THE INSCRUTABLE NILE AT THE BEGINNING OF THE NEW MILLENNIUM

by

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Abstract

After the great drought of the 1980s the waters of the Nile returned in abundance during the last decade of the twentieth century, but the peoples of the Nile Basin are reproducing at a greater rate than the waters of the Nile. The claims to this scarce resource are based on history and equity, both fundamentally incompatible. Despite the creation of basin state organizations for discussion, conferences, and the intervention of the World Bank, the ten basin states, particularly Egypt, are determined to construct their own projects for *Nile Control* to feed their citizens in the new millennium.

> What we basically need is to deal with the Nile basin as a single region with shared natural resources. If we take this as a basis for dealing with the Nile issue, we will be able to devise better ways to achieve the maximum benefit from its waters.
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> Meles Zenawi, Prime Minister of Ethiopia, 7 April 1998.

> Egypt recognizes that each state has the right to equitable utilization of its waters in accordance with international law. Egypt further recognizes that existing water agreements do not hinder the utilization of the Nile waters by any of the riparian states.
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> Marawan Badr, Egyptian Ambassador to Ethiopia, 7 August 1998.

Throughout the twentieth century British and Egyptian engineers and hydrologists had sought to regulate the historic flows of the Nile waters, *Nile Control*, to prevent the destruction by floods during the years of high Niles and the famine when its waters did not arrive out of Africa. Structures to conserve the water, dams, were built at the first cataract in Egypt at Aswan and on the Nile tributaries in the Sudan. More elaborate plans were designed to capture and utilize the Nile waters for those who were dependent upon the Nile. Late in the nineteenth century the Nile was in flood. In the twentieth century the Nile waters vacillated with excruciating and unpredictable flows. The great drought in the Nile basin during the 1980s had reduced Lake Nasser to its lowest levels since the completion of the Aswan High Dam in 1971 to end with the Egyptian water crisis of 1988. During this decade no Egyptians perished from lack of water. The Ethiopian experience was quite different and more devastating. While the Egyptians survived because of the waters stored behind their high dam, a million Ethiopians perished from famine and thirst when the rains did not arrive. They had no dam.

Unlike the Egyptians who had been measuring Nile flows for 5,000 years, the Ethiopians did not begin their investigations into the conservation of the Nile until 1956 when Emperor Haile Sellassie established the Ministry of Public Works. It was reconstituted in 1971 as the National Water Resources Commission to report directly to the Council of Ministers on how best to manage and develop the abundant waters of the Ethiopian highlands. The commission had no knowledgeable technical staff and was, in fact, a sinecure for the Ethiopian elite whose personnel were intimidated by the traditional hostility from powerful regional barons suspicious of the central government. In an attempt to bring order out of bureaucratic chaos a new agency, the Valley Agricultural Development Authority, was

established in 1977, but it soon became a paper program to coordinate water resources. The planning and building of structures of conservation for Ethiopian waters remained the responsibility of the Ethiopian Water Works Construction Authority, a bastion of make-work civil servants. In peace, Ethiopia could hardly afford this plethora of impotent agencies competing for scarce resources. In revolution and war, they became irrelevant, and it was not until the end of his regime that President Mengistu finally realized that his failed revolution needed an Egyptian *Master Water Plan.*

The Ethiopian *Preliminary Water Resources Development Master Plan* (PWRD) was prepared and produced in 1990. Its purpose was to determine the best means "for the control, protection, conservation, distribution, and utilization of the waters of Ethiopia to meet present and future needs for all beneficial uses and purposes in all areas of the country to the maximum feasible extent."[1] Unlike the Egyptian *Master Water Plan*, the Ethiopian PWRD was more speculation than reality inspired by the sixteen volumes of the U. S. Bureau of Reclamation study, now twenty-five years old, and limited information thereafter from three hundred water gauges scattered throughout the sprawling highland plateau divided by the great canyon of the Blue Nile, hundreds of deep tributary ravines, and the Simyen Mountain Massif at the source of the Atbara. There was little infrastructure to reach its rivers and few competent personnel within the three principal agencies for planning and development of Ethiopian waters. Despite efforts to expand the number of gauges and organize the collection of their readings, without a coherent and defined proposal it was impossible to draft a plan or legislation for the conservation of the abundance of Ethiopian waters. Historically, Ethiopia is a land of small plots tilled by peasants with ancient and parochial loyalties and complex relationships with the feudal landlord nobility. After the

overthrow of Emperor Haile Sellassie in 1974, Mengistu Haile Mariam and the *Derg*, the ruling council, launched an ambitious program of collective agrarian reform that destroyed old agricultural practices but failed to replace them with productive cooperative farms. Neither the old nor the new, traditional agriculture or collective communes, could be economically supported by irrigation.

Despite revolution and the end to the *Derg* in 1991, the democratic, federal government of Meles Zenawi could not ignore the question of the Nile waters, particularly when Egypt was inaugurating large projects of reclamation. The dearth of data, skilled civil servants, few financial resources, and the need to establish the stability of a new government made any revision of the 1990 Ethiopian *Master Water Plan* impossible. The alternative was to turn to foreign consultants, at little cost, to examine specific projects enumerated ironically in the U. S. Bureau of Reclamation Report of 1964. During the next decade the French reported on the Blue Nile, the Italians on the Beles, and the Dutch on the Tekeze. By the end of the millennium the Ministry of Water Resources had a plethora of proposals from foreign consultants but no revised master plan to provide for a population reproducing at a rate of three percent per year and a per capita demand for food at six percent. During the decade after the overthrow of Mengistu the necessity for Meles Zenawi to consolidate the new regime, contain the Oromo insurgency, continue the historic conflict with Somalia, and wage war on the border of Eritrea consumed the energies and resources available to the Ethiopian government and its leaders. Millions of dollars for arms and the mobilization of it peoples precluded the evolution of a coherent Ethiopian water plan but not Ethiopian claims to an equitable share of the Nile waters.

