

Comments on a MIT Amicus Brief entitled “The Grand Renaissance Dam: An Opportunity for Collaboration and Shared Benefits in the Eastern Nile Basin”

By Ethiopian National Panel of Experts (NPOE) on GERD

Introduction

The National Panel of Experts on GERD (NPOE) welcomes, indeed appreciates, the effort made now by the seventeen eminent international experts comprising a self-organized group, the International Non-Partisan Eastern Nile Working Group, to bring to the attention of the three countries (Egypt, Ethiopia and Sudan) issues they deem require serious consideration regarding the GERD.

The comments of the international experts, by and large, strive to enable amicable and cooperative working out of modalities to avoid harm to downstream countries, particularly to Egypt.

We can only wish such a gathering of imminent scientists and practitioners had also taken place decades earlier to articulate a similar win-win approach on the Nile that would also have addressed the water resources development needs of upstream countries when they were denied access to international financing sources and were compelled, as Ethiopia now is doing, to embark on costly self-financing that has demanded immense sacrifice from an economy and people that are not exactly well off!!! With this backdrop, we shall put forth our comments, following the four issues the Amicus Group raised.

Issue #1:

Need for Agreement on coordinated Operation for the GERD with the HAD

With respect to this, the Amicus Group suggests:

1. Agreement on filling the dam is urgently needed
2. The agreement on filling should be flexible enough to adapt to actual situation on Nile flow sequences

3. It must be able to meet agreed objectives given the many possible conditions of the Eastern Nile water resources
4. Any filling agreement must have provision for meeting the minimum water requirement for Egypt and Sudan, especially during periods of prolonged drought
5. A joint operating agreement is urgently needed now

Ethiopia has recognized the importance of this issue from the very outset when GERD was conceived. It is from this recognition that Ethiopia took the initiative on its own to invite Egypt and Sudan to work together agreeing to the establishment of the International Panel of Experts (IPOE) despite its preference to do the cooperation through a prior jointly established mechanism i.e. the NBI, particularly under the Eastern Nile Technical Regional Office (ENTRO). Ethiopia's goal here is not to cause unqualified 'no harm', but consistent with internationally recognized principle and Ethiopia's commitment to an agreement it signed with upstream Nile Basin Countries in 2010, the Cooperative Framework Agreement (CFA), is 'not to cause significant harm'. We believe the distinction is important and we prefer to trust this is an inadvertent oversight by the Amicus group.

The reference to downstream minimum water requirement is unqualified as it does not state what it consists of but nevertheless implicitly assumes that this minimum amount is a given. It is evident that this issue is highly sensitive, in that it needs to be defined through agreement the countries themselves work out, taking into account not only the need for flexibility to respond to changes in the hydrological regime (such as caused by prolonged severe drought); but also to factor in the imperative to encourage water use efficiency and minimization of wastage and evaporation loss, etc.

The Amicus Group has emphasized the need for urgency to conclude agreement on filling and operation of GERD. Suggestion on Coordinated Operation is welcome. However, this requires detailed study on objectives, costs and potential benefits of such coordination. The case of the GERD and High Aswan Dam (HAD) is unique compared to many other reservoir systems in the world when it comes to coordination of operation:

- **First**, HAD has the capacity to absorb major and prolonged 'shocks' in inflow, such as the flow reduction in 1984 with subsequent drawdown of the reservoir till 1987. We

believe, what is more important for the operation of the HAD is the annual flow volume than the monthly distribution of the flow. Coordinated operation of reservoirs is about decisions on releases at much smaller time steps than a year.

- **Second**, between the HAD and the GERD there is the Sudan portion of the Nile where the GERD offers huge potential for enhancing water supply reliability and hence enhance economic benefits from water use. Sudan doesn't have sufficient storage capacity or potential sites that could be developed to provide such large storage. Therefore, it is very likely that Sudan would be interested in actual releases from day to day rather than just annual volumes of water released from the GERD. In this case, any potential benefit from the coordinated operation of HAD and GERD cannot be realized unless the water uses/demands in the Sudan are factored in to determine the coordinated operation rules.
- **Third**, even if Sudan's water uses/demands are factored in, there should be mechanism for system-wide monitoring of flows, water abstractions and actual uses to ensure the full benefit of the coordinated operation can be realized.
- **Fourth**, the three countries Egypt, Ethiopia and Sudan are at very early stages of formulating an operation rule for the GERD that would be acceptable to all. This process for establishing the operating rule is expected to reveal the key demands from each of the downstream countries with respect to the operation of the GERD. This would be the first step which provides Ethiopia the insight into the complicated process of balancing its own objective for maximizing hydropower production from the GERD with demands downstream.

