THE FLANDERS UNESCO SCIENCE TRUST FUND (FUST) PHASE II

An External Evaluation Report
(March 2004- March 2007)

Lesley Rickards and Bisher Imam
October 2007

TABLE OF CONTENTS

I. EXECUTIVE SUMMARY

The evaluators found that Phase II of the Flanders UNESCO Science Trust Fund (FUST) has been largely successful both at individual program level and collectively. Overall, individual programs have been well managed and highly effective. All of the programs managed to achieve their desired results, deliver the expected outcome, and contribute to capacity building within their respective mandates. The evolution of these programs during phase II is consistent both with UNESCO's mandate and with the strategic goals of the Government of Flanders Science and Innovation Policy. More specifically, phase II can be characterized by marked increases in regional scientific cooperation, strong involvement by Flemish counterparts, significant gains in regional and country-level capacity through training, and by the initiation and completion of many applied research projects. The program has been highly effective and it is accurate to say that the financial and scientific contributions of the Flemish community are well directed and visible.

The reviewers believe that the success and the continuing evolution of the programs warrant the continuation of the current agreement.

I.1 THE FLANDERS UNESCO SCIENCE TRUST FUND (FUST)

The Flanders UNESCO Science Trust Fund (FUST) agreement supports UNESCO's activities in the Field of Science. The agreement was initially signed for 5 years (1999-2003) and was renewed for additional 5 years (2004-2008) on April 2003.

FUST is motivated by the Flemish Government's commitment to reinforcing international collaboration through the Science Sharing programme as one of the eight strategic goals of the government's science and innovation policy and by the Government of Flanders recantation of UNESCO's role as a promoter of international cooperation in education, science, culture, and communication. Both FUST agreements identify: (a) compliance with UNESCO's priorities as accorded by the Flemish Government, (b) likely future sustainability, (c) effects multiplication, and (d) relevance and availability of scientific support from Flemish institutions as key criteria to select activities for support by the trust fund. Supported activities are to be carried out in real and effective partnership between Flemish institutions, UNESCO, and the beneficiary with focus on maximizing the impacts of Flemish contributions by focusing on long-term sustainable capacity building in scientific, policy, networking, information exchange, and collaborative infrastructures.

Article 2.2 of the 2004 agreement mandates a thorough evaluation of the Trust Fund before the expiration of the agreement. This review, which covers the period from March-2004 through March-2007 is undertaken to support the evaluation process. The reviewed projects include IOC's Ocean Data and Information Network for Africa (ODINAFRICA), IHP's Flow Regimes from International Experimental and Network Data Nile (FRIEND-Nile I and II), Water Center for Arid and Semi-Arid Zones of Latin America and The Caribbean (CAZALAC I and II), Framework Programme for Research Education and Training in Water (FETWater I), and Capacity Building and Training on Environmental Planning and Management in Palestine II, and MAB's Sustainable Management of Marginal Drylands (SUMAMAD). These programs are shown in Figure 1, along with their budget levels.

I.2 BRIEF DESCRIPTION OF SUPPORTED PROGRAMS

The ODINAFRICA-III project brings together marine-related institutions from 25 African countries. The major goals of the project are to improve data and information flows into and out of the national oceanographic data and information centers, to develop data and information products required for integrated management of the coastal areas of Africa, and to increase the delivery of services to end users. ODINAFRICA-III has three thematic work packages: (i) Coastal Ocean Observing System: focusing on upgrading and expanding the African network of sea level stations, provision of near real-time observations, and building adequate capacity for their analysis and management; (ii) Data and Information Management, focusing on further development and strengthening of National Oceanographic Data Centers (NODC) to manage the data streams from (i) and integrating biogeographic and hydrological data

steams into NODC systems, as well as developing information products such as directories, library holding databases and e-repositories; and (iii) product development and delivery, focusing on identification of end-users and their requirements, development of African Marine Atlases, improvement of marine databases, promotion and dissemination of outputs of the project, and assessment of the impacts of products on the end-user. An additional cross-cutting component is public awareness and promotion, both at the national and regional level, through newsletters, brochures and web-sites.

The main objective of the FRIEND Nile program is to improve integrated water resources management in the Nile Basin through international cooperation particularly in the area of research. Researchers from 5 of the 10 Nile Basin countries work to (a) improve understanding of hydrological variability and similarity, (b) enhance research cooperation among Nile Basin countries through hydrological research projects on selected topics, (c) increase the number of trained personnel in the region and (d) create a network between focal training institutions in the countries of the region and to enhance the linkage with similar institutions in the advanced world. The focus is on joint research/training workshops that address four thematic areas: rainfall runoff modeling (RRM), sediment transport and watershed management (STWM), flood frequency analysis (FFA), and drought and low frequency analysis (DLFA). An international conference was held to present research results on these themes. In Phase II, the thematic areas were re-arranged and two new areas were initiated for integrated water resources management and eco-hydrology.

The first phase of the Palestine (1998-2001) project resulted in the development of a computer center and the expansion of the soil analysis lab at the nascent Water Research Center (established in 1995) in the Azhar University, Gaza. Phase I also provided capacity building and training of WRC's staff and some other professionals in the water sector in Palestine. Phase II (2002-2006) aimed to: (1) establish a Palestinian Water Resources Network on training and research, (2) establish a documentation center at WRC, (3) Strengthen the capacity of Palestinian universities and institutions to provide water-related training, and (4) enhance the research capacity of Palestinian universities. Initiation of Phase III has not started, but support for project continuation is strong among Palestinian institutions.

The (FETWater) is envisioned as a program for effective cooperation in research, education, training, and capacity building initiatives to achieve integrated water resource management in South Africa. The primary focus of FETWater, which receives support from FUST and from the Government of South Africa, is on forming and nurturing training networks capable of capacity building in areas relevant to the implementation of the country's National Water Act (1998). Supported network activities include capacity audits to identify training needs, development of training material, coordination of training sessions, and co-sponsoring visits and mobility training for network coordinators. Phase II (2006-2010), was recently approved with identical goals to phase I, but with expanded set of activities to link with other networks and to improving inter-disciplinary collaborations in South Africa and adjacent Member States.

The main objective of FUST support to CAZALAC is to support the establishment and operation of a Water Center for Arid Zones in Latin America and The Caribbean, which will systematically address the serious problems caused by extreme water shortage and impairment in arid and semi-arid environments and will develop favorable conditions for regional cooperation and exchanging experiences regarding these issues. In addition to FUST, the operation and activities of CAZALAC are supported by the Government of Chile and in-kind support from some participating institutions. CAZALAC, which is currently formally constituted as a center under the auspices of UNESCO, holds activities that include joint research projects bringing together scientists from 27 regional countries, training workshops, development of training materials, and acquisition of research equipment.

The Sustainable Management of Marginal Drylands (SUMAMAD) program (2004-2007) is co-sponsored by the Government of Flanders, UNESCO-MAB, IHP, the UN University, the International Center for Agricultural Research in Dry Areas (ICARDA), and the Chinese Academy of Science. The program includes research centers and bio-sphere reserves in 9 different countries. SUMAMAD's overall targets are: (1) improved and alternative livelihoods of dryland dwellers, (2) reduced vulnerability to land degradation in marginal lands through rehabilitation efforts of degraded lands, and (3) improved productivity through identification of wise practices using both traditional knowledge and scientific expertise. SUMAMAD researchers collaborate with dryland users and dwellers, and conduct capacity building in dryland research through training, resource inventory studies, management practice assessment studies, and socio-economic surveys.

An important component of FUST phase II has been the implementation of several small scale initiatives support of large scale projects. These activities included support for outreach efforts, development of educational kits, attending of conferences by FUST beneficiaries, and target of opportunity workshops.

The primary purpose of the evaluation is to provide advice to the Government of Flanders and UNESCO concerning the extension of the FUST agreement. Visits to UNESCO Headquarters, Brussels and Oostende were carried out jointly by the two consultants. The effectiveness and efficiency of the FUST projects within IHP, IOC, and MAB respectively were evaluated using the annual reports, research reports, conference proceedings, and a wide range of other documentation supplied by UNESCO and obtained by the evaluators. Separate field trips for the two consultants, to Cairo and to Salammbô (Tunisia) and Zanzibar (Tanzania), completed the evaluation process.

I.3 MAJOR FINDINGS

- Without exception, FUST supported programs have demonstrated capability to address country and regional needs as well as UNESCO priorities as accorded by the Flemish Government.

- The successes of FUST programs demonstrate the value of the UNESCO's Capacity Building Network model as a catalyst for national and regional intra-sector cooperation.

    - The FRIEND Nile network allowed unprecedented exchange of hydrologic data among 5 of the 10 Nile countries. It also facilitated the selection of common analysis and modeling tools to address common problems, and resulted in agreement among researchers from various countries on a unified set of regional research and capacity building priorities.

    - In South Africa, the FET-Water network fostered the evolution of training networks that are responsive to critical national needs in integrated water resource management.

    - In Palestine, the network of experts expanded the project's impact from one beneficiary university to include additional universities and key actors in the water sector in Gaza and the West Bank.

    - The SUMAMAD network of research centers and biosphere reserves is now poised to make significant contributions to the science of dryland assessment and management through their design and implementation of common assessment framework and the exchange of experiences in sustainable income generating activities.

    - CAZALAC network partners have joined efforts in a continental scale project, namely the Aridity Map, which presents a model for regional cooperation.

    - Within ODINAFRICA the (human) networks developed through the training courses and sub-projects are of great importance and have lead to greater cooperation and collaboration between partners.

- The secondment of experts, despite its time limitation to 6 months, proved to be one of the most effective tools available through which Flemish counterparts can be actively involved in cooperation and in building regional and national capacities. One can only imagine the sustained progress that can result from a longer duration secondment.

- To varying degrees, FUST supported programs are beginning to yield measurable progress in building disciplinary research capacity in areas relevant to integrated (freshwater and marine) resources management within participating countries. Research projects have become as important as training activities in Palestine, FRIEND-Nile, CAZALAC, and SUMAMAD. In ODINAFRICA, data collection, dissemination, and archives will form the basis for new research efforts.

- At this stage, a large number of FUST sponsored research projects can be classified as baseline assessment and some as applied research demonstrations. This is expected and in

fact may be required in order to improve the profile and importance of scientific research within participants' institutions by demonstrating the relevance of scientific research to national priorities and to policies leading to improved management of water and natural resources.

- The round table meeting with FRIEND-Nile team members in Egypt at WRRI demonstrated that the tools and expertise gained through the collaborative training and research efforts is beginning to make inroads into decision making. The activities of the drought and low-flow FN component has had effects on the way decision makers think about data collection and streamflow within the river.

- FUST projects are increasingly receiving positive press coverage. Examples were noticed (e.g., Egypt SUMAMAD and FRIEND Nile), where the press coverage points FUST activities as best practice models and encourages local agencies to adopt and support such models.

- All projects are making sincere, adequate, and successful efforts to highlight the important role of Flemish financial and intellectual contributions to the projects. In various conversation, the evaluators heard the phrase "the Flemish do not only support a project, they adopt it". There is good will being generated throughout FUST projects.

- ODINAFRICA is an underpinning and cross cutting activity supporting both research and policy. Links with the marine research community are strong and ODINAFRICA will provide the infrastructure for managing the data collected by operational systems (e.g. sea level stations) and has already made significant progress in developing marine atlases which are an aid to assessment and management of the marine and coastal zone.

- The involvement of the dedicated group of Flemish faculty and scientists has had an immense impact on phase II activities. Their participation, which continues a well established tradition of Flemish support of UNESCO's IHP, IOC, and MAB, covered a wide range of activities including short-term secondment, visits, brain storming sessions, training workshops and courses, need assessment missions, major research projects, and development of project documents. All members of this dedicated group of scholars are to be commended individually and collectively for their efforts.

- At the start of the ODINAFRICA project, major delays in release of the funds impacted quite strongly on the project, resulting in considerable extra effort in working around this difficulty. Whilst understanding that organizations have their own financial and administrative rules, it would be beneficial if this could be avoided in any future phases.

- Training the trainers is an important tool in multiplying the impacts of FUST support. The concept however, has not been fully and consistently implemented. There is no consistent follow-up regarding the activities of FUST trained experts in terms of training others within their academic institutions or within their operational and/or regulatory agencies. However, within the ODINAFRICA project this is just beginning to be exploited, with some of those trained by ODINAFRICA training courses now training junior colleagues in their institutes, and setting up training courses for others in their country. This is encouraging and should be developed further. Similar efforts are now emerging in the FRIEND-NILE, particularly at the Water Research Center in Egypt, where junior researchers are being trained by FRIEND-Nile trained colleagues.

- Some FUST supported activities such as ODINAFRICA, CAZALAC, and SUMAMAD have established a good digital presence on the worldwide web. Others continue are yet to develop useable websites and to provide easy access to progress reports and technical material. The development of a suite consistently styled web-sites, one for each ODINAFRICA data centre is commendable; when completed these will provide an effective promotion mechanism for the project at many levels. The CAZALAC and SUMAMAD websites provide excellent sources of project information, documents, and progress reports. CAZALAC website will soon be empowered with interactive data access and state-of-the-art internet mapping tools.