While the Ethiopians struggled at the end of revolution to regain their Nile patrimony, the Egyptians were frustrated in the upstream states by a combination of suspicion, political instability, and a colonial legacy that did not encourage any Egyptian commitments other than to meet, discuss, and to meet again. In 1961 the Egyptians had accepted with enthusiasm the invitation of the East African states to join Hydromet (*Hydrometeorological Survey of the Catchments of Lakes Victoria, Kyoga, and Mobutut Sese Seku*). In 1976 they had proposed a Nile Basin commission without success. In 1983 Egypt persuaded five of the riparians (Egypt, Sudan, Uganda, Zaïre, Central African Republic) to become UNDUGU (*Ndugu*, Swahili: Brotherhood). During the next ten years the members of UNDUGU did little except discuss the drought and had no plans when the rains returned. The Egyptians, however and with Sudanese assistance, persevered, and despite the revolving numbers of personalities representing water in the Nile basin states, there was a growing familiarity among the regulars to their meetings who realized they had some common interests in the Nile. In December 1992 at the sixty-seventh meeting of UNDUGU in Kampala six ministers for water resources were convinced by the Egyptians to reorganize this convivial group into a more scientific organization to consider those technical matters that ministers concerned with political affairs had little interest or were ignorant. The Technical Cooperation Committee for the Promotion of the Development and Environmental Protection of the Nile, known in the world of African acronyms as TECCONILE, was a decided improvement over impotent UNDUGU but hardly an Egyptian diplomatic hydrologic victory. To be sure, Egyptian engineers and hydrologists would dominate its deliberations, but Ethiopia remained an aloof observer. Burundi, Eritrea, and Kenya, marginal contributors to the Nile waters, preferred to join the Ethiopians as observers rather

than signatories. TECCONILE was to prove another frustrating experience for the Egyptians.

In 1992 they finally prevailed upon five of their upstream neighbors to become more active under the TECCONILE acronym to plan for the use of the abundant Nile waters that had returned to Lake Nasser in the 1990s. The Egyptian policy for Nile Control had not changed in thirty years. There was, in fact, no alternative but continuous dialogue with hesitant and hostile riparians placated by financial support for their local schemes so long as they would not impede the flow of the Nile to Aswan. The first was accomplished by the International Nile 2002 Conferences beginning in 1993 at Aswan. They have been held annually in late winter, rotating from one basin capital to another.

The International Nile 2002 Conferences have been the forum, often held with considerable fanfare, for members from the scientific community to present their lucid and turgid papers. They have also been common ground for ministers and civil servants to protect their national interests during formal presentations but during the informality of private conversations acquiring mutual respect despite deep differences. In February 1994 at the Second Nile 2002 Conference in Khartoum the participants translated their discussions into practical projects for regional cooperation in the management of the Nile waters. During the past two years the Egyptian engineers and their colleagues of TECCONILE had not been idle. At Khartoum they presented The Nile River Action Plan that included twenty-two projects for water resource management, institution building, training, regional cooperation, and environmental protection among the states of the Lake Plateau. It deliberately contained no proposals for the construction of structures—barrages, canals, and dams-- for the conservation and management of the Nile waters that would have reopened the contentious

issue of Nile Control and who owned the Nile, those with historic or those with equitable rights.

The Nile River Action Plan was the practical manifestation of Egyptian Nile policy to support water management and cooperation among the states of the equatorial lakes. Once absorbed in projects to combat their immediate needs Egypt could pursue its massive projects for desert reclamation without harassment from states on the Lake Plateau. TECCONILE, in which Egypt was the dominant participant, would administer the plan from its headquarters at Entebbe. The Action Plan was unanimously approved in February 1995 by the ministers for water from the Nile Basin states, the Council of Ministers, during the Third Nile 2002 Conference at Arusha. Jackson Makwetta, the Tanzania Minister for Water, Energy and Minerals, cautiously commented it was not a plan, only an expression of commitment. The Tanzanian Prime Minister, Cleopa Msuya, declared his government was committed to the principle of "equitable entitlement," not "historic needs or established rights" to the Nile waters. Their suspicions of the Egyptians were symbolic of the fundamental difference that has historically bedeviled the planning of projects for Nile Control.

Two years later Egyptian shuttle diplomacy prevailed. The Nile River Basin Action Plan was brought before the Fifth Nile 2002 Conference convened in Addis Ababa in February 1997. There were few representatives who could not support innocuous projects for the collection of data, environmental management, and training for personnel in the states of the Lake Plateau. These countries embraced great quantities of fresh water in the equatorial lakes they did not immediately need but could support the expanding population of Egypt. In his opening address to the conference Shiferaw Jaso, the Ethiopian Minister for Water Resources, insisted "as a source and major contribution of the Nile waters, Ethiopia has the

right to have an equitable share of the Nile waters and reserves its rights to make use of its water."[2] There was nothing new in this declaration except a half century. In 1956 the Imperial Ethiopian Government had officially declared it "would reserve for her own use those Nile waters in her territory," known as equitable shares.[3] The dearth of water in Ethiopia and Egypt during the 1980s was a sobering experience that produced a new spirit and clarion calls from Cairo for confidence-building and pious pronouncements from Addis Ababa for cooperation that failed to disguise the incompatibility between "equitable shares" and "historic needs and established rights." At the end of the millennium it had become more, not less, difficult to reconcile equitable shares and ancient rights by more Egyptians and more Ethiopians requiring ever more water.

It should come as no surprise that lawyers are the principal beneficiaries of disputes over the right to use fresh water. For more than a century they have argued that the resolution of contentious claims of river water, historic or equitable rights, should be determined by international law. International law and the sovereignty of the state are frequently incompatible. As time goes by international agreements concerning a river basin with several riparians, the Nile has ten, have become more intricate when demand is greater in some sub-basins than others, the supply is unpredictable, at times insufficient, and the ambiguities of international law make adjudication obscure. These hydrologic and legal anomalies inevitably produced tensions most easily resolved by negotiations between two countries that were resolved by political, not legal agreements. Appeals to international law by petitioners were as friends of the court, not as the judge. The management of the Indus, Ganges, Parana, Columbia, and Rio Grande were all successfully settled between two states by treaties that have stood the test of time. The Jordan, Tigrus-Euphrates, and the Nile, all

with multiple riparians, have been impervious to appeals for a management agreement in which international law may have a legal opinion but no means to enforce it except by rhetorical persuasion. All of these three major river basins are inhabited by peoples with ancient animosities that usually overwhelm the reality of mutual benefit recognized by the antagonists. In all disputes over small streams or great rivers the common denominator has been the capacity to capture the protection of concerned governments, the allegiance of their civil servants, and the academic arguments of scholars to defend those who are dependent on the waters.