Therefore, we believe conclusion of such far-reaching consequential agreement cannot be done in haste, and in any case the three countries appreciate the importance of taking their time to deliberate on and work out important details. It seems events have overtaken the concern of the Amicus Group, and this is to a degree understandable, for the Amicus Group two-day deliberation took place on 13-14 November 2014, and therefore did not have the opportunity to examine the March 23, 2015 Agreement among Egypt, Ethiopia and Sudan on the Declaration of Principles on GERD.

On the basis of the March 23, 2015 Agreement, the three countries shall: (a) conduct joint studies to assess implications (positive and negative impacts), explore scenarios for filling and operation and optimize the Blue Nile-Main Nile system to maximize benefits and minimize impacts from GERD; (b) based on the findings of the joint study, formulate guidelines and rules for first filling of the GERD. These guidelines and rules shall cover different scenarios to cater for actual situation with respect to inflows, states of the reservoirs in the three countries (such as available water in the dams); (c) Use findings of the study to formulate guidelines and rules of operation of the GERD. It has been stated in the Agreement that the operation rules can be adjusted by the owner (i.e. Ethiopia) from time to time informing downstream countries of the impending changes in release patterns. This provides flexibility in the operation of the dam to respond, among others, to change in climatic conditions (such as droughts) and changing load patterns of energy demand centers to which Ethiopia shall supply with energy; (d) set up institutional mechanism to coordinate the annual operation of the GERD. To realize this, the three countries are currently procuring international consulting firm to carry out the joint studies.

As outlined above, the three countries are already addressing the concerns of Amicus Group. As regards the filling and operation of GERD, the countries have agreed to develop guidelines and rules and coordination mechanism, with flexibility for adjustment by Ethiopia to respond to emerging conditions. These are important first steps toward sustainable cooperation and confidence building, things that should be allowed to emerge organically and ought not to be hurried.

Issue #2:

Technical Issues regarding the design of the GERD

This refers basically to two issues: (a) safety of the saddle dam (b) adequacy of bottom/release outlets

The Amicus Group has stated that they are making these observations in the absence of the requisite information. We are at the same time wondering, however, about their concern that "the risks posed by the GERD's extensive saddle dam may not have been fully appreciated or analyzed", if in the first place, they didn't have access to the design

documents. Nevertheless we concur with their observation that, given the height and extent of the saddle dam, this is an important issue. That is why, the IPOE was set up, members of which include, besides world class international experts agreed to by the three countries, nationals representing their countries and who have access to project design documents to assess and evaluate and red flag these risks, as needed. In addition to the scrutiny of the IPOE, we believe the internationally recognized contractors and consulting firms, who have undertaken the job, are up to the task to attend to all the concerns raised.

From the analysis of the document prepared by the Amicus Group it appears that their considerations are based on the alternative that provides a Bituminous Faced Rockfill Dam while the actual solution, under construction, is a Concrete Faced Rockfill Dam. The design and construction of the saddle dam has followed international standards and informed by the practices on the ground around the globe, such as those by the US Army Corps of Engineers, the International Committee on Large Dams, and the CFRD International Society. All the methodology followed and design details are well documented. Key requirements used for design include:

- *The embankment, foundation, and abutments must be stable under the design conditions of construction and reservoir operation.*
- *Seepage through the core, foundation and abutments must be controlled to prevent piping, sloughing, and removal of material by solution or erosion of material by loss into cracks, joints, and cavities.*
- *Freeboard must be sufficient to prevent overtopping by waves and include an allowance for settlement of the embankment.*
- *Embankment settlements, during construction and after impounding, shall be such as to allow deformation of the impervious core with a minimum amount of leakages, as per international standards. The above to be obtained while maximizing the use of the rock available on site, namely gneiss, and schist.*

To address issues associated with Saddle dam's weathered rock, extensive investigations were carried out before construction and, more importantly, investigations have continued during construction. The latter foresee full core recovery boreholes at 12 m spacing all along

the dam alignment, to the design depth of the cut-off (two thirds of the maximum reservoir head). We have good reasons to believe that such a level of ground investigation is among the highest, if not unprecedented, at global level.

