at all levels in developing countries and countries with economies in transition; and/or devising new financing mechanisms to meet the smaller-scale investment needs of water projects in rural areas and smaller towns and cities.**

48. **Local authorities and community-based organizations are in the front line of water supply and water management. Options at the disposal of Governments to strengthen local water governance include: recognition of the role, responsibilities and powers of local authorities and community-based organizations in national water legislation; strengthening of the managerial and technical capacities of local entities as an integral part of decentralization of water sector management; ensuring adequate local-level capacity for resource mobilization to meet both operation and maintenance and investment needs of local water systems; and encouraging, through regulatory reform if appropriate, the more active participation of private, including small-scale, providers in local water supply, backed by a regulatory system adequate to enforce water quality standards and ensure affordability.**

49. **Governments may wish to consider a number of policy options in order to expand and upgrade coverage of urban water supply. In as much as public water utilities remain the principal urban water service providers, measures could include: strengthening their governance through technical and managerial capacity-building, including for network planning, finance, administration, metering and bill collection and maintenance; corporatization or other governance reforms to grant public utilities greater decision-making autonomy, for example, with respect to tariff setting, personnel and procurement; encouragement of competition in areas of the water business not subject to natural monopoly; ensuring affordable access to the poor through regulation of tariff structures and/or targeted subsidies (including, as appropriate, for upfront connection costs). To serve those poor communities, often informal settlements, not yet connected to the piped network, a combination of measures may be considered, including: making concessional finance available to community organizations and small-scale private providers for investment in low-cost infrastructure; working with community organizations towards regularizing land titles and providing tenure security in order to strengthen household incentives to invest in water supply and sanitation and to unlock finance from commercial banks; and devising plans, including for mobilizing finance, to extend the piped network to such settlements in a phased manner.**

50. **Along with urban informal settlements, the funding of rural water supply deserves high priority from national Governments and donors. Support for local initiatives led by community-based organizations, including participation of women, is most conducive to project sustainability. As the main water haulers, women are likely to have the strongest interest in ensuring effective operation and maintenance of a convenient and safe water source. Community organizations could benefit in many instances from capacity-building support, in which NGOs can play a valuable role. Tapping local knowledge can result in technical designs and management arrangements better suited to local circumstances. Some degree of equipment standardization is desirable to permit scale economies in parts and components production or procurement and in training maintenance technicians. Donor coordination with Governments in devising such standards is highly desirable. Financial and technical support to small-scale private providers can also be helpful in expanding rural water access.**

51. **While integrated water resources management provides a useful framework for addressing water management challenges, many Governments have still to assign institutional responsibility for coordinating the formulation**

of such plans and donors may wish to redouble efforts to ensure adequate financing and technical assistance to support that process. Greater flexibility would help water allocation institutions to adapt to changing patterns of demand, while institutional design and regulation emerging from a consultative process would help ensure that allocation rules and compensation for water right transfers are both fair and are seen to be so. Integrated water resources management can provide a strong basis for an effective water-related-disaster early warning, prevention and mitigation system.

52. **National policy and donor-supported actions can make an important difference to water use efficiency, with policies relating to the agricultural sector being particularly important in view of its predominance as water user. Among the options to be considered are: reforming subsidies that encourage wasteful water use, including for irrigation water, fuel and electricity used in water pumping, inputs that are water complements and agricultural output; supporting improvements to water conveyance infrastructure; providing low-cost credit to farmers for water-efficient, small-scale irrigation technologies; extending technical assistance to farmers for introducing improved on-farm water management practices; and research into developing less water-demanding and more drought-resistant plant varieties. In the case of industrial water use, stricter application of the user-pays and polluter-pays principles would encourage water conservation and recycling and wastewater treatment.**

