

NATIONAL BEST PRACTICES REPORT
SUDAN
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Acronyms and Abbreviations:

| | |
|-------|--|
| CBOs | Community Based Organizations |
| DNP | Dinder National Park |
| HCENR | Higher Council For Environment and Natural Resources |
| NGO | Non Governmental Organization |
| SDG | Sudanese Dinnar |
| TOR | Terms of Reference |

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Executive Summary:

The Sudan National Report touched on a number of best practice projects where environmental conservation was fully integrated into poverty reduction, taking into consideration that both parameters are closely interrelated. Apparently, the identified best practices have the potential to be replicated on sustained basis, because, in the first place, they centered on the grassroots communities where direct beneficiaries participated in the planning, implementation and management of all the environmental initiatives. In addition, all the said projects were found to be positively implicating the livelihoods of the concerned communities. Henceforth, what we can glue out of all these practices that the salient elements of replicability and sustainability include: (a) commitment of beneficiaries; (b) participation; (c) in kind community contribution; (d) poverty reduction; and (e) income generation.

Agro – summer Farm: employment creation, poverty reduction and environmental protection, enhanced the capacities of local institutions in the management of small scale irrigated farms intended for income generation and environmental conservation. In projects of this nature revolving funds geared towards resource conservation need to be carefully managed in order not to defeat the entire purpose. The project provided a model to be replicated in other villages along River Rahad and that the participatory approach followed by the project is an important tool for its sustainability.

With regard to Water supply and grazing for nomadic groups the key Lessons learned include: (a) collaboration of different stakeholders is a clue towards the implementation of the project; (b) working with nomads requires great care and ways of involving them should be devised; (c) local active members from the nomadic group provide links with the local society; and (d) active consultation with local communities is the key to success.

The Out- of- Classrooms Environmental Education, the case of Wad Medani Girls Secondary School project, is a real endeavor of filling a major gap in the integration of class room lectures with practical activity that help to forge theoretical knowledge with learning by doing. It could be regarded as way of introducing environment education into the school curricula.

Poverty reduction and environmental protection in Sabnas Island – Nile State project opened avenues for community empowerment and links with government departments and the Agricultural Bank for financial support. Sabnas Society may be considered a model entity that managed to lead the local community in solving a major constraint to rural development and enhance environmental protection.

1. Introduction:

The Nile Basin Transboundary Environmental Action Project (NTEAP) has established major activities on the ground as well as other activities that are of significant importance to the Nile Basin (NB) countries and have an impact on the environment of the basin. All activities are implemented by the project in collaboration with Government Officials, communities, NGOs, CBOs, school teachers and students. These activities are to pilot innovative approaches to land and water conservation measures at the national level, raise awareness on major environmental threats that face the Nile Basin and enhance the technical cooperation among the NB countries. To achieve these objectives, NTEAP intends to document best practices from activities at the national and regional level. The different countries selected the best practices and discussed them at a regional workshop in 2007 in Kigali. For Sudan and as stipulated in the TOR, a seven-step selection approach was used to identify some projects that have the potential to be further disseminated as best practices. These steps can be listed as follows:

- Critical analysis of the on-going NTEAP projects, including the micro grants as well as the national environmental projects which were either completed or due to be.;
- Short listing of the projects that have passed the preliminary screening exercise;
- Setting of five selection criteria namely, sustainability, replicability, poverty alleviation, affordability and innovativeness;
- Conduct meetings / interviews with relevant stakeholders, NGOs, working groups and others;
- screening of potential projects based on the above merits;
- Validate the technical appropriateness to each identified Best practice with the view of its contribution to the proper management of Nile Basin environmental resources; and
- Summarizing the results.

The results of the final sieving culminated into the selection of four NTEAP micro grant projects that can be considered as best practices in Sudan. These can be listed as follows:

1. Agro – summer Farm: employment creation, poverty reduction and environmental protection in Rahad villages – Gedaref State;
2. Water supply and grazing for nomadic groups – case of Sam Turuk – Gedaref State;
3. Out – of – classrooms Environmental Education – the case of Wad Medani Girls Secondary School;
4. Poverty reduction and environmental protection in Sabnas Island – Nile State.

2. Best Practice Concept: Basic Definition:

Generally, within the NTEAP, the art of best practice is defined as a visibly sustained impact of an innovative project/Programme brought about by a particular design, a technique, a process, a methodology and finally delivered with fewer problems and unforeseen complications.

Specifically, in environmental management, the concept of best practice is literally defined as the most efficient and effective series of outcomes that have proven desirable and further generate sustained impact, both on the resource base and beneficiaries. As such, they could be further replicated or up-scaled in similar ecosystems; advisably with a recorded multiplier value.

As a conduit for knowledge management, the best practice concept facilitates wide exchange of information, enhances trading of sustainable good operating systems" and promotes cross-border, transboundary and regional cooperation.

3. Best Practice (1): Summer Agro –Farm: employment creation, poverty reduction and environmental protection in Rahad villages – Gedaref State



Plate (1): Visible Sign of the Project

3.1 Background:

The project area falls in Gedaref State along the eastern bank of Rahad River and close to Dinder National Park (DNP). The Rahad River is a seasonal stream that descends from the Ethiopian Highlands and flows in a north westerly direction to join the Blue Nile River. River Rahad starts to flow around the middle of June and ceases running in November. The sandy riverbed is left with only few pools which may hold water up to the next rainy season. The average rainfall varies from 600-800 mms with the effective spells in the project area from June up to November, reaching the peak in August. During the rainy season the maximum temperature is approximately 30 C° and the minimum is 20 C°, while in April and May the maximum temperature exceeds 40 C°.

The soils are mainly clay loam and the dominant vegetation is Acacia Seyal - Balanites ecosystem (woodland and grasses) colonizes the project area (A. Seyal, Balanites aegyptiaca). Riverian ecosystem occurs on the silt banks of Rahad River. The distribution of tree species is influenced by the combined effects of rainfall, edaphic factors and topography.

The project area as mentioned earlier lies close to the DNP. Thus the protection of the park is of great national and global importance as it provides a refuge for large number of migratory birds and protects endemic species. The demand on natural resources are increasing as the result of population increase and the DNP faces dangers of encroachment by the local population. Adjacent villages along the Rahad River grew in size. Communities practice subsistence rain fed agriculture and keep livestock. Nomadic groups, mainly Fulani are also found in the area and trespass during the dry season into the park to use the available water and grazing resources. Agriculture is the main economic activity of the population of project area. It is of two types; traditional rain fed and gerif cultivation. In the traditional rain fed agriculture, a variety of crops is grown including Sorghum and Millet as stable crops and Sesame as the main cash crop.