To limit seepage and control erosion in the dam foundation, a composite cut-off system is provided which consists of a combination of a plastic concrete diaphragm in correspondence of residual soils and weathered rocks formations and grout injections on injectable fractured rocks. A curtain grouting extends below the composite cut-off to the design depth unless the diaphragm will have already reached that depth.

In order to avoid residual risks of erosion, the design features an Integrated Erosion Control system that includes Plinth width, Diaphragm depth, Protective filter downstream, and Upstream blanket.

A comprehensive instrumentation and monitoring system will be installed to detect: seepage through foundation and dam body, leakage from the concrete face, movements, absolute or relative, seismic effects on the dam crest and foundation. The instrumentation and monitoring system will permit to follow the behavior of the structure during construction and first impounding. An Operation, Surveillance and Management Plan will guide the interpretation of, processing of and response to instrumentation readings during reservoir filling and project operation.

The Project is provided with waterways and bottom outlets allowing release of water downstream during all phases of Project implementation and operation.

A system of three spillways safeguards the project against the Probable Maximum Flood peak discharge. The different typology and location of the spillways introduces redundancy in the system, a key ingredient to guarantee the highest standard of hydrological safety.

Issue #3:

Need for an agreement on the sale of hydropower from the GERD

This basically pertains to speedy conclusion of power trade agreement among the three countries as a matter of priority to ensure GERD's financial viability and return to investment and to ensure release of water from the GERD reservoir for downstream use in Egypt and Sudan. Here we would like to mention that transmission lines and substations are under construction that will integrate the GERD to the interconnected grid in Ethiopia. Studies of transmission lines to Sudan and Egypt have already been done. Bilateral power trade committees of Ethiopia and Sudan are working jointly on possible power trade agreements that will later include Egypt. Even so, the comments of the Amicus Group regarding the urgency of concluding a power trade agreement and commencing transmission interconnection is appreciated.

Issue #4:

Potential downstream impacts on Egypt and Sudan, particularly in agriculture

The Amicus Group has provided extensive space to this issue and made conclusions beyond salinization and recession agriculture to include plausible (adverse) reaction of Egyptian policy makers and farmers. We believe some clarification is in place here:

- a) Generally, soil salinization is an issue in irrigated agriculture in arid/semi-desert region where evapotranspiration exceeds precipitation, such as pertains in Egypt and Sudan. Secondary salinization occurs or is aggravated due to faulty irrigation water management practices such as flood irrigation, basin irrigation, poor drainage/water logging, inappropriate furrow length, inundation, etc. These practices are common downstream parts of the Eastern Nile, and improvement in these will go a long way to reduce salinization. The Group has stated and rightly so *“In reality, the problem of salinization in Egypt would have occurred anyway as Egypt transitioned to reduced releases from the HAD due to increased upstream withdrawals that are independent of the GERD”*.
- b) There is possibility for managing salt export to Mediterranean through combination of approaches that would maximize use of available water given the huge storage

capacity of the High Aswan Dam, such as by reducing evaporation loss and hence conserve more water; revisiting HAD operation to optimize release both from irrigation as well as drainage perspective; and if possible, to explore adopting water use/demand management schemes during the filling period to optimize system wide water use efficiency.

- c) It would have been preferable if we have been provided with the baseline data and information on the basis of which conclusions about salinization and recession agriculture have been made. Further, recent developments, such as the heightening of the Rosiers Dam should be factored in estimating the extent of recession agriculture. Serious prior attempts to quantify this have not yielded reliable results to date. Further, the lack of water in the Nile to flush salt is also attributable to downstream out-of basin transfers and generally inefficient water use not only in agriculture, but in other sectors also. In short, we feel it would have been preferable to await the outcome of the studies.
- d) The IPOE has recommended studies on hydrological simulation and downstream environment and socio-economic impact. We would consider caution and prudence preferable in order not to preempt the results of these planned studies.

Conclusion

The (Ethiopian) National Panel of Experts (NPOE) on GERD does appreciate the concern shown by the 17 eminent scientists and practitioners that have come together to produce the Amicus Brief on GERD. We believe their efforts are done in good faith and with the intention to contribute to the emergence of a lasting regime on the utilization of the Nile, a resource that, when utilized prudently, judiciously, rationally and fairly will be reason for building bridges and confidence among the three countries. Thus the Nile shall provide the impetus for spurring the three countries toward regional and economic integration binding them in a lasting manner. The NPOE firmly believes in this noble cause and is working toward promoting it. At the same time, while we welcome and are appreciative of the Brief, we feel a

good part of the concerns raised have been addressed, while the countries are jointly working to establish mechanisms toward tackling remaining issues that require time.

