

Equitable Distribution of Benefits in Transboundary Waters: The Nile and Columbia River Basins

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AAG Presentation
Boston: April 15th, 2008

Equitable Distribution of Benefits in Transboundary Waters (EDBT)

Objective: Share the benefit of water rather than
the water itself: Win-Win Situation

- What benefits?
 - Agricultural Benefits
 - Hydropower Benefits
 - Flood Control Benefits
 - Others: Cultural, Environmental, fishery, navigation, eco-tourism etc

Result

- Theoretical Framework
- Making EDBT operational: Nile Basin
- Results in Progress

Developing a Theoretical Framework

■ UN 1997 Convention

Article 6

Factors relevant to equitable and reasonable utilization

1. Utilization of an international watercourse in an equitable and reasonable manner within the meaning of article 5 requires taking into account all relevant factors and circumstances, including:

- (a) Geographic, hydrographic, hydrological, climatic, ecological and other factors of a natural character;**
- (b) The social and economic needs of the watercourse States concerned;**
- (c) The population dependent on the watercourse in each watercourse State;**
- (d) The effects of the use or uses of the watercourses in one watercourse State on other watercourse States;**
- (e) Existing and potential uses of the watercourse;**
- (f) Conservation, protection, development and economy of use of the water resources of the watercourse and the costs of measures taken to that effect;**
- (g) The availability of alternatives, of comparable value, to a particular planned or existing use.**

2. In the application of article 5 or paragraph 1 of this article, watercourse States concerned shall, when the need arises, enter into consultations in a spirit of cooperation.

3. The weight to be given to each factor is to be determined by its importance in comparison with that of other relevant factors. In determining what is a reasonable and equitable use, all relevant factors are to be considered together and a conclusion reached on the basis of the whole.

Theoretical framework for EDBT

- Agree on which benefits should be prioritized and distributed
- Address who is going to bear the cost and compensate: create civil societies to represent different cultures
- Differentiate between existing and potential benefit and cost sharing
- Temporal aspect to renegotiate treaties or agreements based on the EDBT principle.

The Nile Basin



Source: Map Design Unit of the World Bank (March, 2000)

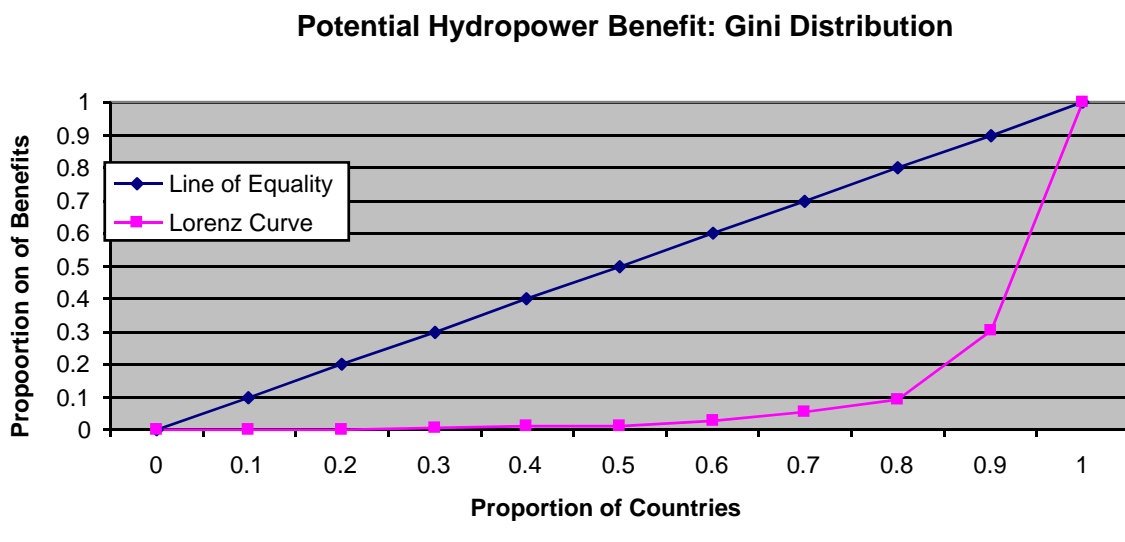
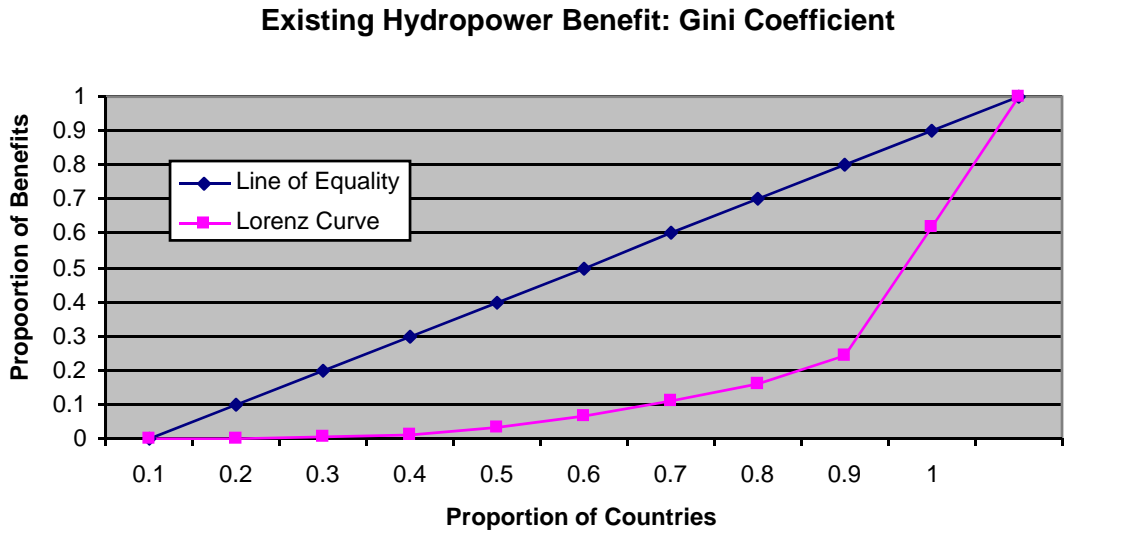
Making EDBT Operational the Nile: Gini Hydropower Distribution