The farmers cultivate their small plots using traditional tools and hence productivity is low. Large numbers of local population are landless, and hence they rent land to cultivate. Local leaders own large agricultural lands. Households also grow small area under cow peas and groundnuts. On the other hand, Gerif land is the land that stretches along the river banks from which flood water recedes. It is thus quite productive since soil fertility is annually renewed by floodwater and has high water retention. The project villages own Gerif land where high value vegetables and fruits are grown (Mango, Guava and Pawpaw) as well as Beans. After harvest the Gerif land is usually rented to nomads after collecting the crop residue which is a valuable resource during the dry season. The villagers keep limited number of domestic animals (Goats, Sheep, Donkeys and Cattle). They keep the animals in the vicinity of the villages and graze the natural pasture around the village first and then they move to the traditional and mechanized rain-fed farms to feed on crop residue and sometimes move into the park.

A survey conducted by the Higher Council for Environment and Natural Resources (HCENR) in the Rahad River villages showed that the marital status of women is that 13.9 % married, 30.6 % divorced, 44.4 % widows and 8.3 % abandoned. The main tribes are (43 %) from western Sudan, West Africa tribes (13 %) and Masaleet are dominant with Burgo, Daju, Fallata and other smaller tribes from local inhabitants. Villagers depend on family labor in their agricultural activities. Women participate effectively in the family farm. Nearly all women consider agriculture as their main activity. However, they also practice off-season economic activities such as handicrafts, collection of wild food and forest products. Women participation in decision making at village level is rather weak. The main problems that hinder their effective participation in village affairs are related to social and cultural traditions.

All project villages have both traditional and local government institutions. Traditional leaders as Sheikhs and holders of positions of tribal nature play important roles in solving main problems as well as problems of tribal nature while people's village committees administer village affairs beside the recently established committees for the purpose of this project (CBOs). As mentioned earlier, farming is the most important activity practiced by household heads. However, they also practice dry season activities as secondary occupation such as wood collection and charcoal making. Women, in the weekly village markets run coffee shops, food shops as well as selling handicrafts. Some inhabitants practice fishing in the pools or in Maya as of DNP and collect honey. Such activity in the DNP creates conflicts with Park authorities and also leads to encroachments on wildlife habitats.

Efforts are made to stop such encroachment through awareness and provision of services rather than by legal and police interventions.

3.2 Problem Statement:

Due to recurrent droughts and civil war in other parts of the Sudan, large number of displaced persons and environmental refugees settled along the banks of Rahad River close to DNP. They practice agriculture and keep livestock particularly by nomads. These activities led to land degradation brought about by over grazing. The root causes of land degradation and environmental deterioration in the area include: (a) irrational land use practices by local communities; (b) over grazing; (c) uncontrolled bush fires; and (d) expansion of mechanized farming. Previous activities to address these problems are represented by the GEF funded project "Conservation and Management of Habitat and Species of Biodiversity in the Dinder National Park".

That project was structured around local community involvement; Park management and Biodiversity conservation. Hence, the said project carried some activities in the project villages including capacity building of Local CBOs, attempts in poverty reduction, efforts in environmental rehabilitation and enhancement of women activities. The main weaknesses of the previous project were the limited efforts directed towards poverty reduction through projects that provide alternative means of livelihood to the local communities and to address the root causes of environmental degradation, particularly during the dry season . It is therefore that the Agro-Summer Farm Project intended to respond to the above issues in three villages on the banks of the Rahad River.

3.3 Justification for Selection (innovativeness):

Taking into consideration the main problems facing the population of the eastern bank of Rahad River, the innovative nature of the project stems from its integrated approach in providing dry season employment, improving agricultural production through improved technology and providing alternate source of energy, all, to simultaneously enhance natural resource conservation, rational use and development. The above scenario was viewed within the context of a strong institutional framework for the target communities.

3.4 Technical Approach: Design and Methodology:

The coherent design of the project went through three well planned steps guided by the Environmentalists Society with full involvement of the local communities. These stages may be summarized as follows:

Stage I:

The Environmentalists Society conducted a baseline survey in the three villages to capture the Socio-economic and environmental problems. The survey also considered levels of decision making in the villages and local institutions as well as the nature and type of contributions to be offered by the local communities.

At this stage local CBOs were formed and became involved in planning and implementation of the project activities.

The survey revealed that the communities were willing to contribute land, labour and supervision of the implementation process. On the other hand, the Environmentalists

Society, being the link with micro-grants project provided funding, ensured cash flow, extension and supervision of implementation. By the end of this stage the roles of each partner was decided.

Stage II:

This stage represents the establishment of the three farms (20) feddans in two villages and (27) in El Ebeik.

With the CBOs and agricultural advisor from the Environmentalists Society, land for establishing the three farms was chosen and selection of beneficiaries was completed. Each village managed to select beneficiaries according to the following criteria:

- Poor families
- Households depending on collection of firewood or charcoal for sale.
- Those (known) to the local community as trespassing to DNP to collect firewood or for honey collection, fishing or poaching.
- Households headed by women.

Through the application of the above criteria, Aredaib El Tignani selected (42) beneficiaries, Deleib Magadi selected (62) beneficiaries and El Ebeik selected (180) beneficiaries. The CBOs purchased all the needed irrigation equipment and rented Tractors for the preparation of the land for farming. The land was prepared in basins. Each beneficiary (household) was given (20) basins in Aredaiba El Tigani, (15) basins in Deleib Magadi and (10) basins in El Ebeik. Crops selected include tomatoes, onions and vegetables for household consumption and for sale.

Stage III:

This stage was mainly devoted to efforts in supervision and provision of needed inputs such as petrol for the pumps, maintenance, provision of improved seeds and solving problems faced by beneficiaries. Each village CBO shouldered these responsibilities and with the beneficiaries decided on how to ensure the sustainability of the established farms after funding from the project stops. In this matter each CBO decided on the approach agreed upon by the beneficiaries. In Arediba El Tigani and El Ebeik each household is required to pay (10 %) of the production to the CBO while in Deleib Magadi male headed households pay (50 %) of the production to the CBO and women pay the costs of petrol for the irrigation pump. Marketing of the production is done locally where vegetable traders get their needs at the farm and sell it in the weekly local markets. The local community was involved in all stages of project planning and implementation including baseline surveys, project design, selection of beneficiaries and project management and supervision. Such involvement was achieved through the CBOs that represent the whole local society.

Actually the initiation of the project came from a request by the local villagers through the High Committee For the Development of Rahad Villages. This committee is composed from (18) villages with (10) village councils.