National Panel of Experts (NPoE) on the Grand Ethiopian Renaissance Dam Project (GERDP) is an independent group of Ethiopian experts composed of practitioners and academicians, both from the government and private sector that is established to advise the Ministry of Water, Irrigation and Energy with regards to the GERDP.

COMMENTS
ON THE AMICUS BRIEF REPORT FOR THE WORKSHOP TITLED
“THE GRAND ETHIOPIAN RENAISSANCE DAM (GERD):
AN OPPORTUNITY FOR COLLABORATION AND SHARED
BENEFITS IN THE EASTERN NILE BASIN”

By Panel of Egyptian Experts Assembled by the Ministry of
Water and Irrigation of the Arab Republic of Egypt

1. GENERAL COMMENTS

1. Although we are not aware of the workshop agenda, it is clear that the discussions during workshop were not based on solid technical studies. The brief is rather a reflection of concerns and impressions of group of experts from different disciplines on highly critical issues on collaboration and sharing benefits of GERD. Most of the analysis carried out during the workshop, were probably relied on the politicians ‘announcement rather than accurate information.
2. The introduction of the brief did not properly address the main topics and discussions that were reflected in the workshop. It assured the Ethiopian right to develop its water resource without participation of the downstream countries. It relies on the politicians announcements without a concrete action on the grounds that force Ethiopia to respect international law.
3. The brief also highlighted that the official policy of Ethiopia government adopts the concept of (No harm) to downstream countries throughout the phase of construction and operation of the dam without any concrete mechanism to ensure that concept. The brief did not respect the concept that the dam is constructed on a trans-boundary river that should follow the international laws and rules which assures downstream agreement on decisions taken regarding the dam operation and implementation.
4. The participants supported the dam with its current dimensions as a no point of further discussions. Only operation, dam filling details and power generation benefits of the dam were thoroughly discussed.

Meanwhile, several concerns were raised in the final report of the IPoE (May 2013) regarding the negative impact of dam on the downstream countries due to the unjustified dam height.

5. Feasibility studies, economic analyses, and efficiency of the power stations were not addressed in the brief.
6. The brief did not emphasize the long term potential impact of the planned cascade dams on the Blue Nile on the downstream countries.
7. The brief adopts the concept that the (HAD) is large enough to accommodate any deficits due to planned Blue Nile dams. However, that is not the real situation and Egypt will be dramatically affected in the period of dam first filling, and during any prolonged drought periods.
8. The discussions totally ignored the outcomes of the final International Panel of Experts (IPoE) report submitted in 31 May 2013, which reflected:
 - a. The missing of complete detailed studies on different aspects that is required before the implementation of the dam.
 - b. The missing of adequate studies for the potential negative impacts of the dam on the downstream countries.
9. Some of the findings of the (IPoE) report can be summarized as follows:
 - a. All submitted design reports are being prepared as level (1) design
 - b. The presented design criteria are of general nature only and lack project and site specific conditions.
 - c. Several design gaps are noticed such as: calculations of the peak flow of the PMF, the operation rules and dimensions of the gated spillway.
 - d. Economic justification is not given with respect to installed capacity of 6000 MW. Particularly with consideration to low load factor and cost of transmission lines, economic merits appear doubtful.
 - e. The evaporation losses in the entire system will be increased. (While the brief promotes the Ethiopian claims that the dam will contribute to the reduction of evaporation in the River Nile due to the operation of (HAD) on reduced water levels).

- f. The potential influence of the proposed cascade development on the flow regime and sediment load at the GERDP and further downstream needs to be investigated.
- g. The ESIA is strictly limited to the impact zones located upstream of the dam site in Ethiopia.

2. SPECIFIC COMMENTS

In the following paragraphs MIT statements are given in italic form, followed by Egypt comment.

1) MIT - Page 1 – Title

“An Opportunity for Collaboration and Shared Benefits in the Eastern Nile Basin”.

Egypt comment:

- The Title is limited to the shared benefits, lacking the DS impacts.
- It gives an impression that MIT group is supporting the dam construction beforehand.