International law derives its legitimacy from agreement or by custom. Treaties are explicit, but their clauses can be susceptible to future interpretation that normally does not undermine the fundamental terms of the original agreement. There are some four thousand treaties relating to international lakes and rivers. Most are bilateral defining the management and sharing of water between two sovereign states. A few are multilateral agreements that embrace a watercourse that runs through several states in its drainage basin. These are specific remedies to resolve special disputes when one or several riparians perceive they will be deprived of a fair share of the water. They are not derived from any generally accepted international law, but in each individual case they represent practical compromises that define what is an equitable distribution of the waters. The pragmatic need to keep peace on the river by sharing its water has produced many of these treaties without reference to any internationally accepted statute. By the end of the twentieth century the aggregate, if not the legal weight, of these many individual treaties has created by custom an unwritten principle that equitable utilization is the foundation upon which negotiations should begin for the division of a scare resource.

The growing acceptance of equitable utilization of river water at the end of the twentieth century replaced that of Judson Harmon, Attorney General of the United States, at the end of the nineteenth. In 1895 he argued that sovereignty gave the right of a nation to the waters within its domain. The "Harmon Doctrine" was later cited by the Ethiopians to claim the Nile waters, but it was never applied in the United States and ignored by the Egyptians determined to demand their historic rights. Like most principles, equitable utilization is a body consisting of its parts, for which there was no consensus on the rules that put it together despite those who have tried. In 1961 The Institut de Droit International proposed equity but recognized circumstances and needs. In 1966 The International Law Association was instrumental in adopting at Helsinki rules for the "Uses of the Waters of International Rivers" in which Article IV authorized states "to a reasonable and equitable share in the beneficial uses of the waters of an international drainage basin."[4] These were impracticable recommendations rendered unenforceable by piously urging riparians to take into consideration the economic and social needs of each. Ironically, the very vague wording of the Helsinki Rules have made them all the more acceptable to those who have never known thirst.

The International Law Commission of the United Nations endorsed the principle of equitable utilization in 1991 so long as an upstream riparian did not cause appreciable "harm" to those downstream. The commission, however, clearly differed from those definitions of "equitable utilization" by the Institut de Droit International and the International Law Association in which upstream states should not "harm" a downstream riparian who had established "historic entitlement" to the water by need, development, and use without its agreement. This ruling by the UN commission essentially confirmed existing

custom and usage unless new water became available. Equitable utilization consequently remains in the eye of the beholder and not enforceable by law. A powerful downstream state will undoubtedly marshal its influence to persuade or convince by force weaker upstream riparians to desist from claims for equitable use.

This legal legerdemain left little leeway for any redistribution of the Nile waters. Egypt and the Sudan had established their historic rights in 1959 by an agreement for the *Full Utilization of the Nile Waters*, but if the upstream riparian states "claim a share of the Nile waters," Egypt and the Sudan will, according to Article V of the agreement:

> consider and reach one unified view regarding the said claims. And if the said consideration results in the acceptance of allotting an amount of the Nile water to one or the other of the said states, the accepted amount shall be deducted from the shares of the two Republics in equal parts, as calculated at Aswan.[5]

None of the states upstream from Khartoum have ever exploited this article to challenge Egypt and the Sudan on their division of ninety percent of the Nile waters. At the Fifth Nile 2002 Conference in February 1997 at Addis Ababa, Ethiopia argued that equitable distribution of the Nile be determined by law not by demand. Egypt and the Sudan are presumably protected by the obligation in the UN International Law Commission report that upstream states should not cause "harm" for those downstream. The upstream states have argued that their later development depends on the principle of equitable utilization that would be foreclosed if causing "harm" to Egypt and the Sudan. There is no statutory law for international watercourses and no international body that could enforce it. Ethiopia cannot conclude that Egypt has exceeded its equitable share when it cannot demonstrate that it has harmed its downstream neighbor. In the nebulous world of international lawyers where continuing discourse takes precedent to statute, those with

historic rights and those with equitable utilization may evolve a shared vision while each vigorously pursues their projects to use the Nile waters for their own needs.

Within a month after the Addis Ababa conference the World Bank was asked to review the proposal made in 1995 by the ministers for water of the Nile Basin States, the Council of Ministers, to provide funding for the Action Plan. This request created a dilemma. The World Bank had a history of support for river basin development, but the rights to water in any river basin still remained politically controversial, legally obscure, and emotionally volatile and nowhere more than in the Nile Basin. The bank was customarily cautious, unwilling to take risks on the Nile without seeking professional advice and partners in the consultative process, the Canadians and the United Nations Development Programme who had already financed and been involved in the evolution of the Action Plan.

In November 1997 a group of international experts on river basins of the world, conveniently known as the International Advisory Group for the Nile Basin (IGA), met at Coolfont outside Washington D.C. to review the Action Plan. Their commentary was critical and their recommendations, subsequently incorporated in the report to the riparian countries in January 1998, significantly revised the shopping-list of projects included in the Action Plan. Instead of twenty-two uncoordinated projects the new Nile Basin Initiative was to promote action programs by a "Shared Vision." Since neither Ethiopia nor the states of the Lake Plateau had ever contemplated sharing anything, let alone their water, this was a radical but unassailable concept. The future development of the Nile would now be determined by policies acceptable to the basin states "to achieve sustainable socio-economic development through the equitable utilization of, and benefit from, the common Nile Basin

water resources." [6] In September the Nile Basin Initiative Secretariat opened its office at Entebbe in the old TECCONILE building under its executive director, Meraji O. Y. Msuya.