- Differences are observed regarding future sustainability of FUST sponsored activities. On the

one hand, projects such as CAZALAC, and FET-Water were initiated with financial contributions from host countries. For ODINAFRICA, the participating countries have all committed some of their own resources and other sources of funding are actively being sought. On the other hand, the FRIEND-Nile, Palestine, and SUMAMAD (apart from the original local project funding) are yet to make measurable progress in diversifying their funding sources. Demonstrable and active efforts were and continue to be made this regard, but more will be needed. Overall, all FUST programs will continue to need the support from the Flemish community before sustainability models can be developed. Arguably, given that FUST does not allow for salary compensations to beneficiaries, their time investment on FUST sponsored program is an "in-kind" contribution.

- Given the on-going political difficulties in the Palestinian Territories, and particularly in Gaza, the Palestine project has by all means managed to overcome tremendous odds. Both UCO and project participants are to be commended for their success. Part of the success is also owed to FUST's steering committee's flexibility and understanding and to the commitment of Flemish counterparts.

I.4 LESSONS LEARNED

- Frequent project-level review missions are important project management tools, particularly because UNESCO project executing officers have consistently been responsive to the outcomes of such missions. It is noteworthy that all of the management models adopted by FUST sponsored projects have the necessary mechanisms including steering committees and project-wide meetings to encourage and foster good communication. Adherence to procedures adopted by these governing bodies is highly important to maintain effective participatory networks.

- Secondment of experts is a powerful tool. However, substantively longer secondment durations will be needed during phase III.

- With respect to capacity building in research, FUST efforts to expand the number of individual beneficiaries are frustrated by the fact that there are only few experts who can actively participate in research capacity building efforts. An added complexity is the fact that many of these local and regional experts have significant teaching and/or operational responsibilities and they may also represent their countries in several other national and regional initiatives. The evaluators strongly believe that beneficiary countries can make tremendous contributions to these efforts by supporting additional trainees.

- There is a danger of some FUST projects becoming too dependant on the Flemish counterparts as advisors and trainers. While such role may continue to be essential during the initial years of phase III, efforts must be made to gradually transform the role of Flemish counterparts from trainers and advisors into research partners. This will depend more on the initiative taken by FUST beneficiaries, and on the ability of projects' governing bodies to activate the concept of training the trainers. It may also require the establishment of competitive mechanisms to select research projects including peer review process. The model provided by the first call for proposals in the Palestine project is an excellent step, which must be encouraged and expanded.

- UNESCO's efforts to integrate FUST related activities within other regional programs will continue to be important. Some success has been observed during the evaluation period, but more will be required. More utilization of UNESCO's affiliated regional facilities and centers and perhaps facilities affiliated with other UN agencies to conduct training workshop is a step in that direction. One must recognize that navigating the complex and highly political structure of some regional initiatives such as the Nile Basin Initiative is difficult and project leadership are commended for making serious attempts at improving such regional communications.

- Academic policies in major research universities discourage members of the academic community from actively participating in capacity building programs. Such time demanding

programs offer fewer opportunities for peer review publications, a risk only well established and highly committed members of the faculty can take. Younger members are thus less likely to be interested in FUST activities, and well established colleagues can participate only for a limited time without impacting their academic life. Creative, "out of the box" approaches are needed to address this concern in manners that retain the independence and intellectual rigor of research institutions while at the same time providing incentive for more faculty participation.

- Outreach activities, made possible by the small scale initiatives which were authorized during Phase II have been very successful. Activities such as the development of pedagogical kits, internet course materials, conference participation in lieu of SUMAMAD/CAZALAC, and the stimulation of youngsters in practical sustainable water use activities in Egypt (FRIEND-Nile) are important effect multiplication tools.

- Sincere local outreach efforts to residents, policy makers, NGOs, and decision makers can yield un-expected support to FUST projects. A case in point is the ability of the highly dynamic SUMAMAD project coordinator in Egypt to integrate the project's activities within local environmental protection, health improvement, and development efforts. In Palestine, several NGO's and non-profit groups are members of the capacity building network. These are all commendable efforts. Outreach from the ODINAFRICA community has been successful resulting in participation in other regional and pan-African projects, improving this visibility of the project. One example of this type of collaboration has led to UNEP support in African marine atlas development.

- Site visits by high ranking top-level Flemish and UNESCO officials significantly increase the visibility of FUST programs at local and regional levels. More importantly, such events improve the likelihood of local commitments to financial and in-kind support necessary for future self sustainability of important projects.

- The establishment of truly regional centers such as CAZALAC is a long and demanding process. However, as demonstrated by CAZALAC's success in bringing together researchers, educators, and trainees from all of South America and the Caribbean countries, the impacts of truly regional centers can be wide reaching.

- The provision of a permanent staff member to CAZALC, along with the extended visits by students from Flemish Universities was an important factor in ensuring the success of the center, particularly in establishing an experimental watershed and conducting field studies.

- Well targeted acquisition of research equipment has a major impact on FUST project. The scientific research which resulted from the construction of rainfall simulator in CAZALAC, the expansion of the soil lab in Gaza are but few of such benefits.

- ODINAFRICA III is a very ambitious and wide ranging project. The original vision anticipated a higher level of funding and when this was not forthcoming, all proposed activities were cut back. Additionally the 26 December 2004 tsunami meant that the project had to rapidly adapt to implement more sea level station at the expense of the additional sensors. In retrospect, it may have been wiser to have focused on a smaller number of activities in order to make major progress on them and defer some activities to a further phase.

- Communication in a project the size and complexity of ODINAFRICA is not always easy. Although in some areas it is very good there is still some room for improvement - this is under consideration by the Project Management Committee and the management structure is likely to evolve in future phases to improve this. However there is a responsibility on all participants to keep updated with meeting reports, etc.

- One of the most important lessons learned in ODINAFRICA has been that in capacity building one size does not fit all: from the start ODINAFRICA has provided quite some flexibility for each country to use the provided support and resources to serve, first of all, national priorities. At the national level there was therefore a different emphasis: sometimes

on public education, sometimes on research, sometimes on coastal management. This flexibility made that each country could maximize its benefit from ODINAFRICA. A more regional or highly focused approach would have been only partially beneficial to each member state. This flexible strategy has been a major contributing factor to the success of the project.

- During the July 2nd, 2007 meeting with Flemish counterparts in Brussels, there was a consensus regarding the significant potential and value of FUST activities. Positive and negative experiences were cited, and constraints were recognized concerning: (a) discontinuities and lack of consistency in of activities particularly between training sessions (b) ambitious expectations and the potential for improvements in the process of mapping (expectation→tasks→budget→actual activities), (c) the need for more local and national initiatives concerning proposals for additional funding sources, (d) slow communication between local/regional offices and UNESCO-HQ, which can impact project performance due to delays in funding, (d) the need for more involvement from junior participants in beneficiary countries, and (e) the need for improved adherence project terms of reference. The reviewers agree that addressing these constraints will improve the already positive experiences and will facilitate a continual success of the program. The evaluators will address specific recommendations regarding these issues both in the following section and at in the detailed programme reviews.

I.5 RECOMMENDATIONS

I.5.1 General Recommendations

- Maintain and/or increase the number of small scale activities including those allowing beneficiaries to participate in international conferences with UNESCO (Science programme) as co-organisor.

- UNESCO and the Flemish government may want to consider increasing the duration and number of secondment of experts during phase III. The evaluators found undisputable evidences of FUST quantitative and qualitative growth. The program is now at a stage where a synthesis of the results from its various activities, lessons learned, and program integration can only be accomplished by the secondment of an expert for a period no less than 24-36 months to UNESCO Headquarter. The evaluators strongly encourage both parties of the FUST agreement to stipulate such secondment and continuing secondment to field sites, but for longer duration, in phase III agreement.

- The FUST program has grown substantially, and a thorough review of the program requires deeper interaction with representatives from beneficiary communities than was available in this review. The steering committee and UNESCO are encouraged to start the next evaluation mission earlier, and to design the evaluator site-visits so that they coincide with project governing body meetings and/or research-training workshops. This is particularly important with respect to MAB and IHP programs where such meetings are commonly held, and would be beneficial for ODINAFRICA.

- Flemish counterparts are well positioned to encourage young Flemish doctoral graduates applying for science grants in Flanders to consider FUST activities in writing their grants proposals.

- Establish a mechanism through which FUST supported programs can interact and learn from each others. A lessons learned annual or bi-annual workshop attended by UNESCO officials responsible for FUST projects, FUST steering committee, and representatives of project beneficiaries will allow such exchange of expertise and will facilitate further integration of FUST supported programs into a coherent whole.

- At the individual level, senior trainees, who have benefited from participating in multiple FUST sponsored training sessions, should become more active in training new trainees within their own agencies and institutions. After all, the expansion of capacity is the key goal of FUST and beneficiaries can multiply the effects by taking more active role in transferring

their newly gained knowledge to others in their countries and/or regions.

I.5.2 ODINAFRICA

- Continue to expand the number of countries participating in ODINAFRICA: a further five countries have expressed interest in joining a further phase of the project. However, in doing this it needs to be recognized that some participants are experienced and need to be given more challenges and responsibilities, perhaps by way of new sub-projects.

- Develop more regional leadership (in contrast to national) and regional sub-programmes. These latter are in a good position to bid for funding within the different regions within Africa, as is increasingly the case for the east African countries.

- Until the present, ODINAFRICA has rightly concentrated on developing the infrastructure necessary for establishing and operating data and information centers, the next phase will need to concentrate more on service provision, building on the marine atlases as a coastal zone management tool and on the tide gauge data for tidal predictions and storm surge modeling, as well as for sea level research. ODINAFRICA-III has moved away from the single programme (IODE) model towards an integrated model including GOOS, IODE and ICAM. The GOOS (GLOSS) and IODE elements have been well developed, the ICAM component needs to be better developed."

- A number of the current participants are experienced in their field: more use should be made of these skilled experts; they should be the next generation of trainers. For example, they could train any new participants in data and information management.

- Although the collaboration with the IOC Project Office for IODE and VLIZ to provide a web site displaying the real-time ODINAFRICA has been a great success, at some stage this operation should either be transferred completely or mirrored at one or more sites in Africa, to ensure that ODINAFRICA participants "own" the tide gauge data system and take responsibility for it.

- Investigate links with IHP to improve the provision of hydrological data for the African Marine Atlases.

I.5.3 International Hydrological Programme (IHP)

- Continue the efforts to expand the number of countries participating in the FRIEND-Nile and to integrate the project with other relevant regional and global initiatives.

- Develop training mechanisms on the preparation of peer review publications and encourage participants to submit manuscripts to international journals (FRIEND-Nile, Palestine, and perhaps CAZALAC)

- UNESCO should continue and focus the efforts to seek additional and alternative funding sources for the FRIEND-Nile and Palestine Project. On going efforts to increase regional support to CAZALAC are commendable and should continue as well.

- UNESCO should take active part in enhancing the presence of the Palestine capacity building project in other relevant activities in the Arab region. Consultation with UNEP is strongly encouraged in that regard since many of the challenges facing Palestinian water resources do involve water quality and health.

- IHP is well positioned to ensure more active involvement of UNESCO IHE in FUST related educational and training efforts. Being UNESCO's main hydrological education and training facility, IHE should play an active role in assisting in the development and delivery of educational material, courses, and training sessions in CAZALAC, FRIEND-Nile, Palestine, and FET_Water.

- FUST related activities are encouraged to establish close linkage to the growing network of UNESCO category 2 centers, especially those with strong water-and dryland related ties such

as the Regional Centre for Training and Water Studies of Arid and Semi-arid Zones (RCTWS-Egypt). With the anticipated approval of five additional water related centers during the 34th session of the General Conference of UNESCO, the network of centers, presents a wealth of resources that should be linked to the overall framework of IHP FUST activities.

I.5.4 Man and the Biosphere/SUMAMAD

- Consider expanding SUMAMAD geographic extent. And consider inviting advanced countries with significant drylands to join SUMAMAD as contributing partners.

- SUMAMAD is well positioned to accelerate the dissemination of best-practices and assessment methodology developed at the projects' nine sites to wider audiences. A document that provides a coherent scientific and policy implications of SUMAMAD's research to-date will be very helpful in that regard. It may require support for secondment of an expert to UNU, and/or UNESCO HQ.

- SUMAMAD partners are well positioned, individually, and collectively to assist UNESCO in various training and knowledge transfer activities pertinent to sustainable dryland management. More coordination with programs such as GWADI are strongly encouraged and could be helpful in that regard. Expanding the on-going graduate student exchange between the 9 participating centers will also benefit such effort.

- SUMAMAD management is encouraged to establish a priority-based approach for the identification and selection of the number of activities to be performed at each individual sub-project site.