2) MIT - Page 1 – “Introduction”

The introduction ignored to include:

- The unilateral announcement of the dam construction, without:
 - Prior notification and consultation with DS countries,
 - Conducting sound studies for dam impact on DS countries.
- The objection of Egypt of such action.
- Previous studies by USBR in 1964 and the Power Trade study for ENTRO in 2007 for the dam height

3) MIT - Page 2 – Line 16 – “Technical aspects”

- The technical aspects presented in the brief are not thoroughly discussed.
- Very limited or even no data have been analysed to reach any of the conclusions listed.

4) MIT - Page 2 – Line 17

“The discussions over the two days were wide ranging, covering technical aspects of the design of the GERD; the potential advantages of water storage in Ethiopia for regional economic development”;

- The brief introduced the GERDP as a promising project that will have benefits for the region which is not the case for Egypt.
- It lacks the analyses supporting the brief’s conclusions. The impacts on the two DS countries have to be considered in a balanced way

5) MIT - Page 2 – Line 19

“DS consequences”

- Impact terminology is usually used instead of “consequences”.

6) MIT - Page 2 – Line 20

“The right of Ethiopia to develop its water resources for the well-being of its citizens was a point of unconditional agreement at the meeting”.

- In order to be balanced, the following statement should have been added:
 - On the other hand the right of the DS countries to guarantee NO HARM, and prevent the expected negative impacts which may affect their well-being is unconditionally agreed at the meeting.

7) MIT - Page 2 – Line 22

“There was also group-wide agreement on the advantages of water storage in Ethiopia and the economic attractiveness of hydropower developments in the Blue Nile gorge”.

- This statement had to be followed by: However, such benefits of power generation must be based on respecting earlier agreement, international law, and guarantee of no harm.
- It looks as a pre judging meeting that GERD has a significant +ve impact on the basin development

8) MIT - Page 2 – Line 24

"The group noted favourably that the official policy of GO Ethiopia.....no harm"

- It is inaccurate and unbalanced statement.
- Inaccurate, because "no harm" policy is media statement and not officially documented.
- "No harm" is a legal term rather than operational term. It should have been defined for GERDP case.
- Unbalanced, because it should have been mentioned in the same context that the official policy of GO Egypt with "wright to develop".

9) MIT - Page 2 – Line 27

“The group supports the Ethiopian strategy of developing its water resources in the Blue Nile basin, and acknowledges that the GERD (now under construction) is the first, major step in the implementation of this economic development strategy”.

- A biased statement, it is general and does not help in the conflict resolution.

- The brief is supporting the construction of dams on the Blue Nile “Cascade” without an agreement with the two downstream countries. It was expected to propose a joint mechanism and a strategy for such development that respects DS countries demands.

10) MIT- Page 3 – Line 3

- *Need for an agreement on the coordinated operation of the GERD with the Aswan High Dam(AHD);*
- *Technical issues regarding design of the GERD;*
- *Need for an agreement on the sale of hydropower from the GERD;*
and
- *Potential downstream impacts on Egypt and Sudan, particularly in agriculture*
- Egypt has serious concerns about the dam size, which is not agreed upon yet.
- Therefore, looking for an agreement for coordinated operation of both GERD and AHD is for sure needed but is a premature step .
- The group should have noted that Egypt is not in need for a hydropower agreement before resolving the size issue and the guarantee of no harm. Upon solving such issues Egypt could start negotiating filling, operation and hydropower agreements.
- Even with agreement, during the prolonged drought cycles (e.g. 1979-1989 cycle), the "no harm" cannot be satisfied due to the size of GERD.
- What is the basis or the outlines of this agreement?
- Upon agreement, Egypt will start looking at the operation.
- DS impacts are abstracted in one issue, neglecting many other important issues.
- ESIA includes the socio-economic and environmental issues not only agriculture and this is the international standards for evaluating large dams!

11) MIT- Page 3 – Line 8

“It is important to emphasize that, in making these assessments; we did not have access to some of the relevant information about the GERD”.

- The statement has confirmed the above mentioned notes.
- However it is not considered, and lead to very serious, but shallow statements and conclusions.

12) MIT- Page 3 – Line 28

“The group noted very well "the Nile Basin will have redundant storage capacity”.

- This statement is contradicted later on "infrastructure on the Blue Nile is not a "mistake" or "overbuilt" from economic perspective".
- If GERD is not a "mistake" or "over built”, fairness requires that "future cascade" to be admitted, if not as a "mistake", as an "overbuilt".
- Economic perspective is not the only criteria, if the "no harm" is an official policy.