The Nile Basin Initiative was indeed a new departure in the management of the Nile, for its objective was equitable utilization that would erode historic rights. Shared visions were not the stuff of imperialists, planners, or dam builders. Economic development could not advance without the grand structures to control, divert, and produce hydroelectric power and water for irrigation from the Nile. Historically, the schemes for Nile Control have been designed at the Ministry of Public Works in Cairo or at the Ministry of Irrigation and Hydroelectric Power in Khartoum. "Shared Vision" was now to be realized by the participation of the local people who lived by the river and would absorb the immediate impact of any project to improve drainage, sanitation, fisheries, wetlands, and weed control. There are no dams, no canals, no barrages, and no obstructions to the flow of waters from the equatorial lakes. The Nile Basin Initiative is a peoples program for the people of the Lake Plateau who desperately need it.

North of the Lake Plateau the Ethiopians and Egyptians had not been idle. During the decades of long and tortuous discussions by UNDUGU, TECCONILE, the Council of Ministers, and the Nile 2002 Conferences culminating in The Nile Basin Initiative, the two downstream riparians, Egypt and the Sudan, were independently designing schemes for their own conservation and utilization of the Nile waters. The evolution of these projects from conception to drafting to pouring concrete was accompanied by continuing dialogue with the upstream riparians. Their political turmoil and dearth of resources presented no threat to the flow of the Nile for Egypt and the Sudan, and gravity precluded any challenge from states on the Lake Plateau or Ethiopia to structures downstream for irrigation and

hydroelectric power. The constraints for their ambitious conservancy schemes would be international interference or the dearth of resources to build them, not objections from upstream politicians or the memory of their engineers.

Elderly Ethiopians still remember the drought of 1972, an omen predicting the fall of Emperor Haile Sellassie two years later, and they will never forget the more devastating droughts of 1984 and 1985 that hastened the collapse of Mengistu and the *Derg* in 1991. The government of Meles Zenawi was determined to avoid these calamities even if Ethiopia had to carry out its own water plans independent of international assistance or a Nile waters agreement requiring concessions that neither Egypt nor the Sudan were prepared to make. The small Finchaa Dam was the only Ethiopian conservancy structure in the Blue Nile basin, but it was built to generate hydroelectric power not to store water for irrigation. The Ethiopians, however, had ambitious plans for other dams at Lake Tana, Tisisat Falls, on the Beles, and the Tekeze to generate electricity. The Ethiopian government would benefit from revenues of exported hydropower, but the Ethiopian people needed food more than electricity they could not consume.

Planning for the use of their Nile waters the Ethiopians dramatically shifted from large to small dams. Micro-dams can be constructed at little cost across the thousands of rivulets, streams, and rivers that lace the Ethiopian highlands to store water for local irrigation and years of drought. Hydroelectric dams spin turbines but pass the water down the Nile to irrigate the fields of the Sudan and Egypt. Small dams in Ethiopia collect water to retain it. They can be constructed by local labor who need no rhetoric from the central government as an incentive, for every Ethiopian knows the inevitable times of dearth and drought, that have nothing to do with international water agreements, will return. Each of these weirs

could contain only a pond compared to the massive imperial dams of the British and the Egyptians for Nile Control. In the aggregate they could become, in the future, a great reservoir.

While Ethiopia was contemplating building small dams, Egypt was constructing monuments. Rameses II at Abu Simbel would have understood the historic manifestation of the "edifus complex" of Gamal Abdel Nasser for a mighty dam and his successors for large schemes of desert reclamation to feed a population that had overwhelmed the fecund soils in upper and lower Egypt. Beyond the fertile fringe of the Nile and the deep silt of the delta spread the sands of Sinai to the east and the Egyptian desert to the west. Two massive projects were approved to reclaim these wastelands watered by the Nile for agriculture, industry, and tourists—one east of Suez in the Sinai along the Mediterranean shore, the other a thousand miles up the Nile in the Toshka Depression in the western desert 150 miles southwest of Aswan.

In 1976 Egypt began the construction of the Salaam (Peace) Canal from the Damietta branch of the Nile under the Suez Canal fifteen miles south of Port Said to emerge on the east bank with Nile water for the Suez Canal Region Development Project. When officially opened by President Mubarak on 26 October 1997, Ethiopia strongly objected to this diversion of the Nile outside its basin. In the geologic past many thousand years ago northwestern Sinai had been part of the Nile Basin. In the historic present it remains a province of Egypt. The Ethiopians were politely rebuffed and thereafter studiously ignored. One of the terms of the Camp David Accords in September 1978 was the return by Israel of 23,622 square miles of the Sinai Peninsula to Egypt. The following year Egypt began to plan for the eastward extension of the Salaam Canal to carry 12.5 million cubic meters of

Nile water annually to the Northern Sinai Agricultural Development Program. Fifteen years later in January 1994 the excavation of the second phase of the Salaam Canal commenced to irrigate 400,000 acres of the Sinai from Suez to El Arish, near the Israeli border, to accommodate three million Egyptian settlers at a cost of $1.4 billion. The irrigation of northern Sinai has not been without controversy dwarfed, however, by the much larger and more contentious Southern Egyptian Development Project.

The completion of the first Aswan Dam in 1902 had contained the historic fear of flood, and in 1971 the Sadd al-Aali had elevated that protection, but neither dam could determine the height of rising waters behind their great walls. Nature made these decisions. After five thousand years the Egyptians knew that floods were as inevitable as drought. As part of the construction of the Aswan High Dam the Egyptians began in 1966 the excavation of a fourteen mile canal through Khor Toshka on the western shore of Lake Nasser to spill any abundance of water into the Toshka Depression. It was a safety valve to release excess water whenever the reservoir behind the high dam rose to dangerous levels that could threaten its integrity. Ironically, the Toshka Overflow Canal was completed in 1978 just in time for the decade of drought when the level of Lake Nasser dropped to precarious lows leaving the mouth of the canal high and dry. For eighteen years this drainage ditch remained an arid wadi, just another monument in the desiccated land of the pharaohs, but like many monuments it symbolized continuity between the past, the present, and the future. During its excavation as a spillway, it became apparent to Egyptian engineers that the canal could be a potential conduit to fill the Toshka Depression, reclaim vast spaces of the western desert, and supplement the aquifers in its oases by the waters of the Nile. The prospect for

these pharaonic proposals diminished into obscurity during the great drought of the 1980s, but they were revived with enthusiasm upon the return of the Nile waters in the 1990s.