53. **An augmented water-related ODA flow is key to meeting the water financing gap. Consideration could be given to an increasing grant component, focusing in particular on serving those populations most in need. Beyond that, Governments may have a number of other financing options, not all equally feasible in all countries. These include: augmenting revenues from taxes and user fees, notably to cover operation and maintenance costs; raising long-term debt and equity finance for water network expansion; devising new low-cost financing arrangements for small-scale water systems, for example, through dedicated water financing facilities and consolidated borrowing of multiple local authorities or service providers; and promoting public-private partnerships to strengthen water utility management and to provide new and additional water sector finance.**

54. **Advancing implementation of the water goals and targets remains at the core of work of several United Nations agencies, as well as of many other international organizations and networks. Greater cooperation and coordination among these initiatives would enhance their coherence and effectiveness. This applies also to mobilizing the sizeable additional financial and technical resources that are critical to reaching the water targets. Strengthening the global monitoring programme and national monitoring and evaluation systems and capacities through technical assistance is fundamental to enable assessment of progress towards the water and sanitation targets.**

55. **While the challenge is daunting, there are good reasons for optimism. The international community is focused on what is needed to meet the target on provision of access to safe drinking water set out in the Johannesburg Plan of Implementation (and the related targets on sanitation and improving the lives of slum dwellers) as part of a broad thrust to accelerate progress towards achieving the Millennium Development Goals. With time-bound targets agreed by some key donors, momentum would appear to be building to meet the Monterrey commitments on development assistance. Governments are much**

more aware of what is required from them in terms of policy, budgetary and institutional reforms to mobilize additional domestic resources and external support. Local authorities have in many instances been accorded greater autonomy and, to a lesser degree perhaps, command over resources. Solutions are well known to practitioners, and communities, NGOs, and the private sector have acquired valuable experience in water service delivery on which to build in partnership with Governments. Innovative instruments are being employed to secure low-cost long-term financing for water management and other infrastructure.

Notes

[1] The members of UN-Water are: FAO, IAEA, IFAD, the International Strategy for Disaster Reduction, UNCTAD, UNDP, the Department of Economic and Social Affairs, ECA, ECE, ECLAC, UNEP, ESCAP, UNESCO, ESCWA, UN-Habitat, UNHCR, UNICEF, UNIDO, UNU, the World Water Assessment Programme, the World Bank, WHO and WMO.

[2] See WHO/UNICEF Joint Monitoring Programme web site (http://www.wssinfo.org/en).

[3] According to the Bill of Rights, Constitution of South Africa, section 27 (1) (b), "Everyone has the right to have access to sufficient food and water".

[4] *The Challenge of Slums: Global Report on Human Settlements 2003* (UN-Habitat publication, Sales No. 04.III.Q.1).

[5] Department of Economic and Social Affairs/Population Division (2004), "World urbanization prospects: the 2003 revision", table 6.

[6] World Bank data shows that over half of private water and sanitation projects and three quarters of investment has gone to just six countries, including Argentina and Brazil: see World Bank, Private Participation in Infrastructure Project Database.

[7] See World Bank, "Reforming the Water Sector", in *Reforming Infrastructure: Privatization, Regulation, and Competition* (Washington, D.C., 2004).

[8] Most empirical evidence suggests that the income elasticity of demand for water by households is indeed low; see J. M. Daluisen, R.J.G.M. Florax, H.L.F.M.G. de Groot, and P. Nijkamp (2001), "Price and Income Elasticities of Residential Water Demand", Tinbergen Institute discussion paper TI2001-057/3, Amsterdam.

[9] In time, rising per capita incomes would tend to shrink the size of subsidies and relieve budgetary pressures.

[10] One example is the Decentralized Infrastructure and New Technologies Facility established by India's Infrastructure Development Finance Company to provide "last mile access" to basic infrastructure, including water supply; See M. Mehta, *Meeting the Financing Challenge for Water Supply and Sanitation. Incentives to Promote Reforms, Leverage Resources, and Improve Targeting*, World Bank, Water and Sanitation Program, Washington, D.C., 2003.