13) MIT- Page 3 – Line 29

“It is important to emphasize that this redundancy does not mean that infrastructure in the Blue Nile gorge is a “mistake” or is “overbuilt” from an economic perspective”.

- The statement is not supported by any evidence.
- The writer needs to review many studies. The dam is uneconomical. Based on reliability analysis it can be proven that it is overbuilt.

14) MIT- Page 4 – Line 1

“Such an agreement is urgently needed to ensure that the Government of Ethiopia can fulfil its commitment that the GERD will be constructed and operated so that the downstream countries (Egypt and Sudan) are “not harmed” during the filling period or during periods of prolonged drought”.

- Even with agreement, during the drought cycles the no harm cannot be satisfied due to the size of the dam (1979-1989 cycle).
- Please note that in a 100 year records about 6 cycles of droughts took place. Lake Nasser for average inflow may recover its storage in 30 years. This simply means that the lake will never have its live storage full, which is strategic storage to Egypt.

15) MIT- Page 4 – Line 17

“Any filling agreement must have provision for meeting the minimum water requirement for Egypt and Sudan”.

- It is strange to use the word minimum water requirements of Egypt and Sudan.

Is it annual or monthly? Since the construction of HAD, Egypt is using their water share fully. Why Egypt accept minimum requirements? What are min requirements?

16) MIT- Page 4 – Line 17

“Seven years of plenty, followed by seven years of famine”.

- Invoking religion notions to technical discussion is not healthy.
- Seven year periodicity in the Nile flow series is not a proven fact.
- Again, note that in 100 year record about 6 cycles of droughts took place.

17) MIT- Page 4 – Footnote

“D/S minimum water requirement“

- It is very ambiguous term.
- Knowing that it is very controversial, the group should have put some effort to define it.
- Did the group mean Egypt's water share of 55.5 bcm/year as per 1959 agreement?

18) MIT- Page 4 – Line 29

“We believe most of the time there will be relatively little conflict between Ethiopia’s desire to maximize the value of the GERD’s hydropower production and the water requirements of downstream users”.

- These believe should have been verified by studies, published papers ...etc.

19) MIT- Page 4 – Line 32

“This will also benefit Sudan by reducing floods, providing hydropower uplift at the Roseires, Sennar, and Merowe dams, increasing summer irrigation supplies, and improving navigation”.

- It will also:
 - decrease HAD power production,
 - reduce inflow to HAD reservoir, and
 - Increase evaporation of the entire system.

20) MIT- Page 5 – Line 16

The GERD’s saddle dam will be constructed of rockfill with a bituminous surface facing.

- It is a preliminary design for the Saddle dam, it was modified to a CFRD.

- The saddle dam also increase the total cost of the project.

21) MIT- Page 6 – Line 14

“Location and Capacity of the Release Outlets”

- This statement supports one of the IPoE findings.
- Till now, the dam configuration was not modified to release the requirements of the downstream countries for all expected cases.
- The outlets will not satisfy Egypt and Sudan requirements in some critical cases, especially during the periods of maximum demand.

22) MIT- Page 8 – Line 1

“If the capacity of these low-level outlets is too small, or the elevation at which water can be released is too high, the GERD may not have sufficient operational flexibility to meet reasonable downstream demands during both the period of filling and during periods of prolonged drought”.

- Also in case of power shutdown due to transmission lines failure or power generation facilities are out of operation, we will be relying only on the low-level outlets which may not be sufficient during maximum demand periods in Egypt and Sudan.
- Once again "reasonable downstream demands" needs to be defined.

23) MIT - Page 8 – Line 10

“When the GERD is completed, its average hydropower generation is expected to be about 15,000 GWh per year”.

- This proves the low efficiency of 31% due to dam oversize and the installed capacity of 6000 MW.

24) MIT - Page 8 – Line 14

“Moreover, a second large water storage facility in the Blue Nile gorge would be the next step in a Blue Nile cascade and could generate even more hydropower”.

- Group full support for additional dams.

25) MIT- Page 8 – Line 17

“The hydro power generated by GERD cannot be fully utilized in Ethiopia's domestic market”.

- The group should have explicitly noticed that GERD future installed power capacity is three times HAD with a potential head two times and approximately the same annual flow.