II. THE FLANDERS UNESCO SCIENCE TRUST FUND

II.1 BACKGROUND INFORMATION

On 19 September 1999, an agreement between the Government of Flanders and UNESCO established the "Flanders UNESCO Science Trust Fund (FUST) for the support of UNESCO's Activities in the Field of Science for an initial 5 years phase (1999-2003). Subsequent to a mandatory review, a second 5 years phase of FUST (2004-2008) was approved by the Government of Flanders on April 2003.

The establishment of the Trust Fund is motivated by the Flemish Government's commitment to reinforcing international collaboration through the Science Sharing programme as one of the eight strategic goals of the government's science and innovation policy. The Government of Flanders, recognizing UNESCO's role as a promoter of international cooperation in education, science, culture, and communication provides annual funds to support: (1) concrete projects in the field of science, (2) secondment of experts, (3) financing consultants for project preparation and evaluation, and (4) research projects as follow-up to activities carried under the fund and to be implemented by trainees at Flemish institutions returning to their home country. Both agreements identified compliance with UNESCO's priorities as accorded by the Flemish Government, likely sustainability, effects multiplication, and relevance and availability of scientific support from Flemish institutions as key criteria to select activities for support by the trust fund. Supported activities are to be carried out in real and effective partnership between Flemish institutions, UNESCO, and the beneficiary with focus on maximizing the impacts of Flemish contributions by focusing on long-term sustainable capacity building in scientific, policy, networking, information exchange, and collaborative infrastructures. To accomplish its objectives, the Trust Fund provides resources for the equipment, development of training and educational material, establishment of data acquisition, archival, distribution, and exchange infrastructure, holding workshops, conferences, and training sessions, and for the publication of research results. The fund, however, does not provide research grants to beneficiaries.

While the day-to-day management of FUST activities is entrusted to UNESCO's relevant programs, the agreement establishes a steering committee with representatives from UNESCO and the Government of Flanders to advise on the development and implementation of projects. The process of initiating a new project includes a mandatory submission to Flemish universities and institutions, where interested researchers have the opportunity to participate in the proposed project. Once a Flemish counterpart is identified, the proposal can then be considered for evaluation and approval. The steering committee is also responsible for monitoring and evaluating the progress of on-going projects and for recommending budget levels for subsequent years.

During phase I, two UNESCO programs were selected as FUST participants, the Intergovernmental Oceanographic Commission (IOC) and the International Hydrological Programme (IHP). In phase II, and consistent with UNESCO's increasing focus on sustainability of ecosystems, and with the Government of Flanders emphasis on "water and associated ecosystems" as an important theme, the Man and the Biosphere programme (MAB) was invited to participate in the activities sponsored by the Trust Fund. FUST related activities within all three programs, (i.e. IHP, IOC, and MAB), increased in number during phase II due in part to the establishment of "small scale initiatives", which was recommended by the 2002 review.

As of December 2006, the Flemish Government has transferred $9,865,067 to the General Fund for Science, including $4,459,286 during the period 2004-2006. This indicates an upward trend in annual contributions, with the exception of the year 2004, which represented a transition from phase I to II. Of this total amount, $8,772,760 was actually transferred to individual projects with the reminder being committed. Since its inception, the fund has provided support to some of the major activities of IHP, IOC, and MAB in the form of large scale projects, outreach activities, and small scale initiatives focusing on capacity building, networking, and facilitating scientific research by the beneficiaries.

Article 2.2 of the 2004 agreement mandates a thorough evaluation of the Trust Fund before the expiration of the agreement. This review, which covers the period from March-2004 through March-2007 is undertaken to support the evaluation process. The reviewed projects include IOC's Ocean Data and Information Network for Africa (ODINAFRICA), IHP's Flow Regimes from International Experimental

and Network Data NILE (FRIEND-NILE I and II), Water Center for Arid and Semi-Arid Zones of Latin America and The Caribbean (CAZALAC I and II), Framework Programme for Research Education and Training in Water (FETWater I), and Capacity Building and Training on Environmental Planning and Management in Palestine II, and MAB's Sustainable Management of Marginal Drylands (SUMAMAD). Funding levels and durations of these programs, along with other reviewed activities are illustrated in Figure 1 below.

II.2 MANAGEMENT STRUCTURE

The FUST program is managed by a four member steering committee. The committee includes two representatives from the Government of Flanders and two UNESCO representatives representing the Extra-budgetary Section and the Science/IODE sector. The steering committee can invite relevant experts to attend its annual meetings. The committee reviews relevant proposals, monitors the performance and activities of sponsored programs, and coordinates the involvement of Flemish experts and universities in the program. Members of the steering committee regularly participate in steering committees and oversight bodies of sponsored projects.

Distribution of Financial Support

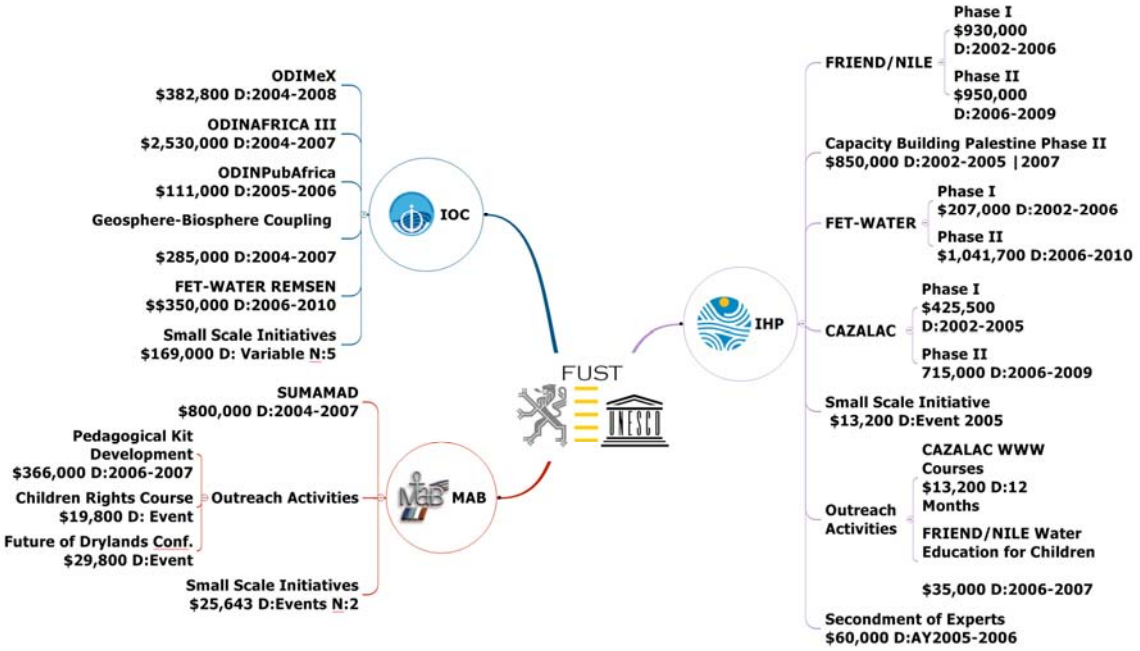

Figure 1. Distribution of resource allocations of FUST during the phase covered by this review. Please notice that some projects are proposed for duration beyond the current phase. Continuation of support for these projects will depend on the renewal of the FUST Agreement.

II.3 PURPOSE OF EVALUATION AND METHODOLOGY

The primary purpose of this evaluation is to provide advice to the Government of Flanders and UNESCO concerning the extension of the FUST agreement. Visits to UNESCO Headquarters, Paris, Brussels and the IODE office in Oostende, Belgium have been carried out jointly by the two evaluators, who conducted interviews with management personnel, Flemish counterparts, and Steering committee members. The visit to UNESCO consisted of round-table meetings with MAB, IHP, and IOC program management and UNESCO's sector for External Relations and Cooperation (ERC) and Dr. Rudy Herman, representing the FUST Steering committee. The objectives of the UNESCO-HQ meeting were to provide the evaluators with background information on FUST and on the individual programs, and to discuss the evaluation methods and framework.

The visit to UNESCO HQ was followed by a 4 additional days at UNESCO HQ, which were utilized by the reviewers to initiate desk studies, survey and acquire available UNESCO project documents, conduct individual interviews with, and prepare for site visit missions. In the subsequent week, IHP/MAB evaluator Dr. Imam, carried out a mission to Egypt to visit the FRIENDS-Nile management team in Cairo and the project coordinator and beneficiaries at the WRC in Qanater near Cairo, and the Egyptian MAB commission in Cairo. A mission to Alexandria was also carried out by Dr. Imam to visit Egypt's SUMAMD site (Al Omayed Reserve) and interview participants and beneficiaries of the SUMAMAD project. Subsequently, the two evaluators joined again in Brussels for a meeting with a representative from the Flemish Government and a round table meeting with Flemish counterparts. This was followed by a joint meeting to IODE in Oostende for further discussion and evaluation. Dr. Imam gave a de-briefing via phone with UNESCO-HQ from Oostende.

The evaluation of the IHP and MAB projects focused on progress in meeting the general as well as specific objectives of the programs, on program management, quality of training materials, future sustainability, and impacts of fund reduction and/or discontinuation on these projects. Furthermore, given the increasing role of applied research in FUST sponsored activities, the IHP and MAB evaluations included brief assessment of research progress. During the Paris desk study, Dr. Imam met with Dr. Rudy Herman and with Prof. Donald Gabriels. The one-on-one meeting with Dr. Herman served to provide an overview of the Flemish Community's objectives of the FUST programme and to indicate the value of the evaluation efforts, particularly in assessing the potential sustainability of the project. Drs. Herman and Imam discussed the various projects in general and agreed on the need to maintain the evaluator's independence. The meeting with Professor Gabriels focused on his experience with FUST and particularly with the CAZALAC project. Dr. Gabriels demonstrated that adequate selection mechanism for training course participants can have very positive impact on the outcome of the course. Prof. Gabriels indicated that in several courses in CAZALAC, a priority was given to candidates who could provide some form of cost sharing of their own attendance. In addition, optimal usage of the resources was possible when UNESCO demonstrated flexibility regarding travel per diem when housing and meals were provided to course participants. The resulting cost saving allowed larger number of participants for the same cost.

The evaluation of ODINAFRICA focused on progress in meeting the general as well as specific objectives of the project, on the project management, the usefulness and benefits of the training courses provided and on the products generated and their value to users. It also considered the future direction and sustainability of the project. Dr. Rickards met with Mr. Peter Pissierssens during the visit to Oostende and with Mr Mika Odido, the Project Manager, during her visit to Zanzibar. Discussions with these provided further insights into the ODINAFRICA project, from the IOC and from the project management perspectives respectively. Discussions with Mr. Odido covered ODINAFRICA cooperation with other organisations. She also met separately with Dr Thorkild Aarup to discuss the implementation of WP2 and was also able to assess progress on this Work Package by attendance at the GLOSS Group of Experts meeting in June 2007 where a number of African countries presented their national report and technologists from the Proudman Oceanographic Laboratory provided an overview of the work they had undertaken in support of the project.

The two evaluators compared notes both in Paris and Oostende, and jointly prepared this report.

II.4 MEETING WITH FLEMISH COUNTERPARTS

On July 2nd 2007, the evaluators met with Flemish Counterparts in Brussels. In addition to Dr. Rudy Hermann, attendees included Professors Donald Gabriels and Ronny Verhoeven from Gent University, Willy Bauwens, and Paul Nieuwenhuysen from Free University in Brussels, and Patric Willems and Dirk Raes from the Catholic University of Leuven. The round table meeting addressed the experiences of the Flemish colleagues during their involvement in FUST projects. Evaluator Imam also held earlier meetings during the desk-study period in Paris with Dr. Rudy Herman and Professor Donald Gabriels. Evaluator Rickards also held meetings with Dr. Herman, and other delegates to IOC during the IOC Assembly in Paris.

Flemish counterparts affirmed their interests and excitement about FUST and the opportunities provided by FUST. They also affirmed that Phase II was successful in achieving many of its objectives. Data is being shared, a local expert base is being built, networking has improved and research projects are being initiated and completed. They cited several examples of success and agreed that given enough time, FUST

projects will make the desired impacts on capacity building and policy at regional and national levels. However, a number of challenges still exist, including:

- Discontinuities and lack of consistency in activities particularly between training sessions and workshops.
- FUST projects have ambitious expectations, there is a potential and need for improvements in the (expectation→tasks→budget→actual activities) mapping process
- Problems encountered when information technology literate researchers interact with those who have had a classical education (with no IT). There is a need for each to learn about the other and how best to work together.
- There is a need for more local and national initiatives concerning proposals for additional funding sources. There was also a concern that the lack of proposals might be because those people who are capable of developing proposals are already overcommitted.
- The slow communication between local/regional offices and UNESCO-HQ, have impacted project performance and caused delays in funding. This has been a recurring concern among Flemish counterparts.
- The continuing focus on senior participants, who may have attended many training sessions must be balanced with the inclusion of more junior-level trainees. Seniors can help training younger and more junior professionals/students in their own institutions. More involvement from junior participants in beneficiary countries is needed
- Established project terms of references (TOR) are not always followed.
- Academic policies at Flemish institutions continue to value publications more than participation in capacity building efforts. A more equitable valuation of faculty efforts is needed.