[11] Despite the role of small-scale water providers, over the past decades, Governments have favoured large water utility companies, and results remain unsatisfactory. Many low-income households buy their water from small-scale water providers, and it stands to reason that efforts directed at improving their services and lowering their costs would benefit the poor.

[12] UNDP/World Bank, Water and Sanitation Programme, *Focus on Maharashtra: Alternative Management Approaches for Village Water Supply Systems*, field note, January 2004.

[13] Typically, a rainwater harvesting system consists of three basic elements: the collection system, the conveyance system, and the storage system. Collection systems can vary from simple types within a household to bigger systems where a large catchment area contributes to an impounding reservoir.

[14] See http://www.unep.or.jp/ietc/publications/urban/urbanenv-2/index.asp.

[15] For example, in Chad, the preparation of the integrated water resources management plan started in 1999 and was finalized and nationally endorsed in 2003. Two national committees were created by decree to oversee the exercise, one technical at the level of 10 directors of technical departments and representatives of main actors and one strategic with ministers, municipalities and elected representatives (see http://www.un.org/esa/sustdev/tech_coop/sdea/index.html).

[16] Current reforms in managing water resources promote a more democratic and responsive management set-up. A risk exists, however, that decision-making could be appropriated by small groups of influential users to the detriment of vulnerable groups. Efforts should therefore be made to empower and encourage participation of the most vulnerable groups.

[17] Examples are from Frank Rijsberman, 2004, "The Water Challenge", prepared for the Copenhagen Consensus Project, revised 3 May. The United States NGO that helped develop the treadle pump estimates that roughly 1.2 million have been sold in Bangladesh.

[18] Projected water scarcity by 2025: International Water Management Institute, Sri Lanka.

[19] See H. Bjornlund and J. McKay, 2002, "Aspects of water markets in developing countries: experiences from Australia, Chile and the United States: *Environment and Development Economics*, vol. 7.

[20] Water-borne diseases from fecal contamination of surface and groundwater continue to be a major cause of mortality and morbidity in the developing world. Diarrhoea and cholera alone kill an estimated 3 million people a year in developing countries, the majority children under the age of five.

[21] One good example of regional cooperation in Asia and the Pacific is the Typhoon Committee, which covers east and south-east Asia and the North Pacific. It was jointly established in 1968 under the auspices of the Economic and Social Commission for Asia and the Pacific and the World Meteorological Organization to coordinate efforts in predicting and monitoring typhoons. The Committee provides advice on improvements to forecasting and community preparedness and prevention activities, promotes research and training, and facilitates identification of funding sources.

[22] Water accounting methodology provides decision makers and users with a basis for informed and cross-sectoral decision-making. It focuses on the interactions between two systems (the user's system represented by the economy and the water resource system) within a reference territory that can be a country, a region or a river basin.

[23] Global Water Partnership and World Water Council, *Financing Water for All: Report of the World Panel on Financing Water Infrastructure*, 2003. Estimates cover drinking water, sanitation and hygiene, municipal wastewater treatment, industrial effluent, agriculture and environmental protection.

[24] Statistics are from the Organization for Economic Cooperation and Development/Development Cooperation Directorate Creditor Reporting System database.

[25] Cambridge Economic Policy Associates, "Funding Johannesburg — Beyond the Rhetoric: Delivering the Water and Sanitation Targets", discussion paper, 2003.

[26] http://www.attra.org/guide/dwsrf.htm.

[27] Inter-American Development Bank, "Municipal Bond Market Development in Developing Countries: The Experience of the US Agency for International Development", Finance Working Papers, Washington, D.C., 1997.

[28] Microcredit and revolving credit funds have proven to be important instruments of poverty alleviation worldwide. Experience shows positive impact of these efforts in terms of asset acquisition by communities and individuals.

[29] http://english.people.com.cn/200207/04/eng20020704_99086.shtml.