However, for the implementation of this project each village formed special CBO for this purpose, the CBO members (15) persons involving at least three women and village elders. The Environmentalists Society Facilitated the formation of these CBOs. The CBOs and village leaders helped in selection of farm locations, contributed land and labour when needed. The agricultural advisor empowered the community with technical know-how and how to plan and manage the farm. The selection of CBO member, not only conform with existing social structures, but also play specific role in raising awareness and extension on the use of farm inputs.

3.5 Partnership:

The main partners include the beneficiary groups (CBO members), the NGOs, the local government, DNP authorities, Village Councils, the tribal leaders, the Higher Council for Environment and Natural Resources (HCENR) and the Environmental Society (Fig 2).

Fig (2)



Plate (2): Meeting with the Leaders

3.6 Essence of the Best Practices: Benefits and lessons learnt

The essence of a best practice project takes into consideration three key issues namely, accrues benefits and lessons learnt, sustainability and replicability. The Summer Sgro-farm Employment Creation Project responded well to the needs of the local people. The mechanism of selection of beneficiaries was fashioned by the local people themselves. The CBOs advertise widely for villagers to show interest and the first selection was done by the CBOs which represent the different sections of the village. Then in a general meeting in the mosque the CBOs announce the selected persons for approval and endorsement. In all the three villages women gained about (60 %). This is so because male members of the society feel that growing vegetables is women work. One male farmer remarked that "this project is good for women because it generates some pocket money for them".

As it was always the case, male beneficiaries have no employment and instead they usually encroach on the park to collect firewood or make charcoal for sale. As mentioned earlier, women were selected as members in the CBO. In the three target villages women represent about 60 % of the total farm workers. They proved to be the best producers of vegetables and control the channels of marketing of such products. Again, their concern in availing vegetables for home consumption during the dry season is considerate. During assessment of the benefits the three pilot farms (Plate 3) were functioning properly for two seasons while the third season when the survey was conducted they were in the preparatory stage of preparing the land and maintaining the pumps. Hence the information provided here was principally based on activities of the previous two seasons.



Plate (3): Preparations for New Crops

With regards to data collection, interviews were conducted with the beneficiaries to estimate the income generated from being involved in the summer farm. In Arediba El Tigani some beneficiaries reported weekly income of (20) SDG from selling vegetables, that is about (80) SDG monthly, which amount to (320) SDG for the period of four months during production season. This income did not include the vegetables consumed by the household nor the costs of onions which are either consumed at household level or sold in bundles. In general, each beneficiary produced an average of (3) sacks of onion which may be sold in the market at price of (60) SDG. Considering the income from sale of vegetables and sale of onions, the yearly income of the beneficiary is approximately (500) SDG. Each beneficiary is requested to pay (37) SDG for petrol and other agricultural inputs provided by CBO. One of the beneficiaries in Deleib Magadi reported weekly income of (20-30) SDG beside provision of vegetables for household consumption. Women in El Ebeik village attain weekly income of about (35) SDG. Such cash benefits are generated for four months during the dry season, whereas during the dead season there is no employment.



Plate (4): Water for Irrigation of Vegetables



Plate (5): A good Stand of Crops

Conclusively, the three farms availed new sources of income and improved the nutritional status of the households through vegetable intake. Women invested the extra income in personal needs while male beneficiaries reported the use of such income in school fees and medical care. Due to these benefits male out migration during the dry season was reduced. Some villagers reported that most of the beneficiaries stayed at home to work in the farm. Women became more independent through the created opportunities to make money by growing and selling vegetables which in turn gave them some degree of financial freedom to meet some of their personal needs. Other benefits include the acquisition of skills and knowledge and awareness about irrigated farm management, cultivation of new crops and identification of new farm inputs.



Plate (6): A stand of Fruits

The environmental benefits of the project were achieved through both the establishment of the summer farms and distribution of Butane gas cylinders and stoves.



Plate (7) A new Stand of Fruit Plantations

The Summer Farm as reported earlier, managed to reduce encroachment on DNP as the selection of beneficiaries target those poor families depending on sale of fuel wood and charcoal from the park. Part of the project was the distribution of Butane Gas Cylinders and stoves. The project bought (51) cylinders and (51) stoves. The village CBOs took the responsibility to distributing these to interested families at cost of (110) SDG to be paid in three installments – (50 %) first installment, (25 %) and (25 %) second and third installments. Deleib Maagadi village received (15) Cylinders and (15) stoves, Ebeik (17) Cylinders and (17) Stoves and Areideba El Tigani (13) Cylinders and (13) Stoves. The rest of the Cylinders (6) were kept to start store for replacing the empty cylinders.

They opened a store and assigned the responsibility to a member from Areideba to be in charge of the store and to collect empty cylinders to be taken to Gedaref for filling. The beneficiaries paid the first installment and kept in a bank account under the name of the High Committee for the Development of Rahad Villages. The arrangement is to collect all payments and start a new round of distribution to other interested families. This arrangement did not work as planned because the beneficiaries paid only the first installment and payment stopped because of the rainy season. It is reported to us that collection of payment will start soon. Despite of limited number of Cylinders and stoves distributed, the activity had an impact on household level and environmental level. It is reported by beneficiaries that the activity helped them to drastically reduce the consumption of fire wood and charcoal to one sack of charcoal each month instead of (4) sacks before. For the distribution of cylinders and stoves, a survey was carried to collect information on use of Butana gas. The result of the survey showed the following

Table (1): Population and Butana Gas Cylinders at Households

| Village | Total Population | No. of Households | Households with no Cylinders | Households with no Cylinders after the project |
|------------------|------------------|-------------------|------------------------------|--|
| Aradeiba | 2,450 | 240 | 220 | 207 |
| Deleib Magadi | 6,790 | 760 | 740 | 725 |
| Ebeik | 4,320 | 460 | 440 | 423 |

According to the plans made by the CBOs and depending on repayment of installments, the monthly distribution of new cylinders is expected to be 10 for each village which amounts to (120) new Cylinders for each village annually which raises the level of coverage to (54 %) in Aradaiba, (16 %) in Deleib and (27 %) in Ebeik, but the plan failed because of the poor repayment of installments.



Plate (8): River Bank Erosion and Sand Deposition

3.6.1 Sustainability:

Sustainability is assured through the contribution of the beneficiaries in the functioning of farm infrastructure (10 % contribution to the CBO). This contribution is used as a revolving fund. On the other hand, mechanisms for accountability were established through regular meetings of the CBO and reporting back to the community in general meetings. The pilot summer farms could be easily replicated in other villages along Rahad River banks or in other areas with similar conditions of water availability.