During the last decade of the twentieth century the towering cumulus clouds from the South Atlantic carried quantities of water that had not been received in a hundred years. At the beginning of the twenty-first century this phenomenon remains controversial. Was this another inexplicable aberration of Nature or a pattern of global climate governed by El Niño? In 1988 the Egyptians had agonized over their options when the Nile had too little water. Suddenly on 4 August the Intertropical Convergence Zone moving north collided with a violent line squall from the southeast just north of Khartoum to drop nine inches of rain in twenty-four hours on a city with an annual average rainfall of seven inches. At the same time less violent but greater quantities of water fell upon Blue Nile and Atbara watersheds. One hundred and six billion cubic meters, nine percent above the century average, surged down the Nile to Aswan to break the great drought, flush through the turbines, and water the fields.

The waters of the Nile had returned. During the next decade (1988-2001) the average annual mean flow of the Nile was 86.5 billion cubic meters and almost recovered the century mean, 88 billion cubic meters. At the end of the millennium the Sadd al Aali dramatically demonstrated it could contain the massive flows of 1994 (91.9 bilm^3), 1996 (92.2 bilm^3), 1998 (121 bilm^3), and 1999 (95.2 bilm^3). By 1996 the Egyptians had to decide what to do with too much water.[7] The dams at Aswan in 1902 and 1971 were to eliminate fear of flood forever, but the Nile torrent of 1996, ten percent greater than the century average, dramatically raised the level of the reservoir. The enormous pressure produced by the weight of 140 billion cubic meters of heavy water threatened the dam above and the

earth below. The maximum level for the reservoir had never reached the opening of the Toshka Overflow Canal above the rising waters of the lake. The crust of the earth at the bottom of the reservoir was a latticework of geologic faults vulnerable to fracture from the increasing weight of Lake Nasser.

On 31 July 1996 the reservoir had risen to 567 feet. The tolerable maximum level for the reservoir without damage to the dam was 583 feet (178 meters) at which the waters of Lake Nasser would spill into the overflow canal and the Toshka Depression. Throughout August the level of the lake moved relentlessly upward inch by inch, centimeter by centimeter. By mid-August it was rising more than three inches a day to 570 feet. Upstream in the Sudan officials in Khartoum declared a state of emergency when the Blue Nile gauge at Al-Daym on its Ethiopian border registered an unprecedented forty-three feet. Hundreds of homes were destroyed along the Nile at the confluence of the Blue and White Niles, and the raging waters surged downstream to destroy the banks of the Nile in Nubia. By the end of August the reservoir had reached 574 feet, the highest level since the completion of the high dam in 1971. On 27 August the Egyptian Minister of Public Works, Dr. Muhammad Abdel-Hadi Radi, declared an emergency in Upper Egypt and established a crisis team at Aswan to monitor the rise of Lake Nasser. They predicted that the reservoir would continue to rise, and it did. On 29 September the lake rose another two inches, 583 feet to spill sixty million cubic meters into the Toshka Overflow Canal. The minister assured the populace there was nothing to fear from earthquakes. Three months later on 9 January 1997, thirty-seven years to the day after Gamal Abdel Nasser had attended the opening ceremonies for the Aswan High Dam, President Hosni Mubarak presided over the inauguration of the Southern Egypt Development Project, Toshka.

The water crisis of 1988, a rapidly expanding population, and the opportunity that Nature provided by the return of the Nile waters in the 1990s convinced the Egyptians to reclaim the wastelands of the western desert and expand the cultivation in the historic oases of Kharga, Dakhla, Farafra, and Bahariya. The popular image of a desert is a vast expanse of uninterrupted sand like the Libyan or the Tenéré in Niger where even the Tuareg fear to tread. Most deserts, however, are alive with unique fauna and flora amid rock, gravel, and alluvial soils from the geologic past. If the Aswan High Dam created a huge reservoir, the Desert Reclamation Authority of the Egyptian Ministry of Irrigation and Water Resources in 1963 launched a decade of geologic and soil surveys around the Toshka Depression to reclaim the desert from the Nile water trapped in Lake Nasser. In 1971 they concluded that half a million acres from the one and a half million of the Toshka Depression were arable for cultivation if watered. This survey was terminated in 1973 by the mobilization for war against Israel, but Toshka was not forgotten. Optimism that land could be reclaimed in the western desert prevailed despite the beginning of a decade of drought. The New Valley Governate was organized in 1980 to administer this vast, sparsely populated region and prepare it for expansive reclamation. The Egyptian Planners Association proposed to extend the canal carrying Lake Nasser water from the Toshka Depression to the western oases in this New Valley.

The following year, 1981, the recommendations in the *Master Water Plan* were principally concerned to reform water management in the Egyptian Nile and to seek new water from the equatorial lakes and the Upper Nile. The first priority, however, was to expand acreage for cultivation by reclaiming land along the Mediterranean Coast of Sinai. The Toshka Project, itself, was not mentioned in the *Master Water Plan*, but the planning

for what was to become The Southern Egypt Development Project had begun. During the next ten years, when the levels of the Lake Nasser reservoir plunged to new lows, the General Authority for Rehabilitation Projects and Agricultural Development and its German consultants from Aeroconsult-Bisser began a more comprehensive study of the soils of the New Valley region in 1983. In 1984 the respected Egyptian Geological Survey began its extensive investigations that were later complimented by satellite surveys from the Remote Sensing Unit at the Institute of Lands, Water, and Environmental Research. During the next ten years the Egyptian western desert was examined on the ground and from the air to determine within a reasonable prediction which areas contained soils, when efficiently watered, could produce economically viable crops. Core holes were bored, samples collected, and satellites swept overhead as the research continued in a desultory but determined fashion.