The evaluators agree that addressing these constraints will improve the already positive experiences and will facilitate a continual success of the program. The evaluators will address specific recommendations regarding some of these issues sections detailing programmatic reviews.

II.5 EVALUATION MISSIONS

Evaluator Rickards visited Tunisia on July 16 and Tanzania on October 4-5; both visits for ODINAFRICA Evaluator Imam traveled to Egypt during the period (June 22-June 29). The mission consisted of visits to Cairo (IHP/ MAB) and Alexandria (SUMAMAD/Omayed)..

II.5.1 ODINAFRICA Field Visit to Salammbô, Tunisia

The field visit to the Institut National des Sciences et Technologies de la Mer (INSTM), Tunis -Salammbô, Tunisia took place on 16 July 2007. Dr. Rickards held discussions with Professor Cherif Sammari, Mr Ridha Mrabet (Director, INSTM), Dr Malika Bel Hassen-Abid (National Coordinator for Data Management), Ms. Saida Messaoudi (National Coordinator for Information Management), Mr. Ali Harzalla and several other members of staff involved in data and information management.

The visit began with presentations illustrating INSTM's involvement in ODINAFRICA and the benefits of such a project. INSTM, Tunisia was nominated by the Government of Tunisia to act as the country's National Oceanographic Data Centre (NODC) on all matters pertaining to oceanographic data and information because of the nature of its remit and expertise. The NODC manages oceanographic data produced mainly by research sector (80%), but also manages data produced by other national institutions (e.g. Ministry of Agriculture, Ministry of Environment, SHO, etc.). However, there is no clear national data exchange policy yet. So for example, the Navy will not release tide gauge data from its network. Work is underway to reinforce cooperation on exchange of data nationally.

The INSTM library was established in 1924: it was the first library in Africa and in the Arabic world in the

field of aquatic sciences and fisheries. It became the Information Centre associated with the NODC-Tunisia in 2001. It targets different users interested in aquatic sciences at both national and international levels.

Within Tunisia the ODINAFRICA project is used to strengthen the infrastructure for its data centre and to acquire scientific data and information from institutions, scientists, departments and other stakeholders. The Data Centre has well established databases which include physical and chemical data, phytoplankton data, biodiversity data and fishing resources data. The NODC is also an OBIS data provider through the African node, AfrOBIS.

ODINAFRICA has provided the opportunity to modernize the Information Centre by providing software, training and new services. Thus, the catalog of library holdings is now computerized; it was built using INMAGIC Integrated Library Management System (ILMS) software, and the records of the national library catalog have been merged into AFRILIB, the union catalog of oceanographic publications from African libraries, available on the ODINAFRICA web-site. The library is an ASFA input centre; publications related to fisheries and aquatic sciences are submitted to the ASFA database. As a national partner, the INSTM library can use the online and updated ASFA bibliographies, which is an essential tool for the aquatic international community. The Information Manager is a member of IAMSLIC, but has no funding to attend meetings.

The activities funded by FUST in Tunisia are well integrated into the national priorities and objectives for the development of marine information and data services. The funding provided by FUST has enabled enhancement of the national infrastructure for data and information management. Equipment was provided in the previous phase. The FUST assistance through ODINAFRICA has been quite influential and provided good opportunities for training courses and, for Information Management, software. This has resulted in a multiplier effect leading to benefits in many areas. Other major benefits have been involvement with the "human network" of ODINAFRICA as the project provides a valuable communication network, together with some funding.

There is support generated from within government which is real and sustainable. This is evidenced by the fact that the NODC is working towards reinforcing its status to become an independent structure with an autonomous budget within INSTM. It also intends to start managing real time data (e.g. from tide gauge stations) and to improve quality control procedures for biological and chemical data. A national portal will ensure interoperability between databases. Furthermore, the institute will install its own tide gauges, integrated into research carried out at INSTM, so equipment will be provided by them. It was noted that spatial-temporal resolution of public domain data can be poor and thus atlases can be misleading. There is also a lack of coastal data for model validation, which is being partly offset by installing tide gauges and moored ADCPs.

The continuation of FUST support will assist in the acceleration and enhancement of on-going national efforts. However for future phases of ODINAFRICA, there was a view that funding should not be evenly distributed between countries. Africa has many countries all connected to different oceans with very different capabilities. Some countries, including Tunisia are well advanced in their data management and could form one of a core group of countries who need to move on and further develop their activities.

One possibility is developing regional leadership. The Evaluator feels that the Tunisian NODC is well established and is in a good position to undertake some sort of leadership role for the North African Region. Morocco also has quite well developed capability and together these could develop a leadership role assisting those countries with less organization and facilities across the North African countries. It should also be noted that collaboration is mainly with Mediterranean countries. INSTM has links with a variety of Mediterranean projects and programs (e.g. MedGOOS, MAMA and MFSTEP), and the NODC was a partner in the EU-funded MEDAR/MEDATLAS II project (1999-2002) and is presently a partner in SeaDataNet (2006-2011).

II.5.2 ODINAFRICA Field Visit to Zanzibar, Tanzania

The field visit to the Institute of Marine Sciences (IMS), University of Dar Es Salaam, Zanzibar, Tanzania took place on 4-5 October 2007. Dr. Rickards held discussions with Dr. Alfonse M. Dubi (Director IMS and Tanzania NODC), Dr. Desiderius C.P. Masalu (Head of Tanzania NODC and Senior Research Fellow) and Ms. Edna A. Nyika (Information Manager).

The Government of the United Republic of Tanzania nominated IMS to be the Designated National Agency (DNA) in 1996 taking over from the Ministry of Natural Resources and Tourism. The nomination was based on the expertise and orientation of IMS. Immediately after its nomination IMS embarked on capacity building efforts in ocean data and information management. These efforts were supported during the previous phase of ODINAFRICA. The aim was to build capacity in both data management and information management. After staff had undergone intensive training through the ODINAFRICA program as well as after IMS had developed and acquired the basic skills and equipment for ocean data and information management, its status was officially upgraded by to full National Oceanographic Data Centre (NODC) at a high level event held in December 2002 attended by the Minister for Science, Technology and Higher Education, Hon. Ambassador Dr Pius Y. Ngw'andu, Prof. M. Luhanga, Vice Chancellor, University of Dar Es Salaam, Mr. Brems Dirk, Attaché for International Co-operation in the Embassy of Belgium and various other government ministers.

Within Tanzania the ODINAFRICA project is used to strengthen the infrastructure for its data centre and to acquire scientific data and information from other institutions, scientists, coastal districts, departments and other stakeholders. The project also provides a valuable line of communication and source of data from the regional and the global communities. Tanzania has adopted a distributed data management mode where specialized coastal and marine institutions manage their own data. However, the Tanzania NODC plays a key role of coordination at national level and maintains a copy of data available at the other institutions. Secondly, the NODC provides training for capacity building in database management to the other institutions to ensure that their data are well managed and thus are readily available.

The FUST funding has allowed a significant amount of capacity building for both data and information managers. This has enabled the NODC to develop a well organized web site and to provide good online services. The multiplier effect is also in evidence as the data and information managers have been active in providing training at national level to stakeholder institutions. This has increased acceptability of the NODC and led to the improved provision of both marine data and information to stakeholders. A further major benefit from the FUST project is the human network which has been developed, both within the ODINAFRICA partnership and beyond.

The Tanzania NODC is well organized and has very competent and experienced staff. Dr. Masalu takes the lead in the data management part of WP3 and is in a good position to advise on data management issues for the region and to work together with other ODINAFRICA partners to take lead on developing further regional activities. The countries of east Africa are quite well organised and have been able to link into a number of well developed funded regional projects (e.g. African Coelacanth Ecosystem Programme (ACEP), UNEP-GEF WIO-LaB Project).

Involvement in information management goes back to 1989 with the establishment of the RECOSCIX-WIO project and is well developed at IMS. Ms. Nyika described how membership of IAMSLIC has been available through ODINAFRICA; this provides access to many facilities and services. Government funding is not sufficient to subscribe to scientific journals, but access is provided through ODINAFRICA. Ms. Nyika has recently been elected Chair of Africa Regional Group of International Association of Marine Science Libraries and Information Centres (AFRIAMSLIC). In this role she hopes to bring together librarians in marine and freshwater institutions in Africa, including those that are not participating in ODINAFRICA, so as to build a strong and vibrant association. She will work on developing close collaboration between ODINAFRICA and AFRIAMSLIC so as to improve marine and aquatic information management in Africa. She looks forward to working with information managers in other disciplines such as health, agriculture and environmental sciences which are much better developed than the marine sciences in Africa. Such links would serve to improve access to, and utilization of research results, thus contributing to improving the lives of the peoples of Africa. This is an excellent illustration of the benefits of FUST, not only to IMS, but across Africa. Ms. Nyika has been instrumental in utilizing her knowledge and experience in providing local, national and regional training and mentoring in information management.

The Information Centre coordinates all marine information management activities in Tanzania. To ensure the long term archival, management and services of all marine data and information in Tanzania, the Centre assists in establishing and training of stakeholder librarians. A union catalogue for all marine science libraries in Tanzania has been developed at the centre.

Within the field of marine information management, good links exist with Flanders experts, in particular with Mr. Marc Goovaerts (Universiteit Hasselt) and Professor Paul Nieuwenhuysen (Vrije Universiteit Brussel). Mr. Goovaerts was Coordinator for the FUST funded ODINPubAfrica project, from which the OceanDocs project was developed. This is an institutional repository for publications published by ocean scientists in Tanzania merged with other institutional repositories created under the auspices of ODINAFRICA Project.

One problem noted by Dr. Masalu and Ms. Nyika is that of continuity of staff in some countries. Sometimes qualified staff move elsewhere and on occasion they have been removed from their post. In a project the size and complexity of ODINAFRICA communication can be a problem. Dr. Dubi was concerned that regional and national coordinator roles have not worked well and the same structure at national level as project level did not work well either. The Project Steering Committee has arrived at a similar conclusion and this arrangement is likely to be amended in any further phases of ODINAFRICA. Dr. Dubi also felt that the Project Management Committee was rather small and there was not always sufficient discussion of decisions. For example, changes from the initial project plan for ODINAFRICA left Tanzania without an ODINAFRICA gauge, although the Zanzibar gauge has been updated by the Indian Ocean Tsunami Warning and Mitigation System through the University of Hawaii Sea Level Centre. However, his view was that overall ODINAFRICA was a very successful project and he would like to see a further phase.

In the view of the evaluator, the Tanzania NODC is well established, and is a good example of an active data and information centre which is well placed to take the lead in a number of areas. Communication and networking are well developed in the east African countries, and this is likely to lead to further cooperation at a regional level, using the expertise and systems developed through ODINAFRICA.

II.5.3 IHP Visit to Cairo, Egypt

The first meeting was held at UCO and attended by Dr. Radwan Al Weshah, Regional Hydrologist for the Arab Region (Dr. Weshah is also the executing officer for the FRIEND-Nile, Palestine, and several small scale initiatives), Dr. Abdel Aziz Farouk Zaki, Project Manager FRIEND/Nile Project, and Ms. Dalia Khalil, coordinator for the Palestine Project. The UCO team provided an overview of the project, and discussed the evaluation process with the evaluator. In addition to the pre-compiled set of documents, the evaluator was given full access to relevant project documentations, training materials, and personnel for the purpose of interviewing. The evaluator conducted personal interviews with Dr. Albel Aziz and Ms. Dhalia Khalil.

During Dr. Imam's visit with UCO, he and Dr. Al-Weshah paid a visit to Dr. Awad El-Hasan, the acting director of UCO. Dr. Awad emphasized the importance of the FUST project both for the Nile basin and for the development of integrated water resources management capacity in the Palestinian Territories. He outlined some of the political and administrative constraints and asserted that UNESCO is an intergovernmental organization that has to work both with NGOs and with National Governments and to assist these governments in building their capacities based on their own priorities and the priorities of UNESCO and its various sections and programs. Both Drs El-Hasan and Al-Weshah conveyed their appreciation of the basic premises the FUST agreement in that it considers UNESCO priorities as accorded by the Flemish Government

On the second day of his mission to Cairo, Dr. Imam and Dr. Albdel Aziz visited the Water Research Institute in Qanater near Cairo. A long interview with Dr. Prof. M. Abdul Motalib, the overall coordinator of the FRIEND-Nile project was held. Dr. Abdul Mutalib emphasized the amount of leveraging and in-kind resources WRI has made available to the FRIEND-NILE project and highlighted the Institute's intention to continue making software, documents, and data, accessible to Nile Basin researchers. He also cited several successful examples of new proposals to fund applied research activities, acquisition of software, and development of decision support systems that are relevant to FN priorities in Egypt and that build upon the experience gained during the previous phase of the project. The interview was followed by a long meeting with senior and junior members of the Egypt's FRIEND-Nile team. The attendees of this meeting included Prof. M. Sunbol, chair of the Nile basin Studies division, Prof. A. H. Fahmi, director of the hydrologic studies division, Dr. E. Ahmad, a researcher, and junior researchers Mr Islam and Mr. M. R. Abdulhamid. The senior scientists cited several case studies in which the training on models such as HMS, statistical packages, and analytical tools acquired during various FN training workshop are being

implemented in Egypt and are currently making impacts on various flood, and drought management decisions in the country. Junior scientists indicated that they are receiving training from their mentors on these tools and they are in the process to initiate new studies. There was a consensus regarding the significant contributions of Flemish counterparts to the project.