3.6.2 Replicability:

The participatory approach to development advocated by the project is an important way of achieving economic, social and political benefits. This was evident by the fact that the project enhanced the capacities of local institutions in the management of small irrigated farms, improved levels of income particularly for women, contributed to environmental protection through reduction of tree cutting and charcoal making and provided fodder for goats and sheep, particularly during the dry season. The above success was exemplified by the support this project received from State Government in the form of regular visits to the project and provision of in-kind contribution. It follows that the DNP project provided a model to be replicated in other villages along River Rahad.

3.6.3 Limitations and Challenges:

This project initiated positive steps towards availing employment opportunities to poor families during dry season, help in environmental protection reduction of tree cutting for firewood and charcoal making and reducing level of encroachment on DNP. Despite these positive impacts, activities, (summer farm and alternative energy sources) faced risks to sustainability. To elaborate, the summer farm depends on pools in the Rahad River. These seasonal pools in some years dry up leading to water shortages. Such a phenomenon was reported in both Deleib and Ebeik villages. In Deleib the water in the pool was not enough to irrigate the whole farm; hence the CBO decided to utilize the available water for vegetables growing by women only. In Ebeik the pool, because of bank erosion, shifted to a new location far from the site of the pump which used to be (100) meters only from the farm. This year and in order to use the pool they need (350) meters pipe adding new costs to the CBOs. They reported that they may rent pipes from a local merchant. Moreover the distribution of Butane Gas Cylinders and stoves would not continue without repayment of the installments. The plans set by the CBOs were defeated by lack or willingness of some villagers to pay installments despite the contracts made with the beneficiaries. This problem must be tackled by the CBOs in order to ensure the proper functioning of the revolving fund and to implement provisions set in the contract with the beneficiary groups.

4. Conclusion:

The project approach enhanced the capacities of local institutions in the management of small scale irrigated farms intended for income generation and environmental conservation. In projects of this nature revolving funds geared towards resource conservation need to be carefully managed in order not to defeat the entire purpose.

The project provided a model to be replicated in other villages along River Rahad and that the participatory approach followed by the project is an important tool for its sustainability. An important innovation relating to proper implementation of the project, efficient use of its resources and enhanced sustainability, is the presence, of a grassroots mechanism of accountability with regular feedback to the communities. The pilot summer farms could be easily replicated in other villages along Rahad River banks or in other areas with similar conditions of water availability.

5. Best Practice (2): Water Supply and Grazing for Nomadic Groups

The case of Sam Turuk , Gedaref State

5.1 Background:

Nomads in the Sudan are generally marginalized and ignored in development policies which tend to favor agriculture by taking the best grazing areas and pushing the nomads to marginal areas. Nomads usually move from place to another through recognized traditional routes according to rainfall and grazing recourses. In Gedaref State, nomads during the rainy season move to Butana and return in dry season to places along Rahad River. During such movement they pass through traditional and mechanized rain fed areas and frequently livestock trespass on agricultural lands leading to conflicts with farmers. On the other hand, on return to Rahad River areas, they come into contact with traditional rain fed farmers and compete with villagers on available meager grazing resources or animals encroach on farms before harvest. To avoid such conflicts, nomads mainly Fulani group drive their livestock into DNP. The herders take serious risks of entering the park despite severe fines and confiscation of livestock by park authorities. To address the above problems pastoralists, through Gedaref State Pastoralists Union, initiated a pilot project: "Water Supply and Grazing for Nomads" based on the philosophy of availing water in grazing areas away from settled communities or areas under farming and with some distance from DNP. Hence, the above initiative was implemented to achieve the following: (a) avail water by deepening Sam Turuk Maya (depression) to be used by nomads; (b) reduce conflicts between nomads and farmers and DNP authorities; (c) demarcate the land around Sam Turuk Maya as grazing land; (d) improve grazing resources through seeding and tree planting, (e) conduct training and capacity building for nomadic institutions, (f) improve the status of nomadic women and train them on processing of milk products; (g) raise health awareness through health education; (h) initiate soil and water conservation activities; and (i) enhance poverty reduction.

5.2 Problem Statement:

The nomadic groups during both the rainy and dry seasons face continuous problems with farmers when either their animals intrude into cropping lands or otherwise they compete for the inadequate range resources along the Rahad River banks. Sometimes in order for the nomads to avoid clashes with the farmers, they are usually forced to take their herds into the DNP. In the circumstances, they get into direct conflict with the Park's authorities to the extent that their animals might be confiscated. This is addition to tree cutting around the water sources (Fig 1).



Plate (1): Tree Cutting in the Area

5.3 Justification for Selection (innovativeness):

The innovative nature of the project stems from the fact that it is an attempt to resolve conflict resulting from competitive use of the natural resources through addressing the main root causes pertaining to: (a) rampant poverty; (b) weak capacity; and (c) limited absorption capacity of the resource base.

5.4 Technical Approach: Design and Methodology:

To achieve the above objectives, the project on the integration of the nomadic groups within their ecosystem was implemented in close collaboration and partnership of Gedaref State Government who contributed funds and released staff from Range and Pasture Department, State Pastoralists Union, Gedared Women Development Association, El Masar Organization and Practical Action as intermediary NGO. At the local level, the Pastoralists formed a group to follow up implementation of the activities and to act as a conduit with the local nomadic groups. On the other hand, the State Environmental Council in Gedaref carried out campaigns in favor of the project in different fora to emphasize the need for land use plans and further emphasizing grazing reserves for nomads. Hence the project enjoyed the collaboration of all the stakeholders in addressing several environmental issues.

A sequential approach was followed in the implementation of the project during the whole year 2006 (**Table 1**):

Table (1)

| Time Horizon (2006) | Activity |
|----------------------------|--|
| January-March | Deepening of Sam Turuk Maya by practical Action and State Government |
| May | Vaccination of livestock in villages of Ebeik, Kash El Feel, Fazra, Aradeiba El Tigani and El Rimeila. This was implemented by State Ministry of Animal Resources in collaboration with the Ministry of Agriculture |
| June | Distribution of pasture seeds and tree seeds around Sam Turuk Maya. This was implemented by The Range and Pasture Department, State Ministry of Agriculture |
| December | Training of nomadic women on environmental issues, health education, first aid, prevalent diseases, food processing and processing of milk products (cheese, yoghurt) and handicrafts. This programme was implemented by Practical Action in collaboration with Women Development Association and El Masar Organization. |

However, in the above context, the role of the local nomadic community is rather limited because of the nature of their life. In fact very small group volunteered and took the responsibility of being the link between the implementing agencies and the nomadic communities. This small group from the nomadic Fulani played very important role in mobilizing and convincing the nomads to vaccinate their livestock and in selection of nomadic women to attend training sessions.

