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An Ethiopian Digest Of Enquiry.

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This is the 9th publication in a series celebrating Clean Rivers Trust's 20 years of research and making waves.

This work is dedicated to the Federal Democratic Republic of Ethiopia and its Ministry of Water.

Foreword.

The issues; covered in the following pages, were, mostly, outlined by the Ethiopian Embassy in London, for the attention of the Trust. Thanks is due to His Excellency; Mr Berhanu Kebede, the Ambassador; Mr Biruk Mekonnen, Head of Political Affairs and Ms Angela Kolongo of the Embassy Press Office (who made travel arrangements far simpler than otherwise they would have been).

Thanks; is also due, to several members of the Ethiopian community in Britain who have talked to me about their views on many subjects.

His Excellency has been very instructive with regard to the current situation in the country; the issues of the River Nile and the general climate; in all its guises.

The issue of qat or khat; Catha edulis is known in the country, was hardly discussed. I am assured that it is not of any importance. From the Trusts past experience it does raise concerns regarding water in any country where it is grown: that is why it has been singled out for attention.

The issues that are relevant to Ethiopia in many instances impact on the downstream neighbours; this is reported as fully and honestly as possible.

Contents.

Introduction.

The Federal Democratic Republic of Ethiopia is a large, landlocked country, bordered to the north and east by the nations that make up the Horn of Africa. It is considered to be one of the cradles of human kind; has a long established civilised society that is ostensibly a Christian country: with 50% of the population being Moslem. It is a parliamentary democracy and proud of it.

It is, in parts, the wettest country in Africa; whilst there are also some of the most arid areas on the globe. Its flora and fauna is amongst the most diverse of any country.

Ethiopia shares many of the common worries shared amongst many of the sub-Saharan states. These being destabilisation and aggression from outside agencies that appear to favour chaos rather than stable development. The country is proud of both its history and its modern and progressive attitudes to the future.

Tigray Province and the north became the focus of the world during the draught of 1984/5 which culminated with the 'Band Aid' phenomenon and the establishment of many NGOs and charities working assiduously to develop a better life for the population. This though has to be recognised as sticking plaster aid from the outside: whilst inside the country there are many specialists who can take the country forward sustainably; showing the world that home grown expertise is essential and available.

Clean Rivers Trust has yet to address many issues that are, as yet, unknown to it, and can only understand with familiarisation. The Trust has carried out many months of research to reach this point and is grateful for the words of wisdom written by Zewdie Abate in his book; '*Water Resources Development in Ethiopia* (Ithaca Press, Reading, UK 1994), which underscores the countries native independence and abilities.

The contents of this short work are a summary of the knowledge so far accrued. There will be longer narratives on each and other issues in future publications.

Ethiopia is, at present, in the midst of huge change; with vast infrastructural development; much of this development is being funded by outside agencies and countries. These changes range from new roads, railway (Addis Ababa to Djibouti), and water related developments; including hydroelectric expansion on the larger rivers of the country; including the Blue Nile and the Omo. These have all to be managed both for the benefit of the country and its people; but with consideration and care for the countries and their communities downstream of the country.

This is a feat of complexity; both of engineering and diplomatic skills. The realisation that so much of a nations wealth is power and the consequential power that that gives has need to be used to benefit the communities internationally and trans-borderally as well as parochially.

Issues of famine and draught still colour the European view of Ethiopia, the country is water rich, though due to its size and population densities the economics of distribution are such that there is little to be done for large traditionally arid regions of the country to gain from the immense rainfall of the well watered parts of the nation. This makes for a reliance on groundwater; though with little natural recharge in many areas these wells will need to access deeper and deeper strata to access these supplies.

The equally problematic issue of sewage treatment and the collection of it has yet to be addressed; particularly in the poorer parts of the towns and cities. These, in many instances do not have the rudimentary benefits of cesspits. There are though several self help possibilities that may be relivent to local populations. The development of water basin management and creation of stakeholder management is developing.