Meanwhile, events upstream seemed to confirm the wisdom to build the Aswan High Dam to make Egypt self-sufficient in water. When the decade of drought came to an end in 1988, the following year an Islamist coup d'etat unfriendly to Egypt seized control in Khartoum, the same year that Yoweri Museveni was writing a new constitution for Uganda to give him greater powers. Three years later in 1991 Mengistu Haile Mariam was overthrown by Meles Zenawi whose nationalism was more outspoken about Ethiopian rights to the Nile waters than either Mengistu, a communist, or Haile Sellassie, the former imperial emperor. By 1994 the Nile waters had returned in flood, and the levels of Lake Nasser were rising. The time had come for the Egyptians to build another monument, not to conserve water, but to use it for the reclamation of land to employ and feed the expanding population of Egypt, one million new Egyptians every nine months.

Massive water projects, once begun, quickly assume a life of their own. Toshka was no exception. The Egyptian Academy for Scientific Research and Technology discovered additional underground water resources in the western oases. By 1996 the Soil and Water Research Institute had found two and a half million acres suitable for agriculture. On 9 January 1997, amidst much fanfare, President Mubarak officially opened the Sheikh Zayed Canal to make possible Phase I of Toshka, the New Delta, the "Mega-Project" that would secure his place with Muhammad Ali and Gamal Abdel Nasser in the hydraulic history of modern Egypt. The canal would carry the Nile waters from Lake Nasser for the desert to bear fruit and add another half million acres to the fourteen million currently under cultivation in Egypt. The canal was named in honor of Sheikh Zayed Bin Sultan El Nahayan, president of the Arab Emirates, who contributed $100 million from the Abu Dhabi Development Fund for its construction. The Sheikh Zayed Canal should not be confused with the Toshka Overflow Canal to drain excessive water from Lake Nasser. Beginning at the Mubarak Pumping Station, the new canal is lined in concrete forty-five miles to the west and then north. At its terminus, to be completed in 2002 at a cost of $1.2 billion, the canal will divide into two branches to bring life to a half million acres of desert.

Like dams, large reclamation projects for irrigation produce concrete and critics. Toshka was no exception. Egyptian and international experts deplored the environmental degradation of a fragile desert. They cannot accept the loss of precious water from evaporation in exposed canals excavated through hundreds of miles of sand, rock, and heat to remote oases. Those who calculate the amount of water in the Nile are the most concerned. They argue there is not enough water for Egypt's ambitious reclamation projects in Sinai and Toshka, Sudanese dams at Kajbar and Merowe, a Uganda dam at Bujagali Falls, not to mention

dozens of hydroelectric and irrigation projects in Ethiopia. Tony Allan, Professor of Geography at the London School of Oriental and African Studies, thinks Toshka "preposterous, a national fantasy…[for Egypt] is going to have less water, not more." [8] Egyptian hydrologists are concerned about evaporative losses, degradation of soils. Toshka has its defenders led by President Mubarak, his ministers, and his government. The prospect of protecting the sparse fauna and flora of the western desert in return for acres of fruits and vegetables has little appeal to those who make policy or the fellahin who execute it. Egyptian engineers have produced volumes of papers for the interminable technical discussions at innumerable conferences that are dissolved by the reality that the population of Egypt in 2015 will be eighty-five million.

In 1996 the Nile produced 92.2 billion cubic meters that raised the level of Lake Nasser to 583 feet. Two years later the Nile demonstrated once again the historic unpredictability of its flood. In late August 1998 over a 121 billion cubic meters surged down the river. On Sunday, 21 September, over half a billion cubic meters were released from the high dam in an attempt to lower the level of the lake, but as in 1996 it was the overflow canal that once again discharged the excess into the Toshka Depression to protect the dam. Despite the spill of 27 September the level of the reservoir continued to rise reaching 592 feet. On Monday, 12 October 1998, it crested at 593 feet, ten feet above the record level of 1996.[9] Mahmoud Abu Zeid, Minister of Public Works and Water Resources and his phalanx of engineers, anxiously monitored the structure of the dam. Fortunately, for their careers the clay core, impacted sand, and rock fill stood firm against the pressure from 162 billion cubic meters of Nile water.

When President Mubarak, Prime Minister Kamal el Ganzouri, and a bevy of cabinet ministers stood on the bank of the Toshka spillway on 13 October 1998, they did not have the perspective of NASA astronauts who were in space at the time photographing a large lake estimated at 117 square miles at the bottom of the Toshka Depression, the first in the western Egyptian desert in 6,000 years. A year later, December 1999, satellite imagery discovered that twenty billion cubic meters, twenty-five percent of the average annual flow of the Nile, had spilled down the Toshka Overflow Canal. Five Saharan lakes filled 625 square miles of the Toshka Depression.[10] This abundance from the Nile and Lake Nasser may have been the work of God, Allah, or Nature, but it appeared a symbolic confirmation of President Mubarak's decision to pass more Nile water every year down the Sheikh Zayed Canal.

A year after the bulldozers began the excavation of the canal an international consortium was awarded $440 million to construct the massive Mubarak Pumping Station five miles north of the spillway. The entrance to the Sheikh Zayed Canal is sixty-three feet above the highest recorded level of Lake Nasser and a 178 feet above its lowest. Any hope of reclaiming the western desert would depend on the largest pumping station in the world to raise the water over the height of land into the Toshka Depression and the western desert. The Aswan High Dam would supply the power for the pumps through a unified grid as far south as Abu Simbel and ultimately to the western oases. Kaverner International, an Anglo-Norwegian company, constructed the intake, six miles of tunnels 164 feet deep into the reservoir. Hitchai of Japan built the twenty-two pumps. Arabian International of Egypt installed them to link and send three and a half billion cubic meters of Nile waters down the Sheikh Zayed Canal.