5.5 Partnership:

The main partners in the implementation and management of the project included the nomadic groups, Gedaref State Government, the Range and Pasture Department, State Pastoralists Union, Gedared Women Development Association, El Masar Organization Practical Action as intermediary NGO and NTEAP/MGP.

5.6 Essence of the Best Practices: Benefits and lessons learnt:

The essence of a best practice project takes into consideration three key issues namely, accrues benefits and lessons learnt, sustainability and replicability. For the Water Supply and Grazing for Nomads Project, despite limitations pertaining to the implementation of the project, the nomads and the village near Sam Turuk were happy of the activity and that, at last, they gained some recognition and attention to their problems of water and pasture shortages. Nomads feel that they pay livestock taxes for a long time without any response to their outstanding needs. Now, through the project, they received some benefits in form of training of women in health, food processing and livestock vaccination.

As with regards to the biophysical environment, the area surrounding the Maya (Fig 3) grew lush grasses (Fig 2) with good tree cover resulting from reseeding of pasture and forest seeds, respectively. In the area of soil conservation despite some weaknesses related to the site selection, the deepening of the Maya is expected to hold water for livestock for some months, thus keeping the herds away from farm lands. One of the most important factors that triggered soil conservation was the afforestation around the Maya and strict prohibition of tree cutting.



Plate (2): Regenerated Vegetation



Plate (3): The Area Around the Mayaa

An important social benefit was the contact established between the Fulani and the foreigners that positively implicated the new ways of doing things advocated by the project. The various training courses offered to the nomads opened the closed social system of the Fulani, hence breaking the barriers with the outside world.

The economic benefits in such closed society are difficult to assess. Available water for livestock in a place away from conflict or fines by Park authorities is considered as a benefit by some nomads. The difficulty of assessing economic benefits is related to the nature of livestock keeping which is kept not for the market albeit for social prestige, since large numbers of livestock gives the owner a special place within the society. Benefits accrued from the sale of milk products amounted to SD 40 per household per month. Integration of nomads into their local ecosystem away from farmlands and the Park had saved an amount of SD 80,000 yearly in the form of fines to the Park authorities as well as the farming communities.

The main lessons learnt include: (a) collaboration of different stakeholders in implementing the project is an achievement by itself; (b) working with nomads requires a great care and many ways to involve them have to be devised prior to any engagement with them; (c) local active members from the nomadic group usually provide links with the local society; and (d) serious consultation with local communities is the key to success.

5.6.1 Sustainability:

The active local volunteers had managed to successfully forged viable links with the various State Government Departments and NGOs. Such links had culminated into the preparation of a follow-up project document to implement the second phase, hoping that all the institutions and various partners would continue working in the new project.

5.6.2 Replicability:

The fact that a follow-up project document has been prepared indicates that the project can be replicated into similar ecosystems having the same problems.

5.6.3 Limitations and Challenges:

The main limitations that might affect the sustainability of the project could be the inappropriate location of the hafir which was already silted and, as such, water availability would be affected. Also the project did not attempt to empower the local community or create an organizational structure at the local level to manage the project. Instead the management of the project was left to the State Pastoralists Union and the volunteers from the local society. These limitations would be addressed during the follow-up phase of the completed project.

6. Conclusion:

The key Lessons learned include: (a) collaboration of different stakeholders is a clue towards the implementation of the project; (b) working with nomads requires great care and ways of involving them should be devised; (c) local active members from the nomadic group provide links with the local society; and (d) active consultation with local communities is the key to success.

7. Best Practice (3): Out of Class Rooms Environmental Education: The Case of Wad Medani Girls Secondary School

7.1 Background:

This mini-project in Wad Medani girls' secondary school was designed, through mobilizing the students, to establish mini-forest in the school to be used as practical field laboratory to learn about the ecological conditions of the country and to understand the role of trees in carbon sequestration, micro-environment for thermal comfort and environmental protection (Plate 1).

By a small grant from NBI not more than \$ 2000 Wad Medani Girls Secondary School managed through mobilizing the technical expertise from Forest Department, Agricultural Research Station and a dedicated geography teacher to organize girls in Environmental Societies and to mobilize them in tree planting and management. Ultimately, this project filled a gap in school curricula "learning by doing".



Plate (1): Signs Showing Trees that Sequester Carbon

7.2 Problem Statement:

It has been observed that issues related to the environment like climate change, land degradation, deforestation and afforestation, through remain to be critical, were not incorporated into the school curricula. As such, future generations are not aware about many environmental problems, have little knowledge about indigenous trees and their role in protecting the environment and have no organizational structures on environment at the school level.

- To make student aware of the roles played by forest trees in environmental protection.
- To provide knowledge to students regarding indigenous tree species and their use for different purposes.
- To establish environmental committees in the school to discuss issues related to environmental protection.
- To provide out of class room learning activity linked curricula.

7.3 Justification for Selection (innovativeness):

Knowing serious lack of environmental awareness among the students, the project was an attempt to introduce fundamental issues on environment into the school curriculum and further create a group of young generation who actively advocate for environmental protection.

7.4 Technical Approach: Design and Methodology:

A small space in the school was selected to establish a mini-forest with the involvement of the students in tree planting, weeding, irrigation and supervision (Fig 2). A group of Students was assigned the responsibility to take care of one or two trees. To enhance the process the Forest Department helped in the provision of seedlings, selection of adapted indigenous trees and provision of technical supervision. The Department of Geography formed the environmental committees and supervised the activities performed by girls and solved related logistical problems. The planted trees were labeled with both local names and scientific names. The mini-forest was then used as out-of class learning about tree species in the country, ecological condition for optimum growth, role of trees in soil conservation and in climate change. Students also learned that trees have economic value and provide rural inhabitants with firewood and charcoal, albeit removal without replacement triggers the process of desertification. In this school and because of concerns about environment two girls were successful in school competition and awarded chances to travel to Rwanda and Uganda as an outreach opportunity for further exposure.



Plate (2) Visibility Sign



Plate (3): A Sign Indicating Tree Species

7.5 Partnership:

The main partners of the project include the students, the staff of the Geography Department, the Department of Forestry and the NTEAP/MGP. About (77) students, members of the Environmental Committee, took part in the project activities. The Forest Department and the Research Station provided the technical support and in delivering lectures to girls on Sudan tree species, economic value and ecological services.

7.6 Essence of the Best Practices: Benefits and lessons learnt

The essence of a best practice project takes into consideration three key issues namely, accrues benefits and lessons learnt, sustainability and replicability. For the Out of Classroom Education Project, the mini-forest availed an opportunity for the students to know more about tree species, planting and management (Plate 4). It further provided an avenue for practical classes in environmental protection and conservation. The technical outcome of the project was used to integrate environment into the school curriculum of geography.