Agriculturally; Ethiopia is developing a cash crop base that sends vegetables around the world; satisfying industrialised countries' needs for all year round production.

The traditional crop of indigenous coffee is much aided in its marketing by the many fair trade label distribution networks. The natural home of coffee has though slipped down the league table of coffee producing nations. This is encouraging the development of other, less commonly grown crops to be considered.

Khat is a crop that in other parts of the African continent and Middle East (especially in Yemen) is grown alongside coffee; in some countries taking its place due to greater local and national prices.

Geology

The geology of Ethiopia is complex at the heart of the country and more easily comprehendible towards its edges; particularly the areas to the East and South of the country.

To the North and West of the country large areas are underlain ith Precambrian rocks; to a lesser extent they can be found in the South and East also. Ethiopia lies at the northerly tip of the continents Great Rift Valley; which spills out of Africa into the ocean, south of Madagascar and in a North and Easterly direction making up the Red Sea and the mountains of Yemen; at the South of the Arabian Peninsular. This vast geological feature is visible in the form of the valley of the Jordon as far North as Syria.

This rift system is marked in Ethiopia by immense masses of volcanic rocks, particularly Cainozoic in the west of the country. Much of the rift area is overlain by reasonably recent lacustrine sediments and volcanoes. There are large areas of exposed lava fields. Most are heavily eroded.

The main rock formation to the East and South are sedimentary sandstones and limestones of the Mesozoic and Cenozoic periods. These geological conditions are anomalous; as such structures in Europe would be considered (hydrologically) as the location of a major; potential, aquifer. In Ethiopia this group of rocks underlie a sparsely populated region, in part occupied by the Ogaden Desert. On maps there is evidence of oases located across the area; though no apparent exploitation of reserves in an area that has a latent fertility. There would appear, due to the rise in internet claims, to be a good prospect of commercial quantities of Gas available to be exploited in the region. [There are plans to exploit the major rivers of the region; the Wabe Shebele Wenz and the Webi Jubba (Giuba) or its tributaries; the Dawa, Genale and Wabe Gestro. These rivers have the potential to irrigate large area: they also could be used to recharge the aquifer further away to the East, opening up large areas that are at present non-productive.] The main mineral export of the country gold, the whole mineral industry only makes up about 1% of the nations gross national product.

The Nile.

The Nile.

The river is considered the longest or second longest river on the planet depending on the criteria of measurement. It takes and distributes water from and to ten countries of the African continent: namely Tanzania, Burundi, Democratic Republic of Congo, Uganda, Kenya, Sudan, Ethiopia, Eritrea and the Arab Republic of Egypt. The Nile is believed to derive its name from the Semitic ‘Nahal’, meaning river valley, or the later Greek ‘neilos’ and Latin ‘Nilus’. If correct the name is apposite.

The main branches of the river are the White Nile which rises in the ‘feeder rivers’ of Lake Victoria; the other branch, the Blue Nile which flows from Lake Tana draining the Ethiopian Highlands, and the Atbara; also flowing from the Ethiopian Highlands..

The Nile has been one of the most fertile river basins in the history of human civilization and development, ranging through, over 5,500 years. This has been due to the fecundity of its constituent parts. The many streams that make up this river are relatively insignificant to the long White Nile which is the major source of basal flow; whilst the, shorter, Blue Nile, adds as much as 80% of the main seasonal high water flows. This corresponds with the historic Nile floods in Egypt and Northern Sudan. It is this flow of the Blue Nile; which joins the White Nile at Khartoum, in Sudan, that brings the fertility of the floodwater’s rich loading of alluvium. This is gathered by the flood from the mountains and valleys of the Highlands that it flows from.