II.5.4 SUMAMAD Field Visit to Omayed Biosphere Reserve, Alexandria, Egypt

The SUMAMAD site visit started with a round table meeting with the Egyptian MAB commission. The meeting was led by the chair of the commission, Prof. Samir Ghabour and attended by Mrs. Mona Allam, the Assistant General Secretary of the commission, Dr. Boshra Salem, SUMAMAD project lead in Egypt, and members of the commission's staff. Prof. Ghabour stressed the commission's gratitude and appreciation of the Flemish community's and the importance of the SUMAMAD project in enhancing the potential for long-term sustainable management of key biosphere reserves in Egypt. He emphasized the sharing the experiences learned from the project with other countries in the region through the publication and wide distribution of books and research results and indirect cost sharing through sponsoring projects that are relevant to SUMAMAD goals and by participating in sub-regional and regional networks. Mrs. Allam and Prof. Ghabour also indicated that the commission is participating in a feasibility study with private and public sector manufacturers to assess the potential for large-scale production and adoption of the solar powered desalinization units implemented under SUMAMAD's project in Egypt.

Meeting attendees acknowledged the success of the SUMAMAD project in Egypt, which they attributed to the dynamism of the project leader and to the participatory approach, and the individual responsibility of beneficiaries of pilot demonstrations are for the maintenance and operation of the units. The meeting was concluded with a review of the "Amal: Hope" short documentary film, which highlights the significance of the SUMAMAD project and the impact if the water desalinization project on the well-being of the local residents in the Omayed area. Dr. Imam also talked to Ms. May El-Shafei, member of the Egyptian press. Ms. Shafie, whose focus is on environmental, social justice, and development issues has been a strong advocate of SUMAMAD and has assisted the project's communication efforts.

In Alexandria, Dr. Imam met with several members of Professor Salem's research team who represented Doctoral (Ms. Marwa Waseem), MS (Ms. Marwa Jaber), and undergraduate students (Mr. Ahamad Abbas and Mr. Mohamad Meleigi). The students presented their activities and discussed their efforts to form an NGO focusing on environmental protection of threatened Drylands, sustainability of existing biosphere reserve, and the declaration of other un-protected areas as protected areas including the Mughra Oasis. Graduate students Waseem and Jaber presented on their SUMAMAD research activities related to site characterization in Omayed and Mughra and development of sustainability metrics, respectively. Subsequent interviews were held with Prof. Isam Khamees, the Vice Dean for research at the Faculty of Science, who discussed the importance of access to affordable clean water to the local residents not only in the Omayed but also in Egypt as a whole. The role of desert plants and artificial wetlands in water purification and the need to adapt indigenous materials and know-how into the development of environmentally benine and sustainable technological innovations were also discussed. Meetings with Professors Selim Zeidan and Laila Bidak, both of whom participated in site characterization studies including the identification and mapping of desert plants as well as experimental studies on plant germination in the Omayed reserve.

The visit to Alexandria also included a field trip to the dwelling of Mr. Abdulkarim, the patriarch of a FUST beneficiary family. Mr. Abdul Karim and his sons demonstrated the working and maintenance of the second-generation solar powered desalinization unit installed on the roof of his house. Members of the family described the improvement in the health of their children after the installation and operation of the above-described unit. The evaluator was treated with the traditional Bedouin hospitality with a meal and tea, which was made from the desalinated water. A rather brief conversation with the family matriarch was held in which, Mr. Abdul Kareem's mother praised Dr. Salem, whose efforts made clean water accessible to her family and provided her and her daughters with a sewing machine and training. A scheduled meeting with local authorities headed by General Abdulkhaleq was cancelled due to his un-anticipated governorate-wide meeting called by the governor. However, both General Abdulkhaleq and his predecessor, General Salem (no relation to Prof. Salem) called in and phone interviews were held in which they both emphasized the benefit of successful demonstration projects such as the water desalinization, income generating efforts and empowerment of women. Both also highlighted the value of outreach activities and participatory efforts in raising environmental awareness and in improving the relationships

between local Bedouin and local authorities. A phone interview was also held with Eng. M. Al-Eisaawy, manager of the Omayed Reserve, who was unable to join the field trip due to other official commitments. Mr Eisaawy stressed the need for project continuation because of the significant help he, as a reserve manager has been receiving as a result of the site characterization studies conducted through the FUST program. He indicated the need to assign more importance to the Mughra Oasis by including it within a reserve protected areas.

Dr. Imam also held two interviews with Mr. Andreas Schneider, the designer and constructor of the solar powered units used by the project. The interviews focused on the technical aspects of the units, planned enhancements of the next generation units, and potential for local manufacturing in terms of materials and processes. The possible wide-scale commercial implementation of affordable units and the impacts of large scale manufacturing on the cost of units were also discussed. Mr. Schneider, who has been volunteering his technical expertise and time to the project, reaffirmed his commitment to the project, but also indicated the need to accelerate the development of a network of well trained and truly committed volunteers, who will be capable of performing advanced maintenance and improvement of existing units without the need for foreign expertise.

III. OCEAN DATA AND INFORMATION NETWORK FOR AFRICA – THIRD PHASE (ODINAFRICA III)

III.1 BACKGROUND INFORMATION

In 1989 the IOC started the implementation of a Regional Cooperation in Scientific Information Exchange in the Western Indian Ocean region (RECOSCIX-WIO) that established a framework for institutional networking focusing on the exchange and sharing of scientific information (literature). This project's funding was taken over by Flanders, Belgium in 1992 until 2000. Acknowledging the success of this project in the IOC Western Indian Ocean (IOCWIO) region, countries of the IOC Central Eastern Atlantic (IOCEA) region requested IOC for a similar network and this led to the development of the RECOSCIX-CEA project, supported by the Government of Flanders between 1998 and 2002. One of the activities of the RECOSCIX-WIO project was to create a Marine Species Database for Eastern Africa (MASDEA), a guideline and road map to species reports from the Western Indian Ocean, now a collaborative venture between the Kenya Marine and Fisheries Research Institute and Flanders Marine Institute.

At the same time Flanders supported the development of national oceanographic data centres in the IOCWIO region through the Ocean Data and Information Network for Eastern Africa (ODINEA) project (1998-2001). This in turn led to the development of the Ocean Data and Information Network for Africa (ODINAFRICA) project, supported by Flanders between 2001 and 2003. Major goals of this phase of the ODINAFRICA project were to enable member states from Africa to gain access to data and information available in other data centers, develop skills for manipulation of data and preparation of data and information products, and develop infrastructure for archival, analysis and dissemination of the data and information products. This phase was reviewed in 2002 and progress was such that continuation was recommended.

The current ODINAFRICA project (ODINAFRICA-III) brings together marine institutions from twenty-five IOC Member States from Africa (Algeria, Angola, Benin, Cameroon, Comoros, Congo, Cote d'Ivoire, Egypt, Gabon, Ghana, Guinea, Kenya, Madagascar, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Nigeria, Senegal, Seychelles, South Africa, United Republic of Tanzania, Togo, and Tunisia). The overall goal of ODINAFRICA-III is to improve the management of coastal and marine resources and the environment in participating countries by: enhancing data and information flows into and out of the national oceanographic data and information centres in the participating countries, strengthening the capacity of these centres to analyse and interpret the data so as to develop products required for integrated management of the coastal areas of Africa, and increase the delivery of services to end users. The Government of Flanders, Belgium has provided US$2.5 million to support the implementation of ODINAFRICA-III over the period 2004 to 2007.

Three thematic work packages are being implemented to achieve the objectives of ODINAFRICA-III. These are:

- Coastal Observing Systems
- Data and Information Management
- Products Development and Dissemination

This evaluation covers the progress in the ODINAFRICA III project over the period December 2004 to March 2007.

III.2 MANAGEMENT STRUCTURE

The ODINAFRICA Project is overseen by a Project Steering Committee (PSC) which directs, monitors and supervises the overall implementation of the project. The PSC meets at least once a year to consider

reports and recommendations of the Project Management Committee and provide guidance, review progress in implementation of the planned activities, and plan for the activities to be implemented in the coming year. Membership includes the Project Manager, a GOOS AFRICA Representative, the IOCEA Chair, the IOCWIO Chair and the Donor. The PSC also maintains and strengthens contacts between partners.

The Project Manager ensures co-ordination and implementation of the project, organises relevant meetings and reports and disseminates information on project activities. In addition the project has an advisory group for Work Package 2 (observation systems) and trainers for data management and information management. The UNESCO Nairobi Office, which is also the UNESCO Regional Office for Science and Technology in Africa (UNESCO/ROSTA), is the project office.

The project is managed by a Project Management Committee (PMC) which meets at least once a year to review progress in implementation of the planned activities, and plan for the activities to be implemented in the coming year. Members are the Project Manager, and the so-called Regional Coordinators leading the Work Packages. Regional Coordinators is a confusing name here, Thematic, or just Work Package, would be more appropriate. The meetings are at times held jointly with the PSC. The PMC oversees the activities of the National Project Management Committees, which includes the following membership: national IOC Committees, GOOS-AFRICA representatives, national ODINAFRICA (data and information centers) representatives, a selection of national experts in appropriate fields; and representatives of stakeholders.

The Project Management seems quite effective, although some parts appear a little cumbersome. This may be inevitable in terms of the size and complexity of the project. The role of some of the Coordinators is not always clear, and on occasion communication from the PSC and PMC to the project participants could be improved. The Project Manager is effective, but has less administrative support from IOC in Paris due to changes in staffing than previously. This has added a considerable burden to the work load, for example, it has been very time consuming setting up contracts for each country, a task that was previously carried out in Paris. Both the PSC and PMC produced comprehensive progress reports which are available from the ODINAFRICA web-site.

III.3 PROGRESS AND ACCOMPLISHMENTS

III.3.1 COASTAL OCEAN OBSERVING SYSTEM (WP2)

The objectives of this work package are to upgrade and expand the present African network for in-situ measurements and monitoring of ocean variables, provide near real-time observations of ocean variables and build adequate capacity for collection, analysis and management of sea-state variables. The focus is on installation of new tide gauge stations and upgrading existing stations. The Work Package includes training on installation and maintenance of equipment, as well as analysis and interpretation of data for technicians and scientists.

At the start of the project a survey revealed at least operational 40 tide gauge stations spread unevenly along the African coastline and island states. Some countries have functioning national networks, but there were long stretches of coastline with no working gauges. The original plan was for ODINAFRICA to improve the African network of sea level stations by installing/upgrading tide gauges at 19 locations. Following consultations with other partners, collaboration will allow a total of 33 tide gauges to be installed or upgraded. ODINAFRICA itself will install 12 new gauges. Progress to date has been considerable although so far not all of the gauges have been installed. Comprehensive site surveys have been undertaken to assess the proposed sites, resolve any problems and suggest alternative sites where necessary. Collaboration was established with the Permanent Service for Mean Sea Level and the Proudman Oceanographic Laboratory, UK, to assist in the purchase and configuration of the tide gauges. This configuration, and in particular that relating to transmitting the data to the Global Telecommunication System (GTS), took some considerable time to resolve and required extensive consultation with the instrument manufacturer. The tide gauges were not shipped until all of the problems could be resolved. However, four gauges have been successfully installed and are transmitting data in real-time.

The ODINAFRICA Sea Data Facility (http://www.sealevelstation.net) has been developed by VLIZ and

is operational at the IODE Project Office in Oostende, Belgium. This facility captures the data from the GTS and archives them in a relational database as an ODINAFRICA backup to national and GLOSS data centres, displays plots and provides raw data, and provides tide-gauge operator alert (by email or SMS) in case of instrument malfunction. The facility has built in a transplantable format with a view to having it mirrored at a location in Africa in the future. The data will also be mirrored on the respective ODINAFRICA NODC websites. The facility receives real time data from the sea level stations directly via GTS. This has been made possibly thanks to the kind cooperation of the World Meteorological Organisation.

A training course on sea level measurement and interpretation took place IOC Project Office for IODE in November 2006 in cooperation with the GLOSS program. It included: introduction to tidal theory, analysis of tide gauge data, introduction to harmonic analysis, introduction to tidal analysis software package, use of data within local and regional 'operational oceanography', and tidal predictions.