G = 1 Perfect inequality in distribution
G = 0 Perfect equality in distribution

$$Gini = \frac{1}{2n^2\bar{y}} \sum_{i=1}^n \sum_{j=1}^n |y_i - y_j|$$

Source: Cullis and Van Koppen, 2007

Gini Coefficient = 0.62

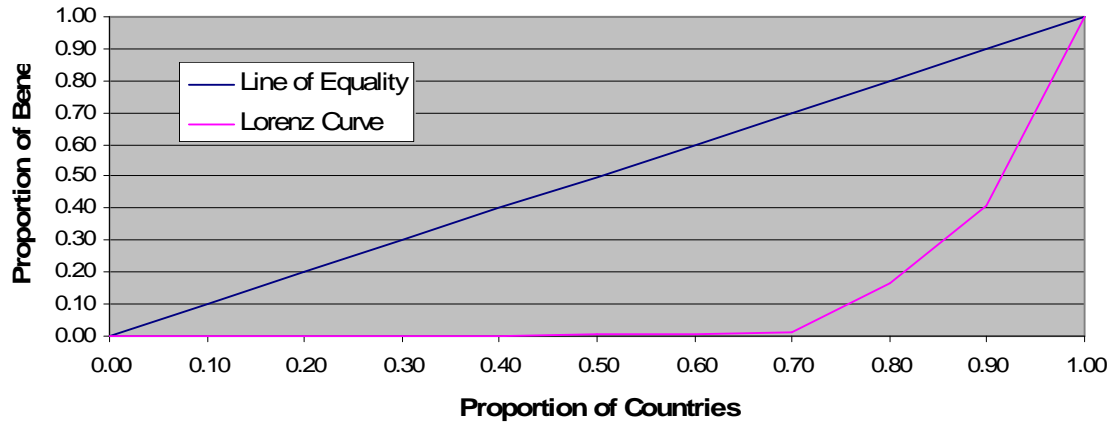


	Potential (in \$ millions)	Existing (in \$ millions)
DRC	42,400,000	226,320
Eritrea	0	0
Burundi	109,280	2,880
Sudan	152,000	18,000
Rwanda	240,000	4,720
Egypt	256,800	226,000
Uganda	816,000	12,400
Tanzania	1,600,000	27,120
Kenya	2,400,000	48,880
Ethiopia	12,960,000	30,240