Plate (4): Improved Water Cooler

In addition planted and protected trees increased the greenery around the school, hence created a micro-climate which finally provided a thermal comfort for the students (Fig.5). Through this activity, involved girls introduced planting trees at home and ask mothers to further nurse the seedlings. As such, the multiplier value of the project extended well beyond the 77 students and included many families. Moreover, the project proved to fill a major gap in the integration of class room lectures with practical activities that help to forge theoretical knowledge with learning by doing.

7.6.1 Sustainability:

The sustainability of this project depends on the commitments of the Geography Department to provide continuous guidance to the Environmental Committees as well as the technical inputs to be provided by the Department of Forestry and the Forest Research Station. The fact that the activities of this project filtered into many houses indicates that the project's activities can be further expanded on sustained basis.

7.6.2 Replicability:

The environmental Committees had already played a significant role in the replicability of the project, since many female households were reportedly engaged into tree planting at homes (Plate 5).



Plate (5): Watering Trees

7.6.3 Limitations and Challenges:

It is clear that both the school management and other teachers showed less interest in the activity and willingness to be involved. Failure of the Department of Geography to be sustainably engaged into the post-project activities and continuous liaison with the technical entities, might risk the future dissemination of the essence of this project.

8. Conclusion:

This project is a real endeavor of filling a major gap in the integration of class room lectures with practical activity that help to forge theoretical knowledge with learning by doing. It could be regarded as way of introducing environment education into the school curricula.

9. Best Practice (4): Poverty Reduction and Environmental Protection in Sabnas Island (Nile State).

9.1 Background:

The population of Sabnas Island in River Nile State depends on agriculture to attain their living. The agricultural infrastructure faces problems of sand encroachment and growth of weeds that obstruct canal water flow to irrigate the fields.

This also results in frequently changing the location of pumps in order to reach the Nile for pumping irrigation water. On the other hand, during Nile floods, the agricultural lands are flooded, thus restricting all agricultural activities. The chairman of Eastern Sabnas Development Society summarized the problems they face in the form of water shortage for irrigation and Nile flooding. Poverty is prevalent among the population; previous survey estimated that 68% of the populations are living under the poverty line, because of the reduced agricultural production. In order to improve the standard of living for the population, who primarily depend on agriculture as the main source of livelihood, the problems pertaining to water shortage for irrigation must be addressed. This could be done by removing sand and weeds that collectively impede water flow into the farms.

9.2 Problem Statement:

Agricultural production in Sabnas Island is seriously constrained by both the sand encroachment over farmlands and the growth of noxious weeds that impede the smooth flow of irrigation water through the conveyance system into the fields. This also results in frequently changing the location of pumps in order to reach the Nile for pumping irrigation water. On the other hand, during Nile floods, the agricultural lands are flooded, thus restricting all agricultural activities.

9.3 Justification for Selection (innovativeness):

The innovative nature of the project stems from the fact that the Eastern Sabnas Development Society was able to mobilize community members and generate cash and in kind resources to address the problems that constrain agricultural production. Not only that, but also the NGO managed to involve the State Ministry of Agriculture to achieve the core objectives of the project by establishing a strong link with the community. This association culminated into an effective division of labour where the State Ministry of Agriculture provided all the inputs needed to reopen the channel and the beneficiaries provided the labour input and further helped the society in the overall management of activates.

9.4 Technical approach: Design and Methodology:

The entire design of the project is centered on the halting of the sand encroachment over the agricultural lands, availing irrigation water through cleaning of the main canal and purchase of basic agricultural inputs. Through a micro grant of US\$ 25,000 the project carried out the following activities:

- Removal of sands and weeds by digging and widening the river channel on the western side of the island.
- Purchase of agricultural inputs, including pumps, tools, and pesticides.
- Mobilization of the community through Nafir to provide labour to improve irrigation infrastructure.
- Awareness raising and capacity building in environmental management and agricultural extension.

9.5 Partnership:

The main partners to the project include the Eastern Sabnas Development Society, the beneficiaries, the State Ministry of Agriculture, women local organization, the Agricultural Bank and the community at large.

9.6 The Essence of the Best Practice: Benefits and Lessons Learnt:

Sabnas community, guided by the Eastern Sabna Development Society, was able to achieve the objectives of the project in removing obstacles that impeded the flow of water for irrigation. They were able to widen the river channel by digging a canal of 2 meters wide and 150 meters long. Through such activities both water for irrigation and drinking become available not only for the population of Sabnas Island, but also for villagers living downstream on the western side of the river. In connection to this, the inhabitants of Sabnas Island got clean drinking water through a tank erected in the island. While it could be difficult to quantify the economic benefit resulting from increase in farming activities, yet it is observed that most of the potential agricultural lands were put under cultivation with different crops mainly, wheat, vegetables and legumes. Wheat growing in a large scale, as observed is expected to satisfy substantial portion of food needs of the local society and may generate extra cash for family needs.

9.7 Sustainability:

The project, through the active members of Sabnas Society, established a well designed infrastructure and further acquired capacities to maintain it. Not only that, but also the society provides continuous technical guidance to the people of Sabnas Island. Under the circumstances, the project activities can easily be sustained. In addition, the experience gained and ability to mobilize local resources provides a guarantee that the channel could be regularly maintained.

9.8 Replicability:

The fact that the project availed safe drinking water and water for irrigation; most of the potential agricultural lands were put under cultivation with different crops mainly, wheat, vegetables and legumes; and reportedly wheat was seen grown in a large scale, all, constitute a conducive environment for the replication of the project in similar ecosystems.

9. 10 Limitations and Challenges:

That fact that the location of the water pump is subject to frequent change due to water level in the river turn to be a limiting factor to the effectiveness of the irrigation infrastructure. Also the permanently open water channel in the middle of the river might be washed or silted during flood season. In the event of siltation, frequent maintenance is needed. This undoubtedly adds new cost of production to the list that farmers already have.

10. Conclusion:

The project opened avenues for community empowerment and links with government departments and the Agricultural Bank for financial support. In this regard, the society managed to buy on installment a tractor from the agricultural bank and was able to pay installments. Sabnas Society may be considered a model entity that managed to lead the local community in solving a major constraint to rural development.

11. Best Practice (5): Establishment of Natural Water Cooling Unit In El Dueim High Secondary School for Girls

11.1 Background:

The Environmental Education and Awareness (EE&A) component of Nile Transboundary Environmental Action Project (NTEAP) implemented a secondary schools subcomponent with the objective to enable students participate in meaningful environmental education projects and build teachers capacity in daily teaching of issues related to the environment. The project has four main activities: (a) establishment of school environmental projects to facilitate project based learning; (b) building the capacities of teachers and students in EEA; (c) selection of ten schools from five States to participate in the programme; and (d) demonstration of pilot educational projects with support from NTEAP in the range of 2000 USD. The project established partnership with institutions and practitioners in the field of environmental education and awareness by representing those institutions in a working groups and involving them in implementation of the main components' activities.