III.3.2 DATA AND INFORMATION MANAGEMENT

The focus of this Work Package is on the further development and strengthening of National Oceanographic Data Centers (NODC), upgrading infrastructure in the NODCs (including internet access and computer systems), integrating biogeographic and hydrological data steams into systems, training of data and information managers for new NODCs established as part of this project, and rescue of historical data (especially sea level data). This work package has also developed draft "performance standards for IODE NODCs", which will aid in assessing NODC progress in the future.

Implementation of the Data Management part of the Work Package is progressing well. All planned activities are being implemented in a timely manner and successfully. Introductory and advanced data management training courses have been undertaken. However, there are challenges and problems that that have been identified which need to be considered carefully. These include: data managers not having access to PCs and internet connection, frequent changing of data management staff, aging equipment such as PCs, poor communication in some countries, unstable location of some Data Centers, need to encourage Data Managers to train other staff, balance of focus between the functioning of Data Centers and their problems, and the implementation of the project activities, poor selection (process) of some trainees, ensuring full utilization of ODINAFRICA trainees, and improving collaboration with South Africa.

Implementation of the Information Management part of the Work Package is also progressing well. A basic marine information management training was held. In addition, training courses on development of electronic repositories of marine related publications from Africa were held. This forms part of the ODINPubAfrica project separately funded by FUST and coordinated by the University of Hasselt. A total of 15 Information Managers from the ODINAFRICA institutes of have received specific training in order to sustain and underpin the development of the project. Over 1280 publications have been added to the repository. The catalogue of library holdings developed by ODINAFRICA (AFRILIB) has been quality checked and good progress has been made in the development of a web interface to allow online access to the union catalogue of ODINAFRICA institutions (http://www.odinafrica.org/afrilib). The database currently holds approximately 12000 records.

Two web-site development training courses/workshops have been held to ensure that all ODINAFRICA III participants have web-sites which properly reflect the regional and individual national nature of the NODC activities. The two first parts of the workshop schedule were successfully accomplished, with the trainees exhibiting a real interest in the topics. The trainer noted that it was hard to meet all of the initial objectives as the participants required more practice and assistance to upload their own NODC website on the server. Each participant now has their own website, but many problems still remain, for example, uploading contents, naming files (difference between Windows and Linux), improving graphic quality, etc. These can be overcome, with appropriate assistance, provided the trainees have enough time to work on their websites. The coherent set of web-sites are an excellent mechanism to promote ODINAFRICA, and the support from Flanders, within the individual countries and more widely.

III.3.3 PRODUCT DEVELOPMENT AND END USER COMMUNICATION AND INFORMATION DELIVERY (WP4)

This Work Package focuses on identification of end users of marine and coastal data and information products and their requirements, identification and development of set of core products prepared by each NODC, development of Regional and National Marine Atlases, improvement of atmospheric and oceanic monitoring databases, promotion and dissemination of outputs of the project to all stakeholders, and assessment of the impacts of products on the end-user.

Progress has been good and building on the activities of Work Package 3, several new products have been generated. Marine biodiversity databases have been developed for molluscs and sponges. Workshops were held during which publications were examined to extract information relating to these which were entered into the database. Leadership was provided by Dr. Edward Vanden Berghe from the Flanders Marine Data Centre.

The African Marine Atlas (http://www.africanmarineatlas.net) was officially launched on 23 February 2007; this provides substantial maps, images, data and information to coastal resource managers, planners and decision-makers from various administrative institutions and specialized agencies in Africa. The Atlas indicates areas of intense use along the coastline requiring careful management and provides potential foresight on likely consequences of specific decisions. It has over 800 downloadable data products derived from the fields of marine geo-sphere, hydrosphere, atmosphere, biosphere, geopolitical and the human socio-economic dimensions.

The Atlas also indicates gaps in knowledge and information base, where additional efforts may be directed. In the future the Atlas will also act in other ways as a guide to recreational opportunities and tourist attractions. The web-site is one of a set of Marine Atlas products that will include web data services, web mapping and an Atlas publication when completed. Primary partners in this project were the United Nations Environment Programme (UNEP), and the African Coelecanth Ecosystem Programme (ACEP).

The ODINAFRICA project has organised a large number of regional events throughout the duration of the project. The Second ODINAFRICA Seminar provided a forum for experts and institutions participating in the network to review progress, exchange experiences, showcase their products and deliberate on ways of strengthening and further developing the network. An earlier seminar took place during the previous phase of the project. A further seminar is planned before the end of the project, to be held in Nairobi, Kenya.

III.4 FINDINGS AND LESSONS LEARNT

- The project is efficiently managed both by the Project Manager and Work Package Leaders. Reports of progress are available from the Project Steering Committee and the Project Management Committee, both of which meet approximately annually. Problems are addressed effectively, for example at the start of the project there were delays in the transfer of funds from Flanders to UNESCO, requiring the budgets and work plans to be revised. This delay had a significant impact and has resulted in the end date of project being extended by 6 months.

- Administration of contracts is the work of all programme specialists and it is very time consuming. In addition changed regulations (2007) have not made things easier. Initially for ODINAFRICA this work was carried out by IOC, but later transferred to the Project Manager to be more in line with normal practice and as part of the UNESCO decentralization policy. This extra burden of administrative work for the Project Manager needs to be factored into any future phases of the project and the discussion with the UNESCO Nairobi Office held to establish if they are willing and able to provide administrative support to assist with this task.

- Funding an infrastructure activity requires some patience in terms of concrete and visible results. However, this stage of ODINAFRICA is really beginning to be fruitful, after the earlier projects and basic capacity building activities. ODINAFRICA has become well known and is an exemplar for other regions to follow in developing Ocean Data and Information

Networks. Flanders should be congratulated for funding this type of activity.

- ODINAFRICA is a large and diverse project, with many deliverables, undertaken with countries of widely varying capacity. However, although it is making significant progress in terms of the general objectives and with specific project deliverables, in any future project care needs to be taken to ensure that the resources are not spread too thinly, perhaps focusing on a smaller number of activities.

- Within ODINAFRICA there are many common regional objectives, however there are significant differences in national priorities and how each participating national centre can best manage the allocated funds. For example, one centre may have a top priority for equipment, another for training and yet another for access to scientific material. In ODINAFRICA III there is sufficient flexibility to allow for these differences whilst maintaining the overall objectives for the program.

- There is a need to address differences in capabilities in different countries. Some countries are difficult to communicate with and appear to make little progress. There is also a recurring problem of staff, once trained, moving on to better paid employment. Before committing to a further phase of funding, a further assessment needs to be made on how best to develop the skills in the "difficult" countries, and to consider the value of providing further funds to countries who are not delivering.

- A further important lesson learned in ODINAFRICA has been that in capacity building one size does not fit all: from the start ODINAFRICA has provided quite some flexibility for each country to use the provided support and resources to serve, first of all, national priorities. At the national level there was therefore a different emphasis: sometimes on public education, sometimes on research, sometimes on coastal management. This flexibility made that each country could maximize its benefit from ODINAFRICA. A more regional or highly focused approach would have been only partially beneficial to each member state. This flexible strategy has been a major contributing factor to the success of the project.

- The project has been successful in bringing together 25 countries in Africa. During this and previous phases of ODINAFRICA a human network has developed. The importance of this "invisible" deliverable should not be underestimated: it improves the efficiency and effectiveness of the project.

- Some NODCs are more advanced (and better funded nationally) these should to be encouraged to lead activities in future ODINAFRICA phases. To some extend this has begun to happen with a small group taking the lead for the African marine atlas. These NODCs are also in a good position to run training courses for participants who join in a further phase of the project.

- There do not appear to be many links with Flemish scientists in Universities, except within the marine information arena, where some strong links exist. However, there are also close links with VLIZ, in particular benefiting from their strength in marine biodiversity.

- Much effort has been taken up with the tide gauge site surveys, procurement and setting up the instruments prior to shipping the equipment. This has involved much in kind support, which may not be sustainable in the long term. Thus is it essential to build up the expertise to configure and maintain the gauges locally, or find some funding mechanism to continue expert technical input.

- Good links have been developed with appropriate expertise in other countries (e.g. USA, UK for sea level). VLIZ has also provided technical support for the tide gauge real time display - this being endorsed by GLOSS to be used more widely. However, in the longer term the real time tide gauge data display and the data themselves need to be available from within Africa. Although it is important that the data are provided to the GLOSS data centers, they should also be utilized in the countries where the tide gauges are located.

- Many successful training courses have been held covering a variety of aspects of both data

and information management – at an introductory and an advanced level. Some participants are now very experienced and are utilizing their skills in local, national and regional training and mentoring. ODINAFRICA participants have taken part in a number of joint IODE-JCOMM training events. ODINAFRICA is also an active participant in the implementation of the UNESCO/IOC Leadership program in Africa.

- In the information management arena ODINAFRICA has facilitated membership of IAMSLIC which provides access to many facilities and services. The ODINPubAfrica project (a separately funded FUST project), from which the OceanDocs project was developed, has led to significant improvement in providing access to full-text knowledge items available in African ocean libraries and information centers.

- A good start has been made in developing a coherent set of ODINAFRICA NODC web sites, although there is still work to be done. There is variable visibility for both Flanders and ODINAFRICA within these: this should be addressed and made more consistent.

- The Window Newsletter is clear, informative and professional. It is well produced and a valuable mechanism for dissemination of information about ODINAFRICA III and other relevant activities. Links with the NEPAD COSMAR Newsletter are also valuable.

- Appropriate links with other regional programs and projects (e.g. NEPAD, UNEP and GOOS-AFRICA) are essential to the success and long term sustainability of ODINAFRICA. These are in place and continue to be developed with ODINAFRICA representation on many regional project and program committees. This must continue to ensure the ongoing high visibility of ODINAFRICA.

- ODINAFRICA has developed many links with projects within Africa, but it can also be beneficial to link with external projects. One example is the EU funded SeaDataNet project which aims to set up a pan-European infrastructure for ocean and marine data management. Although a European project, it includes North African countries (e.g. Morocco, Algeria, Tunisia and Egypt). Since both ODINAFRICA and SeaDataNet have some very similar aims, and have some common participants, opportunities for synergies should be investigated.

- Many of the training courses for ODINAFRICA III have been held at the IOC Project Office for IODE, located in Oostende. This excellent facility has generously been provided by the Government of Flanders and has greatly benefited projects like ODINFRICA.

III.5 RECOMMENDATIONS

- The current success of ODINAFRICA III warrants the continuation of the FUST Agreement. ODINAFRICA III is an ambitious project, with many components and data and information centres of widely varying capabilities. It is making good progress and has begun to deliver new data streams and data products. In fact, this is a critical stage, infrastructure is in place, but further funding is required to ensure the long term sustainability of the different activities. The evaluator strongly supports the extension of this project.

- The small scale activities have been beneficial and should be continued in any further phase of FUST funding.

- Continue to expand the number of countries participating in ODINAFRICA: a further five countries have expressed interest in joining a further phase of the project. A number of the current participants are experienced in their field: more use should be made of these skilled experts; they should be the next generation of trainers, perhaps providing initial training and acting as mentors for any new countries joining the project.

- It needs to be recognized that some participants are experienced and need to be given more challenges and responsibilities, perhaps by way of new sub-projects, building on the mechanism used for developing the African Marine Atlases.

- Develop more regional leadership (in contrast to national) and regional sub-programmes.

These latter are in a good position to bid for funding within the different regions within Africa, as is increasingly the case for the east African countries.

- Until the present, ODINAFRICA has rightly concentrated on developing the infrastructure necessary for establishing and operating data and information centers, the next phase will need to concentrate more on service provision, building on the marine atlases as a coastal zone management tool and on the tide gauge data for tidal predictions and storm surge modeling, as well as for sea level research.

- ODINAFRICA-III has moved away from the single programme (IODE) model towards an integrated model including GOOS, IODE and ICAM. The GOOS (GLOSS) and IODE elements have been well developed. For the next phase the ICAM component needs to be better developed. The Marine Atlas is a pilot product that should lead into a more active participation of the ICAM programme

- Ensure that ODINAFRICA continues to be embedded in other programmes and projects (e.g. NEPAD, UNEP, GOOS-AFRICA, etc.)

- Although the collaboration with the IOC Project Office for IODE and VLIZ to provide a web site displaying the real-time ODINAFRICA has been a great success, at some stage this operation should either be transferred completely or mirrored at one or more sites in Africa, to ensure that ODINAFRICA participants "own" the tide gauge data system and take responsibility for it.

- Improve consistency of ODINAFRICA NODC web-sites in particular with respect to visibility of ODINAFRICA and Flanders.

- Investigate links with IHP to improve the provision of hydrological data for the African Marine Atlases.