Gini Coefficient = 0.62

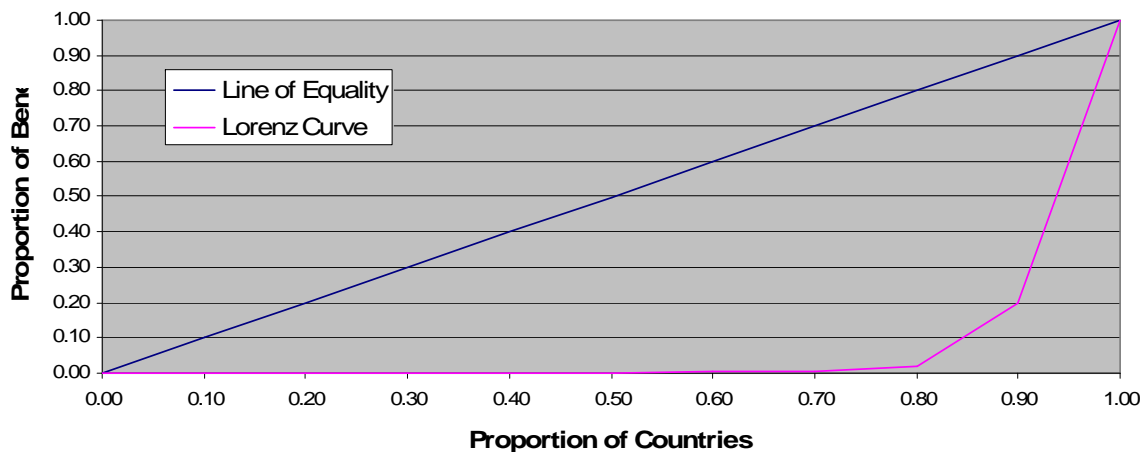
Making EDBT Operational the Nile: Gini Hydropower Distribution