- However, GERD annual energy production is only 50% more of average energy generated from HAD for the last ten years. This simply proves the low efficiency of GERD.

26) MIT - Page 9 – Line 5

“Not only will a delay have major financial consequences for Ethiopia, but also, if there is no power trade agreements in place and transmission lines are not ready when it becomes possible for the GERD to generate hydropower, then water cannot be released through the GERD’s turbines. This has significant implications for a joint operating agreement for the GERD and the AHD (as discussed above)”.

- What is this? Are we trapped? Are we forced to have a power treaty to guarantee water flow?
- This statement looks like a clear threat to Egypt.
- The brief should mention that GERD should not be completed unless a power plan production is being developed taking into consideration the concerns of the two DS countries.
- The dam shouldn’t be used for political issues.

27) MIT - Page 9 – Line 20

“while these impacts may be locally significant, most can be mitigated by financial or technological interventions”

- This statement by the group is really vague, and needs to be elaborated word by word, specially the type of technological interventions, the interventions cost, and who will pay for it.

28) MIT - Page 10 – Line 38

“if Egyptian farmers and policymakers blame their problems on Ethiopia and GERD”

- This is a harsh undiplomatic statement.

3. CONCLUSIONS

1. It is obvious that the discussion during workshop was not based on solid technical studies and major data were missing. The brief is rather a reflection of concerns and impressions of renowned group academician on highly critical issues on collaboration and sharing benefits of GERD.
2. The brief neglected the major review comments and findings of the International Panel of Experts final report of May 2013 which reflected; among other important technical issues, the following:
 - a. The missing of complete detailed studies on different aspects that is required before the implementation of the dam.
 - b. The missing of adequate studies for the potential negative impacts of the dam on the downstream countries.
3. The brief lacks many of the published documents listing the negative impacts of the GERDP on Egypt.
4. The brief discussed important issues regarding need for an agreement on the coordinated operation of the GERD with the Aswan High Dam (AHD); technical issues regarding design of the GERD especially the size of low- level outlets; need for an agreement on the sale of hydropower from the GERD; and downstream impacts on Egypt and Sudan in agriculture. However, there are important comments and considerations on these issues as given in our detailed comments file.
5. Feasibility studies, economic analyses, and efficiency of the power station were not addressed in the brief. The brief didn't elaborate on the height of the dam and whether it is economically and technically justified, requiring the construction of the longest rockfill saddle dam in the world, the power factor of the project is extremely low having a value of 0.31, and that the installed 6000 MW power capacity is definitely not economical.
6. The major negative impact of GERDP on Egypt is not only the possible increase in land salinity as given by the brief, but are mainly the reduction of its water resources not only during first filling but also during dam operation, the reduction of the generated power from HAD, and Biological, physical and socio-

economic impacts. These negative impacts were not adequately addressed in the brief.

7. The brief also failed to identify that GERD will be one of the principal causes for the expected problem of salinization of the Egyptian delta region. Rather diluted the issue in the claim that Sudan will increase its quota of water use. Such increase is not possible without GERD.
8. For the case of the low-level outlets, how can the brief assert that Ethiopia has adopted a no harm policy for the downstream countries and yet does not condemn the lack of design assurance and clarity for this crucial element of the GERD? This is one of the keys to guarantee Ethiopia's commitment to ensure the water rights not only during the filling but as critical during normal operations. The brief should have required that a stochastic analysis of the operation of the GERD be applied for the proper design of these low outlets.
9. The brief used several general statements without attempting to give any definition, such as no harm, minimum requirements, and reasonable downstream demands. Also vague statement was used without elaboration such as stating that most of the dam negative impacts can be mitigated by financial or technological interventions.
10. Several paragraphs are of general natures which are applicable to any dam construction on any trans-boundary river.
11. The brief fully supported GERD as the first of series of cascade dams on the Blue Nile.
12. The brief did not clearly address the main dam and saddle dam safety, and the impact of dam break on DS countries.
13. Also no comments are given on the economic justification of constructing the 5200 meters saddle dam and its effect on increasing the project cost and hence increasing the cost of the generated unit energy.
14. In summary, the main objective of the workshop is to promote collaboration and shared benefits in Eastern Nile Basin. However, it lacks the appropriate analysis to evaluate the impact of such project on downstream countries. It is clear that the discussions

during workshop and the outcomes were not based on sound technical studies or on sufficient data.