The fluvial stream is the life blood of this huge region of Africa; it is also the handicap that has limited the nations upstream of the broad flood plains of the Northern countries. These expansive states have been closer to the modern, developed, world for so long; particularly Europe, that they have been the beneficiaries of agreements made the other side of the Mediterranean Sea, and for over 100 years

The volume of water that brings such benefits to the floodplain are now considered as a wasted resource, unless there is some use made of them: in countries short of fossil and hydrocarbon fuels, the natural instinct is to harness that raw energy

With such plans, there are drawbacks; considerable problems have developed which have been detrimental to Ethiopian power generation and has also had unexpected effects cumulatively with other such operations elsewhere in the Nile basin; particularly where the river meets the sea.

Treaties.

The Nile has been subject to international agreements for many years. Several have had little to do with the regulation of flow but all are based on the protection of water volume.

The first treaty (or protocol) was between Great Britain and Italy in 1891. The purpose of which was principally to define territorial claims between the two colonising powers in East Africa; the only water based agreement was that Italy would not substantively alter the flow of the River Atbara into the Nile.

This agreement was primarily a border settling agreement and the water aspect, being unclearly worded to be of little if any significance.

The second agreement or treaty was an accord between Britain and Italy over the waters of the River Gash in Eritrea; it was a most equitable and friendly concoction.

The document required equitable treatment of the rivers waters so as to care for the power (Britain) down stream in a spirit of good neighbourliness. Such wording, and the disappearance of both powers; from the immediate landscape, has rendered it defunct. It did give rise to an agreement in 1925 between the two countries.

The third was a treaty between Great Britain and Ethiopia in 1902. the wording of this agreement has much to raise tempers; the English language version was accepted by the British and the Amharic version shows a different translation of meaning. Primarily the word ‘arrest’ was meant to the British to apply to any work on tributaries of the Nile; the Amharic understanding was that it meant; if the waters were stopped altogether.

The agreement was made by the British as a colonising power and with no provision for adoption by the Sudan. With the accession of Sudanese independence this treaty should have died off. It did not; this treaty being the most controversial of agreements, due to both sides accepting their own nation language led understanding. The Sudanese still believe that their right of veto has been lost due to imperialism and political ambiguity.

The forth agreement was an understanding between Britain and the independent state of the Congo in 1906. The purpose was protecting the waters of the Nile and its tributaries from impoundment or interruption of flow.

There was no replication of any sort that might benefit the population of the independent Congo.

The fifth treaty was a tripartite agreement; between Britain, France and Italy, in 1906. The purpose was to agree to act on behalf of Britain in the Ethiopian sub basin of the Nile. Not withstanding the rights that the Italians may have the Ethiopian nation had no right to 'absolute sovereignty' of its own water resources.

The Ethiopian government rejected this agreement and it was shelved with the misfortunate Anglo-Ethiopian agreement of 1902.

The sixth protocol involved Britain and Italy and was signed in 1925. This high handed act of imperialism was to agree how another sovereign country's (Ethiopia's) territory was to be managed. The area covered by this treaty was Lake Tana, at the head of the Blue Nile.

Ethiopia was aware of these plans and Britain was at times arrogant enough to go and discuss the proposal with the government in Addis Ababa. At the signing the Ethiopian government made it known that this was a most unhelpful and aggressive act. The powers that be wished it to be referred to the League of Nations; sadly it was not, at least not formally debated. Both Britain and Italy denied any coercion of Ethiopian sovereignty when asked by the League for an explanation. They further said that there was no formal method agreed to police the Lake in any case. The British and Italian governments pointed out that there was a need for; 'a reliable and self-enforcing mechanism that can protect the property rights of each stakeholder' (Britain and Italy) 'is essential if the principal of economically and ecologically sustainable international water development is to be applied.' The statement did not say how those that were to benefit would apply the treaty.

The seventh agreement was between Egypt and Anglo-Egyptian Sudan in 1929. This was a powerful and strikingly arrogant British fabrication. The treaty; was between Egypt, (still under British influence) and Sudan;

governed by Britain, they were to receive uninterrupted supply of water. This water, the majority of the river's volume; is sourced from those countries upstream of the two signatory nations. The countries, bar one; Ethiopia, were under the imperial control of outside agencies. The fact that Ethiopia was considered too feeble to count was short sighted but long remembered by the people of Addis Ababa and the country generally.