Toshka represents a revolutionary departure from the Egyptian past. It is a new frontier in the desert which every Egyptian throughout history has avoided whenever possible. The pressure of population may convince the Egyptians to abandon the river for the sand if the government can provide the incentives and its media can promote the prospect of prosperity in a land reclaimed from one of the hottest and driest environments in the world. It is indeed a challenge in a culturally conservative country whose citizens may not respond to the call unless compelled to do so. Toshka has become the great pyramid of Hosni Mubarak, his monument, his high dam. "We are currently going through a shift in Egypt's history, and I am devoting no less energy to this, than I am to combating terrorism and solving the Mideast problem."[11]

Toshka also represents a cultural and political revolution. It is the gravestone of the Egyptian Revolution of 1952 and the Arab Socialism of Gamal Abdel Nasser. The monolithic regime of Egypt today and its structured bureaucracy is more reminiscent of Rameses II in the thirteenth century before Christ than the socialists and communists of the twentieth century after him. The central government of Egypt appoints its powerful provincial governors, the mayors of its 4,000 villages, those who preach in the 60,000 mosques, and the presidents of its fifteen universities. They are supported by an inflated bureaucracy encrusted through time like a Red Sea coral reef with volumes of regulations that stifle initiative, discourse, and dissent. Entangled in a legal and regulatory cobweb spun by the spiders of Arab, Turkish, French, and British rulers, a third of the Egyptian people are underpaid civil servants with security of employment that often perpetuates their officious and mediocre performance.

In order to attract resources to build Toshka and the New Valley, the Egyptian government had to accept, as much by necessity as conviction, the economic rules of the free market, the historic Arab bazaar, the *suq*, untrammeled by restrictive government regulations. Toshka and the New Valley are being promoted more than just an agricultural breadbasket, but an opportunity for mining, manufacturing, and tourism supported by water, infrastructure, legal, and financial incentives to attract global money. In 1997 Law No. 8 exempted private investors from many of the crushing regulations that had previously inhibited investment. Generous tax benefits are offered. In August 1999 Prince Al-Walid bin Talal bin Abdel Aziz of Saudi Arabia was the first global entrepreneur to make a substantial investment in Toshka. The billionaire owner of Saks Fifth Avenue in New York and the George V Hotel in Paris decided to become an Egyptian farmer, more a landlord, however, than a fellahin. He purchased 120,000 acres of the northern branch of the Sheikh Zayed Canal to grow high value crops--citrus, grapes, vegetables--for his supermarket chain in Saudi Arabia and outlets in Egypt and the European Common Market. Determined to transform his acreage into the largest farm from reclaimed desert Cadiz Inc. of Santa Monica, California, and its farming unit, Sun World International, are designing a massive drip irrigation system in tract number one of Toshka. Fruit does not spring instantly from the ground and its acculturation in a desert will need an elaborate infrastructure that will require another twenty years. The Nile may deny its waters or give them in abundance, but in the end it will be old man river that determines the success of Toshka.

The New Valley Canal will be excavated north to the Darb el-Arbain, Baris, the Kharga Oasis, and then northwest to the archipelago of oases--Dakhla, Farafra, and Bahariya a hundred and forty-three miles beyond the terminus of the Sheikh Zayed Canal and a hundred

and eighty-eight from the Mubarak Pump Station. Thirty pumping stations will push the Nile through the desert. None of these giant reclamation projects can become a reality without an elaborate infrastructure. A network of macadamized roads will need to be built across the sands to bind together the oases with the Nile lined by the necessary wires and cables of communication. Railways, river ports on Lake Nasser, and the Abu Simbel International Airport will have to be modernized. It is a grand scheme at an incalculable price that will consume the energies of Egypt during the first half of the twenty-first century.

The purpose of Toshka and the New Valley is to expand the cultivation of Egypt to feed and to employ its exploding population. The western desert is the new frontier for millions of Egyptians to have a productive life in farms and factories rather than a life of urban poverty in Cairo or the provincial cities of Egypt. Some believe that the sophisticated technology required to reclaim the desert will not need substantial numbers of Egyptians, particularly the unskilled, working on schemes that require employees with advanced vocational training. There are those among the young, that Egypt has in abundance, who would prefer the bright lights of poverty in the city to the eternal sun and sand of the desert. The government will undoubtedly use all means at its command to bring seven million Egyptians to the New Valley, for without them Toshka will fail.

There is, however, a much deeper, historic reason for Toshka, the unity of Egypt. Five thousand years ago Menes, known as Hor-Aha, the Fighting Horus, was the first king of the first dynasty of the Old Kingdom. In 3,000 B.C.E. he unified Upper and Lower Egypt. During the next five millennia the pharaohs and their successors have found it necessary to use all their political skills and military strength to maintain the unity of the two Egypts. Every ruler of Egypt has employed different measures to retain his authority over a slender

green thread eight hundred miles by the banks of the Nile from the first cataract of the Nile at Aswan to the Mediterranean Sea.. Despite the revolution in communications and technology the unity of Egypt, symbolized by the river, remains the challenge for contemporary rulers as it was for Menes five thousand years ago. Today Egypt is dominated by the megalopolis of Cairo with its fourteen million citizens and the Delta where sixty percent of the Egyptians live. Forgotten and ignored Upper Egypt has been the perennial backwater of traditional agriculture and rural life where poverty is relieved by religion. Islamic piety is deeply rooted in the fellahin of Upper Egypt without the scholarship of Muslim *Shaykhs* and the *Ulama* scholars at al-Azhar, the center of Islamic learning in Cairo for a thousand years. Troubled and impoverished southern Egypt has been the fertile soil for the growth of Islamists and their divisive use of terrorism that can perhaps be contained by the economic rejuvenation of Upper Egypt. Toshka is no longer a massive reclamation scheme, but a political project to rehabilitate the south and tie the knot of unification. Menes would have approved.