III.6 CONCLUSION

ODINAFRICA-III has been very successful in implementing its goals. Despite some initial delays with release of funds and further delays when significant time was spent resolving configuration and communication problems between the tide gauge sensors, INMARSAT and the Global Telecommunications System, excellent progress has been made in all of the work packages. Both data and information management have moved forward, and good quality products are now becoming available (e.g. real-time sea level data, marine atlases, biodiversity databases, NODC web-sites). Support from Flemish counterparts has been forthcoming especially in the information management, marine biodiversity and technical support for the real-time data display.

ODINAFRICA-III has grown from a data and information management project developing infrastructure and strongly rooted in IODE, to a more integrated approach bringing IODE together with GOOS (e.g. GLOSS, real time data stream from tide gauges), and ICAM, although this latter activity needs to be further developed. A further phase will allow this to develop this approach further with a greater emphasis on products and services which is now achievable with the infrastructure in place. The project has been very effective in using funding from FUST, and has also developed other cooperation and partnerships both nationally and regionally. ODINAFRICA is a well known project, and its successes reflect well on the vision of Flanders to fund such a cross-cutting and underpinning activity.

IV. CAPACITY BUILDING AND TRAINING IN ENVIRONMENTAL PLANNING AND MANAGEMENT (PALESTINE) II

IV.1 BACKGROUND INFORMATION

The first phase of this project was initiated in 1998 for the period (1998-2001) following a 1995 needs assessment mission to Gaza. Its general goal was strengthening water sector institutions and contributing to the long-term sustainability of water resources in the Palestinian territories. The Flemish Government provided $550,000, which supported the development of computer center and the expansion of the soil analysis lab at the nascent Water Research Center (established in 1995) in the Azhar University, Gaza. The funds also supported significant capacity building and training of WRC's staff and professionals in the water sector in Palestine. Several review missions were undertaken between 1999 and 2000 including a second need assessment mission. These early reviews were positive and led to an expert mission in January 2000 to assist in developing Phase II document and principles. A draft document was completed by May 2000, and a review workshop was held in July 2001. Phase II was approved for the period (2001-2004) at the level of $850,000. As stipulated by the UNESCO-Flanders FUST agreement, UNESCO and the Government of the Palestinian territories signed a plan of operation agreement soon afterward.

As a continuation of phase I, the long-term (development level) objectives of Phase II remained similar to phase I: "to contribute to the long-term conservation of water resources in the Palestinian Territories through strengthening the institutions acting in the water sector and through strengthening linkages and cooperation in the field of research and training between Palestinian institutions" as phase II was envisioned as a continuation of phase I. However, the activities of this phase were designed consistent with 4 immediate objectives:

1. Establish a Palestinian Water Resources Network on training and research: The primary aim of the network is to foster and facilitate collaboration between water sector actors in Palestine, particularly in the area of training and research. Other objectives include defining training and research priorities, selecting research and training activities from proposals, and evaluating the progress of these activities. All Palestinian institutions and research centers relevant to the water sector are invited to participate to the network with each being represented on the network's executive body, the Technical Network Commission (TNC).

2. Establish a documentation center: The documentation center would be an important expansion of the WRC infrastructure, which was carried out during phase I.

3. Strengthen the capacity of Palestinian universities and institutions to provide water-related training: Training activities were proposed under three major strands

> Training of trainers: This strand aims to build internal capacity for Palestinian trainers in order to expand the opportunity of training for water sector staff. Activities such as the participation of foreign experts, crash-courses abroad for Palestinian trainers, workshops on management of training, and adaptation of training materials, must be proposed jointly by the users (water sector agencies) and providers (trainers) with criteria for project selection to be adopted based on relevance, integration within the users' strategic plan, effect multiplication, and the inclusion of means to gauge the effectiveness of training.
>
> Capacity building of scientific staff for education and research: This strand focuses on providing support for training staff on project management, specific technical needs of research projects, and laboratory equipment. These activities were motivated by the need to improve the effectiveness of project management through workshops, assist in research by funding short visit by Flemish researchers to Palestinian centers and Palestinian researchers to Flemish universities, and to improve the level of expertise in utilizing research infrastructure acquired under Phase I and under other international programs.

Special projects for top level staff: mainly to attend seminars and workshop relevant to water policy, management, and negotiation techniques

4. Enhance the research capacity of Palestinian universities: To improve collaborative research environment in the water sector, this phase included provisions for supporting joint research proposals that address long-term sustainability of water resources in Palestine, facilitate capacity through research, foster collaboration and interdisciplinary approach to water research, and/or contribute to raising public awareness of water issues.

IV.2 MANAGEMENT STRUCTURE

This project has a multi-layered management and steering structure. The overall management and facilitation of the project is provided by UNESCO's Cairo Office (UCO). The project is directed by the regional hydrologist for the Arab region and coordinated by a project manager, housed at the WRC in Al-Azhar University. A Steering Committee (SC) advise the project with membership including representatives from the Flemish Government and universities, Al-Azhar university-Gaza, Palestinian ministry of higher education, and water authority, the project manager, and two additional members to represent the Palestinian Water Resources Network on training and research and to be selected from the membership of its technical Network Commission (TNC). The TNC's broad membership represents Palestinian universities, NGOs, water sector ministries and authorities, along with representatives of Flemish universities. The commission is empowered to review, evaluate, and recommend research and training projects, prepare activities for submission to the steering committee, and review and evaluate current projects and recommend actions to the SC. Both the SC and TNC meet annually.

IV.3 PROGRESS AND ACCOMPLISHMENTS

The first mandated FUST review acknowledged that during 2001-2002, the project was put on hold due to the volatile political and security situation in Gaza and the West Bank. By December 2002, consultations between Flemish counterparts and UCO led to re-launching the project despite of the difficult environment. A call for research proposals was issued by UCO and distributed to Palestinian research centers, universities, and ministries. Proposals were solicited in 13 general areas that are highly relevant to water resources issues in Palestine. Professor W. Bauwens from the Free University in Brussels conducted a thorough technical review of the 32 proposals that were received.

In April, 2003, the SC and the newly formed TNC met for the first time, the meeting resulted in approving the final work plan for Phase II project. Members of the TNC reviewed the 32 received proposals and recommended 11 projects for funding, which were subsequently approved by the steering committee. In addition, this meeting, which effectively re-launched the project, resulted in identifying three sets of training priorities reflecting the TNC's vision of the three training strands.

Budget expenditures indicate that only 43% of the 2003 budge allocations were spent. This was due to difficulties in signing contracts and affecting payment schedules for the 11 successful proposals. By the end of 2003, contracts for only 5 of these were signed. Progress was also slow on the creation of the documentation center despite of the funds invested in training a WRC staff member in the Vrije University on the "Scientific and Technological Information Management in Universities and Libraries: an Active Training Environment" (STIMULATE), because the staff member decided to continue graduate studies in Brussels. Delays were also noticed with respect to the launching of training activities under the priorities identified by the TNC in the first meeting. The main implementation challenge continues to be the difficult political and security environment and further amplified by the repetitive closure of Gaza's boarders and the West Bank and the late start of the project.

The TNC and SC recognized these difficulties in their second meeting in April 2004. Both bodies emphasized the need to (a) improve the frequency of reporting from project management in Gaza to UCO, (b) accelerate the dissemination of funds to successful proposals, (c) make more progress on the dissemination, and (d) improve communication with the West Bank components of the project through the creation of focal point in An-Najah university, and (e) extend the second call for proposal and supplement the extension with an Info-Pack, prepared by Professor Bauwens describing the project's goals, research and training priorities, and explaining the basic proposal requirements.

Given the continuing difficult political and security situation, FIT project accomplishments in 2004 were reasonable. Membership of the network continued to grow particularly in the West Bank, a 5 days training course on Project Preparation, Fund Raising, and Project Management was held in April 2004 in Amman Jordan and was attended by 13 participants representing universities, NGOs, and agencies. Furthermore, by June 2004 contracts for the remaining research proposals were signed and first payments to all projects were fully processed by Sept, 2004. Some of the proposals funded in 2003 were able to submit initial progress reports. UCO identified 11 new projects from the list of submitted projects, 5 contracts were signed out of the 11 new projects and research started accordingly. Expenditures during 2004 were again below budget (65%), the major gap was related to training activities particularly for staff at universities. On the other hand, with help from the Catholic University, Leuven and UCO, books, conferencing facilities, and three PCs were purchased for the documentation center. A mission conducted by professor Bauwens identified some concerns related to the activation of the documentation center, and matters related to communication.

In 2005, Professor Bauwens conducted a mission to the Palestinian Territories and as a result produced a comprehensive mission report. The report identified serious gaps and issues related to communication between project management and its beneficiaries. While acknowledging the difficulties posed by the political situation, the report also emphasized the significance of adhering to the project's terms of reference (TOR) documents and guidelines and the need to clearly define the role of the various actors (UCO, TNC, SC, project partners, project management, research advisory panels). Professor Bauwens recommended the development of proposals to improve the responsiveness and performance of the project management team at Gaza and UCO and the acceleration of implementing the decisions of TNC and SC.

During 2005-2006, most of the funded research projects were completed and their final reports submitted. Training proposals were received, evaluated, and approved in priority areas identified in the TNC-SC third meeting. Training materials were developed for 6 expanded courses covering integrated water management, EIA for water analysis, irrigation water management, spectroscopic and chromatographic instruments for water analysis, and on ground water well sitting, design, construction, maintenance, and rehabilitation. Approximately 130 trainees representing a wide swath of water sector actors from municipalities, environmental management, agriculture, university research, regulators, and public health specialists attended these workshops and courses. The fourth meeting of the TNC and SC, which was held in December 2006, approved 3 additional training courses, a project conference in 2007, and the extension of the project to 2007 utilizing un-spent resources. Progress was also made in addressing some of the concerns raised in Professor Bauwen's report.

IV.4 FINDINGS AND LESSONS LEARNED

- Against a background of extreme political and economic difficulties, this ambitious capacity building project has, in the opinion of this reviewer, succeeded beyond all reasonable expectations. An active network of water agencies, NGOs, and private experts has been developed and in fact, continued to expand during the evaluation period. The network, assisted and nurtured by the project steering committee, and especially by the dedication of Flemish scientists and advisors, has managed to identify priorities, facilitate research, and foster, albeit late, the development of training activities that address local needs and represent a national consensus of water actors. Part of the success is owed to the flexibility demonstrated by the steering committees of the FUST project as well as the FUST steering committee.

- Clearly, the project faced difficulties and set backs, particularly with respect to the activation of the documentation center and the late start of training activities. But resources were still mobilized to carry out, even under difficult situation, a suite of competent research projects and outstanding professionally designed and delivered training workshops and courses. Furthermore, the project management structure provided a mechanism to address some of the key challenges that faced the project. Minutes of the TNC and SC meetings show several concerns about reporting, particularly with respect to communication between the project manager and UCO. However, UCO was able to establish direct communication with project participants, which has partially ameliorated this concern. Other concerns include the issue of consistency in carrying out activities in timely manner and the role of the Palestinian

UNESCO National Commission in managing project activities.

- At the technical level, the majority of the final 21 research reports demonstrated promising scientific competence and creativity. These projects covered policy research, hydrologic modeling for both surface and ground water, GIS enabled modeling and analyses, water quality research, experimental design, and advanced mathematical modeling. Most projects focused on applied research, and in many instances, can be classified as base-line assessment studies of existing environmental conditions as opposed to cutting edge research. A positive influence on research activities has been the thorough technical review of the proposals submitted in lieu of the first call, which was conducted by Professor Bauwens. The appointment of advisory panel for each research/training proposal is also a positive development, but it needs to be strengthened by a clear definition of the responsibility of the advisory panel, especially in taking prompt action on progress reports. In general, better results could have been attained had the agreed-on procedures, schedules, guidelines, and mechanisms been thoroughly followed.

- Project documentation is an important aspect of project management. This project is thoroughly documented. The minutes of the SC and TNC meetings provide a good history of important discussions. The documents also included summary of research project progress relative to its milestones. The project coordinator at UCO has done an outstanding job in this regard.

- Detailed reviews of the training material of all 6 courses delivered in 2006 reveal the high professional standards and competence levels of the providers. Without exception, the reviewer is very impressed with content and quality of all technical training materials, exercises, and presentations. One can imagine the possible multiplication of impacts that could have been attained had these training sessions been distributed throughout the project. Some courses could have easily been given twice.

- The continuing deterioration of the political situation in Palestine is rather unfortunate. This reviewer believes that in cases such as Palestinian water resources, capacity retention is as important as capacity building. It gains multiplicative effect with every scientist, engineer, and expert who provides continuity by deciding to remain and contribute. The final research reports and the quality of the technical material of the last 6 training courses demonstrate that FIT-Phase II, has succeeded in providing Palestinian experts in the water area, who may be in high demand in neighboring countries, with the opportunity for intellectual satisfaction at home, and in enhancing the capacity of universities to conduct research. More importantly, the Flemish support has allowed them to contribute to improving the potential for water resources sustainability. It has been successful, despite of extreme difficulty.