Much of this protection for Sudanese water supply was so the new cotton growing area known as Gezera south of the confluence of the White and Blue Niles.

The policing of this was to be carried out by the British acting as unbiased arbiter.

The last of the major treaties; the eighth, influenced by the old colonial powers, was between Sudan and Egypt (1959): that allowed these two countries to 'utilise the total flow' of the River Nile. This treaty gave Egypt the moral right to develop the Aswan High Dam, as well as continue to utilise the waters of the Nile to irrigate crops. The agreement allowed Sudan to develop the Rosaries Dam on the Blue Nile; upstream of Khartoum.

The treaty set up a joint committee for future consideration of Nile issues; this has developed into the present Nile Basin Initiative Organisation. This body has arbitrated over several long term disputes regarding water use in the basin and rights to water use. This body has had the additional aid of the 'donor' nations that are part of economic life throughout the Nile basin. The need for outside funding sources is an accepted necessity; it also acts as a governor, which takes the initial impetus out of many disputes.

Today (September 2010) there are heated words being traded between nations within the Nile basin regarding a treaty that would be of benefit to countries at the head waters of the river; much as has been unanimously agreed at other times over the last few years. It is accepted by all the nations if the catchment that each country has rights to utilise the water so long as quality is not diminished and the maximum supply possible is set downstream to its neighbour.

The United Nations are working to develop strategies that may be utilised in areas of dispute regarding cross boundary water issues. The need for volumetric allowance is a necessary consideration.

Dammed Water.

As with the preceding section on treaties, power generation has required much argument and at times conflict. The nations of the basin have to protect their parochial interests, at the same time needing to support or temper their neighbours' ambitions.

Ethiopia has a wealth of water that falls on the Highlands. Large quantities flow out of the country via the four main rivers of the country; but a large volume is lost to groundwater and evaporation. This supply is attracting attention as a second source of water supply to areas that are water poor. The harvesting of water and the storage in flood retention reservoirs have several important elements. Firstly they allow the nation to be less reliant on the river systems; it also demonstrates the commitment of the country to sustainability and innovation.

The purpose of most modern dams is to generate power, enable irrigation and impound water for future potable supply. The World Bank has long been an active supporter of such projects.

Ethiopia has long been aware of the potential that daily flows unendingly out of the country. The Aba Samuel Dam being completed in1939 showed early understanding of the possible future of the nation's water. Ever since the Aswan High Dam, in Egypt, was muted in the 1950s Ethiopia has been looking to develop its own generating potential. In the 1960s through to the 1980s 3 further dams were completed. Today the nation is making huge investments across the water basins of the country to develop electrical generating capacity that is able to supply, not just the home energy market, but much of the energy needs of neighbouring states; even countries with no common borders with Ethiopia.

This development of generating capacity is considered by, many, financial and other organisations to allow the country to develop the market on a pan Saharan basis. Energy exportation could be developed to become the country's largest export and foreign currency earner.

This ability to export excess energy will allow the development of inter country co-operation on other issues as they become apparent. This will allow for Ethiopia to take its place amongst the major power generating nations. The sustainability of such schemes may allow other developments,

such as allowing non fluvial water distribution of water across national boundaries to aid other cross border developments.

The newer, major, dam construction schemes are not attracting total international plaudits; several international ecological and environmental pressure groups and organisations are describing their concerns and fears in broad statements of approbation. Much that is being said is so similar to those that greeted the Three Valleys Dam project in China. These are made without taking into account of the differences in topography or population dynamics or concentrations.

The earliest dam in Ethiopia, the Aba Samuel scheme ceased generating due to problems related to siltation in 1970. The research into remedial actions took many years so as to enable the dam's renovation allowing it to resume power generation.