Duem Amiria Secondary School is one example in the school networks established by NTEAP which submitted a project proposal for the supply of safe, healthy and clean drinking water for the students based on a method innovated by scientist from University of Sudan. The main objectives of the proposal include: (a) to demonstrating EEA methods in the school as one way of learning by doing; (b) to provide adequate, healthy and cool drinking water for students and school staff by minimizing opportunity of potential transmission of water born diseases caused by using traditional water pots (zeer); (c) to decrease cost of getting cooled water by providing a sustainable energy efficient solution that depends on a natural process instead of use of electricity; (d) to raise students and school management awareness on the environmental conservation concept; and (e) to promote school management and students' participation in project implementation, monitoring and protection.

11.2 Problem Statement:

Provision of healthy cool drinking water in public areas such as schools constitutes a challenge for most of developing countries in Africa, where the climate also in most of those is extremely hot all over the months of the year. Furthermore, cost of electrical appliances may not be affordable and supply of electrical energy for operating refrigerators in most of the situations is unreliable.

In Sudan the use of pottery made container locally known as Zeer is common for drinking water. However, the use of such traditional containers is subject to be polluted through infectious organisms and dust, since they are exposed to the open air.



Cooling System Unit was an innovation by scientists in the University of Sudan and further developed and widely adopted by the Sudanese Environmental Conservation Society (SECS) to overcome the problems associated with the commonly used clay fired pot (Zeer).

11.3 Justification for Selection (innovativeness):

The main concept of the Cooling System Unit innovation was articulated by the Sudan University of Science and Technology, Faculty of Fine and Applied Arts, Industrial Design Department. The Sudanese Environmental Conservation Society, an important partner for the environmental component of NTEAP, picked this innovative idea within the context of environmental conservation advocated by the Microgrant programme.

11.4 Technical Approach: Design Description

The unit designed is of a rectangle shape, and composed of two concentric rectangles of bricks providing 20-cm distance between them, where a galvanized pipe coil passes through. This coil is surrounded by the cooling medium (coarse sand and crushed bricks). The main concept is that the cooling water passes through the coil by the cooling medium while the spilled water from the outlet taps is keeping this medium always wet. Users get the cooled water using the outlet taps.



Plate (3): The Cooling System Unit

The unit was constructed under the tree shed in order to protect it from the direct sun radiation and located in a green open space to let the air flow help in cooling the medium and the water. The spilled water from the model was used to irrigate the surrounding green environment.

11.5 Partnership:

Partnership already established with SECS, the Federal Ministry of Education and the state authority of education.



11.6. The Essence of Best Practice: Benefits and Lessons Learned

The Survey conducted among school children revealed that most of them contributed to the project and learnt a lot from the Cooling Unit experience. The project provided healthy, clean and cool water under extremely hot climate throughout the year, particularly during the day time where water demand by Children both frequent and high. Moreover, no extra work was required to carry water to the cooling container like the case of the traditional one and this guaranteed availability of cooled water all the times. Also the project provided a good opportunity to expand in tree planting by efficiently using the spill water which contributed much in increasing the awareness of the students in efficient use of water and its conservation. The students learned new ideas of making use of locally available materials to meet their needs instead of relying on imported expensive appliances. This part had added to their physics and geography syllabus.

11.7 Sustainability and Replicability of the Project:

The system is durable and requires no extra running cost, and provision of healthy drinking water is an important issue requiring the attention of all concerned with education for sustainable development. The Students in school said they will maintain the system and take care of it because they need it.

Since the project promoted an innovation that used local materials to provide clean cool water with no running cost in energy, thus it can easily be replicated.

11.8 Limitations & Challenges:

The construction requires some welding work henceforth skilled labour in welding works will be required. Also a prerequisite would be the availability of shade at the time of construction, but later new planted trees can provide required shade.

12. Conclusions:

This is an integrated project that potentially serves the purpose of learning by doing, creates awareness in environment and sustainable development and provides benefits to the school community by improving the environment of the school. The potential of its sustainability and replication is great.

Best Practice (6): International Sediment Initiative Conference

1. Background:

Sedimentation process causes great problems worldwide by raising the cost of operation and maintenance and complicating the design of water structures. The problems linked to sediment create difficulties in managing water systems. Consequently, there is a need for clear understanding on how to improve the watershed management, soil loss tolerances and hence formulation of appropriate soil conservation strategies.

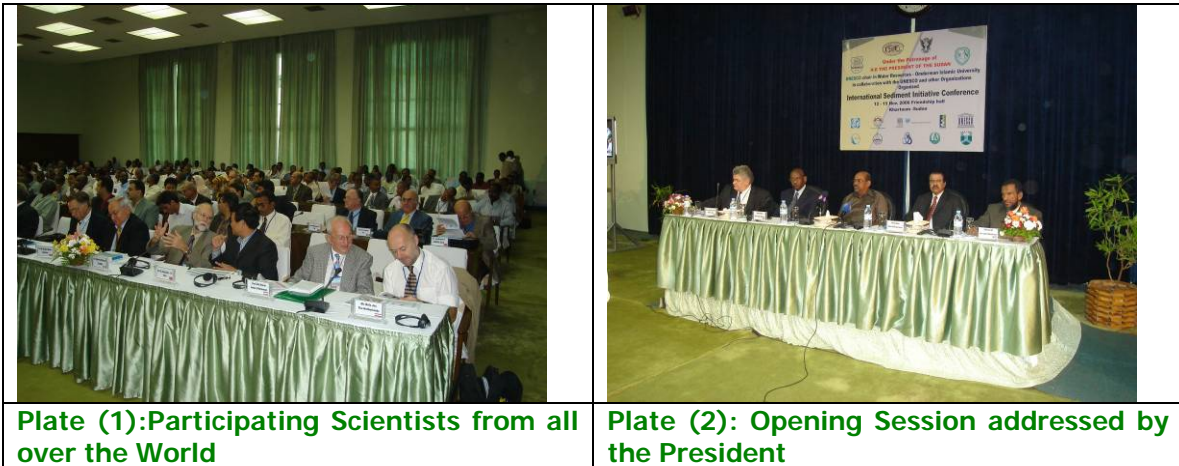
Natural geologic erosion takes place slowly over centuries or millennia. Whereas erosion that occurs as a result of human activities may take place much faster. Therefore, it is important to understand the role of each when studying sediment transport.