The environment, soils, people, and unity will sink into the sands of Toshka without water. Egyptian dependence on the Nile needs no explanation from foreign environmentalists, scientists, demographers, or politicians. After acrimonious negotiations, whose ghosts still haunt the Ministry of Irrigation and Water Resources in Cairo and the Ministry of Irrigation and Hydroelectric Power in Khartoum, Egypt and the Sudan agreed on 8 November 1959 to divide the Nile waters between them. Egypt received 55.5 and the Sudan 18.5 billion cubic meters of the Nile, eighty-four percent of the average annual flow of 88 billion cubic meters. The parting of the waters in 1959 made possible the construction of dams, the Sadd al-Aali at Aswan in Egypt, Roseires and Khashm al-Girba in the Sudan. Once dams are built they become an accepted reality. The water they contain is not. It

fluctuates from one year to the next from decades of dearth to decades of plenty determined by Nature as its volume behind each dam is relentlessly reduced by the accumulation of dead storage of silt in still waters. The one constant has been the arbitrary intervention by man to divide the resources in perpetuity for his livelihood. In the last half-century the historic rights of Egypt, 55.5 billion cubic meters, and the Sudan, 18.5 billion cubic meters, have become their non-negotiable entitlement to the Nile waters. This article of faith was founded on the pragmatic assumption that the upstream riparian states did not need nor had the will, the resources, or the political stability to obstruct the flow of the Nile. These three factors have frustrated Egyptian and Sudanese efforts to find new water that made the entitlement of 1959 all the more sacred and necessary to reclaim one and a half million acres for greater Toshka.

When it is completed in 2017, the first phase of Toshka is estimated to require over five billion cubic meters of water sucked from Lake Nasser by the Mubarak Pump Station. Since there is no prospect in the near future of new water, the Egyptians have no other option but to find the water for Toshka by the conservation and management of their historic and acquired rights to the Nile, 55.5 billion cubic meters. This creates two conundrums. In the year 2001, the new millennium, Lake Nasser was filled to the brim. Despite efforts by Egyptian and foreign engineers, hydrologists, mathematicians, even astrologers they have failed to predict when Nature will provide sufficient water for the needs of Egypt today and Toshka tomorrow. Without the reform of water management in Egypt at a time of increasing demand by more Egyptians, the prospect of conserving five billion cubic meters for Toshka becomes ever more difficult except for the fact that the water arrives at Lake Nasser before Aswan. This fundamental law of gravity has not been lost on the Ethiopians in their highland massif.

At the beginning of the twenty-first century the utilization of the waters of the Nile has changed much by symbolism but little in reality. Symbolically, every member of the Nile Basin riparian states has declared its commitment to resolve Nile Control by cooperation and consultation. Ministers meet, experts discuss. The annual 2002 Nile Conferences have become an international forum for dozens of technical meetings orchestrated by the Nile Basin Initiative promoted and funded by the World Bank. Interminable negotiations over a scarce resource are indeed preferable to water wars. Despite the burden of yet more pretentious acronyms, ENCOM (Eastern Nile Council of Ministers), ENAP (Eastern Nile Subsidiary Action Program), hostile rhetoric or violent conflict will most certainly not create new Nile water. Efforts by David Grey of the World Bank in Washington and its Nile Basin Secretariat under Meraji O.Y. Msuya in Entebbe have succeeded in organizing a Nile club of confidence and conviviality among ministers and engineers for "Shared Visions" and a "Win-Win Scenario." At the end of March 2001 the Council of Ministers for Water Affairs of the Nile Basin states meeting in Khartoum enthusiastically approved the projects proposed by the Nile Basin Initiative. The proposals were, in fact, revisions of The Nile River Basin Action Plan submitted to the World Bank in 1995 by the Egyptians under the aegis of the Technical Co-operation Committee for the Promotion of the Development and Environmental Protection of the Nile Basin (TECCONILE). Not surprisingly, in 2001 the ministers had to generate yet another committee and acronym, the International Consortium for Cooperation on the Nile (ICCON) in order to continue the dialogue of organizing the Nile waters. Even the Ethiopian Minister for Water Resource Development was effusive. "It is only through joint actions that we can meet the challenges and benefit from [Nile's] bounties.

We are bound by the dictates of modern global economy and the hydrology of the Nile River system to work together for the benefit of our people."[12] The reality was much different.

The beguiling beauty of the inscrutable Nile is its mystery. For five thousand years its source was unknown. Its authenticity still eludes us. In August 2001 the rain clouds from the South Atlantic returned to wash away homes and crops in the Sudan and raise the nilometers to higher levels. The lakes of the Toshka Depression were once again renewed. This new abundance of Nile water confirmed the determination by the riparians to exploit their beneficence for the needs of their own people. In the conference hall, before the media, and intimate discussions the rhetoric of cooperation and consultation could not compete with the determination of individual leaders to meet their perceived responsibilities to their own citizens or subjects each taking advantages of the weakness of the other.

Egypt continues to fund and support projects of the Nile Basin Initiative, which they first proposed in 1995, that leaves them free to develop their extensive deserts in Sinai and the New Valley. The Egyptians are the immediate beneficiaries of civil war in the Sudan and the debilitating conflict between Ethiopia and Eritrea that has rendered these two commanding upstream states impotent to divert the Nile waters. Their disability is not, however, a permanent condition nor are the less ambitious schemes of the Upper Nile Basin states. Ethiopia has long sought to develop its phenomenal hydroelectric power by thirteen dams, projects under the "Shared Vision" of the Nile Basin Initiative. These same waters, however, can be used for irrigation. The Sudan is beginning preparations for the Kajbar Dam at the third cataract of the Nile and with loans from the United Arab Emirates to begin construction of the Merowe hydroelectric dam at the fourth cataract. Not to be left out of the race for the Nile waters Uganda received financial assistance from the World Bank in December 2001 for

the construction of another controversial hydroelectric dam at Bujagali Falls six miles downstream from the Owen Falls Dam at the outlet of Lake Victoria.

Despite abundant water in the last decade of the twentieth century, the fundamental issues of Nile Control have not changed in the last hundred years, only the players. Every state in the Nile Basin is confronted today by an expanding and younger population. They demand the benefits from the waters of the Nile to quench thirst and satisfy stomachs. These waters rise and fall with exasperating unpredictability. They can certainly be used more efficiently but will remain a finite and scarce resource. The Nile Basin Initiative has sought to create a spirit of cooperation among the traditionally hostile Nile riparians. The fundamental issues, however, remain. There are too many people who drink the Nile waters and too many to be fed from its known cubic meters that breeds the hydrologic Nilotic fever—*Every man for himselfe and God for us all.*[13]

END NOTES

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