This closure has had the effect of warning against some design characteristics of the original concept: so as to avoid the rapid rate of sediment drop out. Thus the temporary shutdown secured the eventual longevity of the dam. Dredging and other sedimentation removal is costly; it also permanently removes much of the water borne silts that have for thousands of years given fertility to the floodplains downstream. This leads to designs that keep the leading edge of generating water fully laden with silts in suspension.

One example of environmental damage engendered by removal of silt from the fluvial system is the degradation of the Nile Delta. Several years ago the delta ceased expanding. This low-lying eco-system; which is extremely fertile, began contracting and loosing agricultural ground to the sea. There has had to be a major flood prevention and land stabilisation scheme implemented so as to stop further erosion and protect the area so that the whole complex delta structure is not lost.

Though not of national concern to the Ethiopian nation, the attempted circumnavigation of the White Nile swamps via the Jonglie Canal (a joint venture between Sudan and Egypt to increase the flow to the river and its capacity for crop irrigation and power generation) is a major concern for the whole basin and the world. The project which was started in the 1970s and funded by the World Bank; to the sum of $100,000,000 came to a premature stop in 1983 due to civil war and rebel action. The canal had still a further

100 kilometres to be constructed; which has not been resurrected; though there are many authorities that would like it to be. Since 1997 there have been some attempts; bu these have been abortive and poorly executed.

These marshes are constantly being reported as being under threat from oil refinery and allied plants that service the oil fields of the region.

The damage and loss of such important wetlands; considered in the 1970s as sites of water wastage are now recognised world class sites of ecological significance.

The Ethiopian nation has, from time immemorial held a high moral regard for the environment and is doing much to help draw attention to such areas of concern.

Another, such concern, is the use of billions of cubic metres of Nile water for land reclamation and development projects in the Sinai Desert; this scheme transfers water out of the basin altogether. Many stories and scenarios for the future of this scheme abound; but they are shrouded by politics. This project is in breach of basin agreements; but it appears that as Egypt is a relatively stable regime and many of the upstream, Nile basin countries, are less stable politically. Thus, allowing Egypt to act unilaterally on this issue.

Similar water transfer takes place in Tanzania; water from Lake Victoria is transported by a 170 kilometre pipeline (contravening the 1929 treaty) to the, dry interior, towns in the centre of the country.

Ethiopia has the potential and capability to complete large scale, sustainable irrigation projects. This potential would allow many thousand of hectares of ground to be utilised on a multi crop year basis, and an equally large area of impounded, harvested rainwater that would annually be replenished.

Water.

Water.

Ethiopia is a water rich country; it is one of the few nations; on the African Continent, to be so fortunate. The country is incumbent to derive benefit of this bountiful asset for its people, but simultaneously be magnanimous in its letting go of the vast majority of its fluvial wealth: so benefiting many millions of other, Nile basin, peoples.

As has been noted already the waters that flow from this country are not only used for potable supply; power generation and agriculture are far larger beneficiaries.

The majority of the country relies on surface water and shallow groundwater (rain fed gathering wells) rather than the deeper 'historic' water wells that access waters hundreds of years old. The shallow well and surface sources are recharged from the highland areas of the central massif of the country, the arid regions; as already stated, are reliant, to a great extent, on oases and, some, deeper aquifer boreholes.

The rainfall as a national average is startlingly high,

The Highlands receive around

Water, Water Everywhere….

Water being so plentiful in the heartland of the nation has many advantages; but the size of country, the regions at the edges of the state being water poor; water distribution is near impossible on the scale that would be needed to deliver such a bold scheme. This problem is, on the whole, reflected in population and agricultural levels. These being proportionately smaller and what population there is, spread sparsely. The agriculture in most of these regions is that of semi-nomadic grazing and gathering the natural foods that grow spasmodically.

Sewage Treatment.

Agriculture.

Agriculture.

Coffee.

Qat, Khat, Catha edulis.

Bibliography.