In response to the importance of sedimentation, the International Sediment Initiative (ISI) has been launched by the United Nations Educational, Scientific, and Cultural Organization (UNESCO), as a major activity of the current Sixth Phase (2002–2007) of the International Hydrological Programme (IHP). It is expected to add a new dimension to ongoing efforts aiming at sustainable sediment management, in the context of sustainable water resources development at global scale.

The International Sediment Initiative (ISI) is a new global initiative to assess erosion and sediment transport to marine as well as their social, economic and environmental impacts, lake or reservoir environments. It is aimed at the creation of a holistic approach for the remediation and conservation of surface waters, closely linking science with policy and management needs. The International Hydrological Programme Intergovernmental Council, at its 15th session (Paris, June 2002), adopted Resolution XV-8 specifically to deal with these issues. Resolution XV-8 emphasized the development of the decision support framework for sediment management, in order to provide guidance on legislative and institutional solutions, applicable to different socio-economic and geomorphic settings. One of the recommendations of the resolution was the establishment of an international Steering Committee to develop the ISI strategy along with the participation of UNESCO officials. This Steering Committee, formerly known as ISI Task Force Group, was approved and endorsed at the IHP's 16th Session of the Intergovernmental Council. The Steering Committee has met four times since 2002, and the fifth meeting was scheduled for November 2006 in Khartoum, Sudan.

First International Sediment Initiative Conference (ISIC) was organized in the occasion of the event in the period 12-15 Nov. 2006 in the Friendship Hall, Sudan-Khartoum under the patronage of H.E. the President of Sudan Field Marshal Omer Hassan Ahmed El-Bashir.

The Nile Transboundary Environmental Action Project (NTEAP) together with other partners collaborated with UNESCO Chair in Water Resources-Sudan in organizing the conference.



2. Problem Statement:

Sediment has various detrimental effects which include degradation of water quality, degradation of catchments, hampering of navigation, reduction of fisheries and aquatic habitat, deforestation, reduce capacity of hydro power, and problems to agriculture production and irrigation.

This conference was the first attempt of ISI to invite worldwide relevant institutes, agencies and individuals to come up with an initiative to deal with sediment.

3. Justification for Selection (innovativeness):

- Such a sediment initiative is expected to help international communities achieve practical outputs through partnership, pooling resources, focusing science, coordinating efforts, sharing information and experiences, and generating a broad basis of support.
- Project will build capacities, promote knowledge transfer within country and the basin
- Project is addressing one of the most important issues identified as environmental threat in the Trans boundary Environmental Analysis.
- The expected outcomes and interventions from conference will contribute to the overall objective of NTEAP.

4. Technical approach: Design and Methodology:

The conference was organized in five themes, namely: (a) sediment sources and causes; (b) sediment data collection techniques and modeling; (c) sediment scour, transport and deposition; (d) sediment management and mitigation measures; and (e) sediment environmental and socio-economic impacts. The conference was run in two parallel sessions. About 60 presentations including 6 keynote lectures were covered in 16 sessions, besides the poster presentation and a successful DVD video presentation by Prof. Hotchkiss from USA was presented, followed by an excellent discussion through a direct telephone communication between Khartoum and USA.

These papers were carefully selected by the Scientific Committee among a large number of papers submitted to the conference secretariat. About 300 participants from inside and outside Sudan have attended the conference. The Opening Session was addressed by six speakers, namely: H.E. the President of Sudan, Field Marshal Omer Hassan Ahmed El-Bashir, the Chairman of the Organizing committee and Director of the UNESCO-CWR, Prof. Abdella A. Ahmed, the General Secretary of UNESCO-IHP, Prof. Andras Szollosi-Nagy, the Minister of Irrigation and Water Resources of Sudan, Eng. Kamal Ali Mohamed, the President of the UNESCO General Conference, Dr. Musa Gafer Bin-Hassan and the acting Vice Chancellor of Omdurman Islamic University, Prof. Mohamed Saeed El-Khaliefa. Very fruitful discussions took place during the conference, and the conference concluded its activities by the Khartoum Declaration (see appendix 1), the conference had a very high attention and coverage from national and international media. The conference followed by a study field trip to Gezira Irrigation scheme, where participants saw a real life sediment problems, and how the Gezira irrigation scheme management authorities deals with this serious problems. The participants have visited some locations where the operation of sediment and aquatic clearance were taking place, participants had also visited cotton, durra and groundnut fields and farms Group Regulators at Km. 99 of the Main Canal, and they also had a detailed explanation from the scheme's engineers regarding the management of the irrigation system in this scheme.

5. Partnership:

Partnership established included:

- research institutions and universities will benefit from the outcome of the conference. International experts will bring their knowledge to the conference on causes of the phenomena and its effects on river environment and aquatic habitat
- knowledge exchanged on good practices will be transferred to institutions affected, ranging from government to community based
- Policy makers and planners at the macro levels in planning for natural resource management and land use planning
- water resource sector for integrated water resource planning
- energy sector in management of water reservoirs for energy supplies
- public utilities, urban and city water supplies
- regional organization in more knowledge to trans boundary water quality issues and Nile environment threats

6. The Essence of the Best Practice: Benefits and Lessons Learnt

The project was very successful in all respects as witnessed by all the international experts who attended the conference.

- over seventy papers were presented covering all the themes of the conference. With contributions from more than fifty countries.
- experience sharing in the field of sediment was accomplished. Good discussion of the presented papers led to mutual benefits and capacity building.
- the conference is addition of a new dimension to ongoing efforts aiming at sustainable sediment management, in the context of sustainable water resources development at global scale. The conferences represent the first attempt of ISI to invite worldwide relevant institutes, agencies and individuals to come up with an initiative to deal with sediment.
- provide chance for international communities achieve practical partnership, pooling resources, focusing science, coordinating efforts, sharing information and experiences, and generating a broad basis of support.
- the conference was a wider global forum of discussion on sediment management for sustainable development.
- moreover, it helps build the capacity of the individual researchers and institutions who are involved as well as enhancing their role in sustainable sediment management.
- Khartoum declaration was another product of the conference where the way forward in the field of sediment transport is outlined.

6.1 Sustainability and Replication:

Steering committee established for ISI, will guarantee sustainability of activities. Main activities identified by SC include:

- Initiation of case studies for river basins as demonstration projects practices.
- Setting up a global erosion and sediment information system
- Review of sediment related research
- Education and capacity building for sustainable sediment management.
- Networking

10. Conclusion:

The conference was a good opportunity to the country and NBI in linking with international institutions and scientists to address a very important issue and further enhance collaboration.