Potential Irrigation Benefit Distribution



Gini Coefficient = 0.55

Existing Irrigation Benefit Distribution



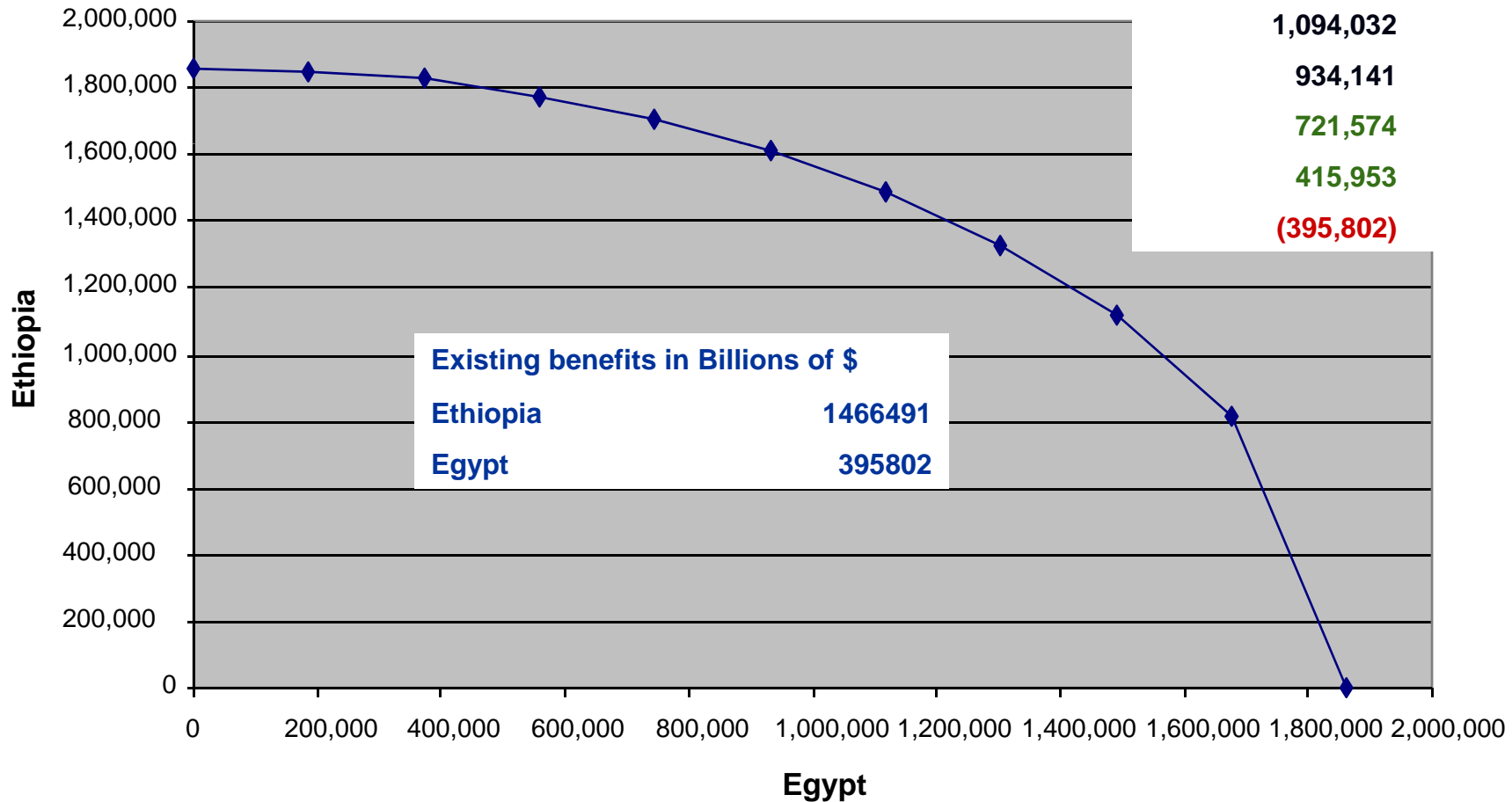
Gini Coefficient = 0.62

	Potential (in \$ millions)	Existing (in \$ millions)
DRC	197523.2198	197,523
Eritrea	502786.3777	502,786
Rwanda	2873065.015	71,827
Burundi	3321981.424	251,393
Uganda	3627244.582	161,610
Kenya	6320743.034	1,203,096
Tanzania	14868111.46	3,411,765
Ethiopia	382842105.3	20,000,000
Sudan	597286742	240,000,000
Egypt	1466233925	1,080,000,000

Making EDBT Operational the Nile: Pareto Distribution

Total Benefit = 1,862,293 billions of \$

**Pareto Hydropower and Irrigation
Benefit Distribution in \$ billions**



Ethiopia	Egypt
1,466,491	(1,466,491)
1,457,156	(1,280,261)
1,428,865	(1,094,032)
1,380,712	(907,803)
1,311,017	(721,574)
1,216,991	(535,344)
1,094,032	(349,115)
934,141	(162,886)
721,574	23,344
415,953	209,573
(395,802)	395,802

Research in Progress: Institutional Capacity to solve equitable Distribution of Benefits: Nile basin

adapted from Wolf 2006, and Wolf and Dinar (1994)

Strategy	Economic Feasibility (25%)	Salience (25%)	Political Power (25%)	Technological availability (25%)	Sum (100%)	Effectiveness (100%)	(Sum) X (Effectiveness) (100%)	Limitations and discussion
International water Law	15	15	10	15	55	60	33	Requires great change in the political system
Economic criteria	25	20	20	5	70	80	56	Does not consider intangible aspects such as culture and environment
Integrated Resource management	5	20	10	5	40	95	38	Complex and creates bureaucracy
Needs based	15	25	20	5	65	50	33	Technological fix creating redundancy and not good for long term.
Religious, Ethical, Cultural Laws	5	10	5	25	45	80	36	Very few cases that it has been applied. Does not short term economic problems.
Just information Sharing	25	25	25	20	95	15	15	Very limited Effectiveness and low enforcement
Do Nothing i.e status quo	25	25	25	25	100	5	5	Does not solve anything. And thus does not accommodate some saliencies and hence political will

Results in Progress: Nile to Columbia Model



**The Columbia Basin Rivers
(U.S. Army Corps of Engineers, 2003)**



**Source: Map Design Unit of the World Bank
(March, 2000)**

Results in Progress: Nile to Columbia Model

Nile Basin Initiative (NBI)

- Equitable Distribution of Benefits
- Environmental rights are being assessed.
- Local people representation: The Nile Basin Discourse
- The Principle of Subsidiary
- Several non riparian countries and international organizations are involved
- Gender Awareness
- Nile Basin Dialogue Forum

Columbia River Treaty (IJC)

- Equal/Equitable
 - Hydropower sharing
 - Flood Control
- Guiding Principles
- 2014a.d.

Challenges

- Native American/ First Nation rights
- Environmental/Salmon rights

Research in Progress: Inequitable Distribution of Benefits and Costs: Space, People, Cultural and Religious Values.

Nubians Displaced By the Aswan Dam

Irrigation benefits Highland (Christian) rather than Local (Tigre and Kunama)

Civil war

Irrigation benefits Highland (Christian) rather than Local (Anuak)



Source: Map Design Unit of the World Bank (March, 2000)

Conclusion

- EDBT results in a win-win situation in regards to potential rather than existing benefits
- Potential benefits distribution is very feasible in the Nile Basin.
- Benefits of transboundary waters are not distributed equitably over space, people, cultural and religious values.
- However, the principle works very well with historical precedents, rights and structure of legal frameworks as it does not negate or interfere with status quo but improves the existing situation.

Questions?