Abate, *Water Resources Development in Etiopia,* Ithaca 1994.
Schrijver, *Sovereinty Over Natural Resources,* Cambridge 1997.
Sands, *Principals of International Environmental Law*, Manchester 1995.
McCaffrey, *The Law of International Watercourses,* Oxford 2002.
Blade, *Egypt Warns Against Nile Basin Pact*, France 24 19/04/2010.
Pottinger, *Can the Nile States Dam Their Way to Cooperation,* IRN Berkeley 2004.
Lowell, *The Nile River-History and Politics,* Leeds 2009.
Friesecke, *Western Powers Seek Sudan Disintergration,* Executive Intelligence Review 2004.
Kameri-Mbote, *From Conflict to Cooperation in the Management of Transboundry Waters (The Nile Experience),* International Environmental Law Research Centre, Geneva 2005.
Zahran, *Navigating the Regional Difficulties of the Nile,* Foreign Policy Magazine, Washington, USA September 2010.
Obera, *Pollution of Lake Victoria and Mismanagement of its Fresh Water Resources Puts Kisumu City in a Situation of Nightmare Water Crisis,* Ground Report 2007.

Lumumba, *The Interpretation of the !929 Treaty and its Legal Relevance and Implications for the Stability of the Region,* African Sociological Review 11,1,2007, pp. 10-24.
Mulliro, *River Nile Disputes: Egypt Threatens Action Over Nile Treaty,* Alshahid Network September 2010.
Hussein, *Egypt Moves File to National Security Authority*, Daily News, Egypt 16th September 2010.
Tekle, *Eritrea's President Says New Nile Treaty 'wrong agreement'*, Sudan Tribune 16th September 2010.
Ethiopia Signs New Nile Treaty Despite Egypt, Sudan Opposition, Sudan Tribune 16th September 2010.
Mekonnen, *The Defects and Effects of Past Treaties and Agreements on the Nile River Waters,* www.ethiopians.com/abay/engin.html
Addis Ababa City Program, UN Habitat 2010.
Howard, *Taps For Towns,* Water Aid 2005.
Addis Ababa Sanitation, WEDC 2009.
Wood. *Qat (Catha edulis); Chewing While A Nation Thirsts,* Clean Rivers Trust 2010.
Wood, *QAT, A Supplement,* Clean Rivers Trust 2010.
Wood, *Fruit and Nuts? Alternative High Value Crops For Yemen,* Clean Rivers Trust 2010.
Herodotus, *The Histories*, (c.460BC) Penguin 1998.
Getinet, *Niger (Guizotria abyssinica)* International Plant Genetic Resources Institute 1996.
Oil From Jatropha, www.plantoils.in/portal/jatropha/abo/cul.html
Benge, *Assessment of the Potential of Jatropha curcas (biodiesel tree),* USAID 2006.
Exports by Ecporting Countries to all Destinations, International Coffee Organisation July 2010.
Coffee Production Statistics 1995-2000, Coffee Research Organisation 2008.
Ethiopia Coffee History, Production, Economic Facts, Tree Crops Organisation 2010.
Schluter, *Geological Atlas of Africa,* Springer 2008.
Philip, *Foyle's Modern School Atlas of Comparative Geography,* Foyle 1928.
US Geological Survey,*International Minerals Year Book,* USGS 2004.
Abede/Geheb, *Wetlands of Ethiopia,* IUCN 2003.
Kengne et al, *Mosquito Development in a Macrophyte-based Wastewater Treatment Plant in Cameroon,* Elevier 2003.
Brown, Barley, Wood, *Minewater Treatment,* IWA 2002.

Brish Geological Survey, *Ground Water Quality; Ethiopia*, NERC 2001.
Little Green Data Book World Bank 2007 & 2010.
Ethiopia Climate Risk Forcast, World Bank 2009.
Lemessa, *Khat (Catha edulis): Botany, Distribution, Cultivation, Usage and Economics in Ethiopia,* UN Emergencies Unit 2001.
Atlabachew, *Fluoride Content of Ethiopian Khat Chewing Leaves,* I First 2010.