- Currently, it is unlikely that similar activities can be carried out in the Palestinian Territories without Flemish support. The first two phases of FIT provided infrastructure and research capacity building. Several Palestinian agencies expressed strong support to the development of phase III of the project. Plans are underway to write a proposal for the third phase. This reviewer is strongly supportive of the establishment of a phase III project with increased West Bank participation. The FUST steering committee is encouraged to inquire about the possibility of providing some salary contribution to researchers, or perhaps require the involvement of graduate assistants, involvement from universities with graduate programs.

- The 2002 review encouraged the expansion of the active participation from Flemish counterparts in phase II of the project. Obviously this recommendation was thoroughly followed. Flemish counterparts were partners in all stages and demonstrated dedication and enthusiasm. Yet, there is a danger of the project becoming over-reliant not merely on their input, but on them performing some of the tasks that can and should be performed by the project management, partners, and local experts.

IV.5 RECOMMENDATIONS

- This reviewer strongly supports the extension of this project and the development of Phase

III. All participants, UCO, and Flemish counterparts are well positioned to develop a solid project plan that continues capacity building, enhance infrastructure, and expand opportunities.

- Both UNESCO and the Flemish Government may wish to discuss the possible and gradual involvement of the UNESCO Ramallah mission in this project. This may improve the local visibility of the project, and will allow the project partners better access to its management over the long-term. UCO expertise, particularly in hydrology and water resources, has been and will continue to be a vital asset and therefore, UCO must continue to play a leading role. But the gradual transition will also contribute to UNESCO's de-centralization efforts.

- UCO is well positioned to make more concerted efforts to engage and include project participants in other training and research activities within the Arab region.

- Continuing the success of this project under the extreme difficult circumstances will require true adherence to established procedures and guidelines. This is particularly important as this project relies on competitive proposals to perform much needed capacity building.

- Gradual transition from baseline and assessment research projects to applied and basic research is also needed to improve the project's standing within Palestinian academic institutions and to increase the interest of more Flemish counterparts in the project.

- One of the key activities that have significant effect multipliers is the development of graduate programs. The UCO, the SC, and TNC are strongly encouraged to include activities that may lead in that direction. A Masters in Water Resources management, with modern curricula, and participation from multiple universities will be a tremendous boost to the educational, research, and training capacity in the Palestinian Territories in integrated water resource management. Flemish counterparts are very well positioned to contribute to the development of curricula, teaching modules, theses supervision, and exam committees. UNESCO both through its education sector and through IHP and IHE, is also very well positioned to assist in this important development, which will leave a long-lasting legacy.

IV.6 CONCLUSION

In Conclusion, despite of the political turmoil, and the deteriorating economic conditions, particularly in Gaza, this ambitious project has been successful in meeting many of its goals. More than 180 trainees were trained through 8 training workshops, 21 research projects were completed, and several improvements in infrastructure have been realized. The Flemish financial support along with the active participation from Flemish scientists in all aspects of the project played a major role in the eventual success of this project. This support contributed to measurable improvement in the Palestinian capacity to address future challenges in integrated water resources management, an issue of critical national priority in Palestine.

Based on the projects' ability to perform against significant odds, the importance of supporting the Palestinian efforts to improve their ability to deal with a looming water crisis, which will require substantial local expertise, the reviewer strongly recommends continuing support for a new phase of the project.

V. FLOW REGIMES FROM INTERNATIONAL EXPERIMENTAL AND NETWORK DATA NILE (FRIEND/NILE)

V.1 BACKGROUND INFORMATION

Although the FRIEND NILE (FN) program is one of several other programs within the Nile Basin, its objectives are distinct from other "development" oriented program. In 1996, 5 of the 10 Nile basin countries (Egypt, Ethiopia, Kenya, Sudan, and Tanzania) formed a regional network and joined 6 other regional initiatives within UNESCO's Flow Regimes from International Experimental Network Data FRIEND) programme. FRIEND's primary objective is to "develop better understanding of hydrological variability and similarity across time and space, through mutual exchange of data, knowledge and techniques at a regional level". The main objective of the FN programme is to improve integrated water resources management in the Nile through international cooperation. In this, the programme shares its fundamental motivation with other international initiatives such as Nile Basin Initiative (NBI), the Technical Advisory Committee (Nile-TAC), the International Nile Basin Association, the Nile Basin Capacity Building Network for River Engineering (NBCBN), and the Nile Basin Research Programme (NBRP), among others. However, unlike these programs, which focus on legal, social, engineering, and developmental frameworks of Nile water resources management, the FRIEND Nile objective is to improve the international river basin management of the Nile through improved scientific cooperation among the Nile countries in the field of water resources management.

In 2001, and following discussions with the Government of Flanders and Flemish universities, a meeting of the recently identified project management team, a work plan was developed and later approved by Government of Flanders. The FN programme was to be supported the FUST framework for a first phase (2001-2005) and a budget of $930,000. The immediate objectives of the first phase were to:

1. Improve understanding of hydrological variability and similarity acrsoo time and space and to develop hydrological sciences and practical design methods for both low flow and high flow cases

2. Enhance research cooperation among Nile Basin countries through hydrological research projects on selected topics, conducted by researchers from all participating countries

3. Increase the number of trained personnel in the region with the view to improving sustainability of the present initiative and to reduce, in the longer term, dependence on external support agencies

4. Create a network between focal training institutions in the countries of the region and to enhance the linkage with similar institutions in the advanced world

Four thematic areas were identified: rainfall runoff modeling (RRM), sediment transport and watershed management (STWM), flood frequency analysis (FFA), and drought and low frequency analysis (DLFA). Thematic teams were established and activities were initiated. While no salary payments are made to any of the participating researchers, FN supports the research activities by sponsoring thematic workshops, training course, consultancy missions, purchase of equipment and software needed by team members. These activities are implemented by the Water Resources Research Institute (Egypt), UNESCO Chair in Water Resources (Sudan), University of Nairobi (Kenya), University of Dar Es Salam (Tanzania), the Ministry of Water Resources and University of Mekele (Ethiopia) and the IUPWARE Flanders Inter-University Program In Water Resources.

In 2005, and following several meeting including a preparatory meeting, the sixth meeting of the project management team and the 8'th meeting of the FN steering committee, a project document was presented to UNESCO and to the Government of Flanders for Phase II support. The document, which was prepared with assistance from Professor Willy Bauwens, retained the main goals and objectives of the first phase, but anticipated to consolidate the success of phase I and to initiate a new thematic structure of

1. Integrated water resources management
2. Hydrologic modeling

3. Erosion and sediment transport modeling
4. Statistical and stochastic methods
5. Ecohydrology

Phase II was later approved for the period (2006-2009) with a total budget of $950,000.

V.2 MANAGEMENT STRUCTURE

FRIEND Nile is executed by the UNESCO Cairo Office (UCO). The regional hydrologist for the Arab Regions (Dr. Radwan Al Weshah) is the project director. Overall coordination of the project is the responsibility of the sitting director of the national water resources research center in Egypt. Each research theme is coordinated by a theme coordinator, and the interests of each participating country being represented by a country focal person. The theme coordinators, focal persons, project director and overall coordinator are members of the project steering committee (SC). The SC membership also includes representatives from the Flemish Government, as well as representatives from regional research and development initiatives such as NBI and donors. The SC is responsible for reviewing A project management team composed of representatives from the Flemish Government and other donors, the project director, and the overall coordinator, is assisted by a project manager (Dr. A. Zaki) located in UCO oversees the administrative aspects of the project. The SC supervises the implementation of the project activities, review and approve the project overall policy and future actions and evaluates the outcome of the project activities. The project management team reviews the implementation of the project activities and to approves the annual project work plan and budget within the FUST framework.

To date, thematic workshops are the main forum where theme-based research activities implemented in each country are presented and discussed and input are sought from colleagues and from Flemish counterparts. Some of these workshops are held in conjunction with training sessions (research through training). The workshops provide not only means to share experience and research results, but also the platform to build confidence among team members representing different countries.

The project frequently holds topical workshops and meetings. These are held during major milestones such as the formulation and discussion of new phase and initiating and discussing proposals to additional donors.

V.3 PROGRESS AND ACCOMPLISHMENTS

During the review period, the FRIEND-NILE has been active. Both the SC and PM team held regular meetings at various locations in the participating countries. Thematic workshops and training workshops were also held regularly. I general, within each thematic team, research activities during phase I focused on obtaining output and results using models and analysis tools that can be applied to improve design procedures of necessary future development projects in the Nile basin countries. These activities included data processing and analysis, selection and introduction of suitable models and tools, application of the selected models, and reporting activities. Following is a rather brief description of research progress accomplished during the review period for each of the thematic areas

V.3.1 Flood Frequency Analysis (FFA)

Coordinator: Dr. M. Motaleb, Director WRRI, Flemish counterpart: Prof. Willems Patrick, Catholic University, Leuven.

The group held three workshops in Alexandria Egypt (2004), Nairobi, Kenya (2004), and Khartoum, Sudan (2005). The main objective of this group was to develop both regional and station-based flood frequency curves at various locations and regions within the Nile basin. The team first acquired maximum daily streamflow data for 38 stations in the 5 participating countries. The data was then processed using three different packages representing different extreme value distributions as well as parameter estimation procedures. Team members worked on data from their own countries, but followed a homogenized approach to construct their studies. The second phase of the study was to investigate regionalization approaches. The studies resulted in a total of 8 joint conference papers presented in the FRIEND Nile international conference,

V.3.2 Sediment Transport and Watershed Management

Coordinator: Prof. Abdalla Abdelsalam Ahmed, UNESCO Chair in Water Resources, Sudan, Flemish counterpart: Dr. Veerle Vanacker, Catholic University, Leuven

The group held three workshops in Alexandria Egypt (2004), Nairobi Kenya (2004), and Khartoum Sudan (2005), and actively participated in the Highland2006 Conference and Sediment Transport Modeling Training Course, which was held in 2006 in and coordinated by Mekelle, Ethiopia, and coordinated by the Katholic University, Leuven, and the University of Mekelle. The group's approach has been to focus on modeling studies. The members first identified data requirement for erosion and sediment transport modeling and a target study watershed in each country. Availability of required data was then assessed, and model inter-comparison studies were conducted to identify appropriate model, which was the Surface water Modeling System (SMS). SMS is a modeling environment that includes a suite of 2D hydrodynamic, sediment transport, and contaminant transport model. However, while all members were able to run and practice with the model, data deficiencies, particularly with respect to high resolution digital elevation data was a major hindrance. The team was able to overcome some of these difficulties and proceeded with several case studies. In addition to modeling, members of the STWM team conducted several studies to characterize sediment problems in the Nile basin using historical data of streamflow and sediment concentration. The studies resulted in a total of 6 joint conference papers presented in the FRIEND Nile international conference

V.3.3 Rainfall-Runoff Modeling

Coordinator: Prof. Felix Mtalo, Water Resources Engineering, University of Dar es Salaam, Tanzania, Flemish counterpart: Professor Willy Bauwen, Free University of Brussels.

During the review period, this group also held three research workshops in Dar Es Salaam, Tanzania, (2004), Addis Ababa, Ethiopia, (2004) and Khartoum, Sudan; (2005). The objective of the RRM research is to develop suitable rainfall runoff models and related techniques on a number of catchments within the Nile basin for the purposes of supporting flood forecasting, water resources management, estimation of missing data, and investigating climate change and land cover land use changes on the hydrology of these catchments. By 2004, the RRM team has identified and obtained necessary hydrometeorologic, hydrologic, topographic, and land use data sets for targeted watershed. The team has also gained reasonable training on some of the modeling software, and initiated testing and preliminary runs of three widely used modeling systems with varying degrees of complexities and data requirements. Similar to other groups, the RMM conducted extensive model inter-comparison studies and were able to discern the applicability of a number of hydrologic models to varying hydroclimatic regimes within the basin (humid, arid/semi-arid). The efforts of the RRM were translated into 8 conference papers presented in the FRIEND Nile international conference.

V.3.4 Drought and Low Flows Analysis

Coordinator: Prof F M Mutua Professor, University of Nairobi, Kenya, Flemish counterpart: Prof. Willems Patrick, Catholic University, Leuven.

During the review period, the DLFA team also held three meetings in Alexandria, Egypt, (2004), Nairobi, Kenya; (2004), and Khartoum, Sudan; (2005). DLFA objective is to analyze daily rainfall and river flow data within the Nile basin to better understand the spatial and temporal characteristics of the low-flows and droughts within this basin. In most of its analytical studies, the DLFA team has utilized tools developed by and available at KU-Leuven. To define the problem, the team first investigated various definitions, indicators, and measures of drought and their data requirements. The team conducted research on various aspects of low-flow series including duration frequency analysis, peak-over-threshold technique, and statistical analysis of dry periods. The studies resulted in a total of 9 joint conference papers presented in the FRIEND Nile international conference

V.3.5 Conference and Preparation for Phase III

As noted above, a FRIEND Nile international conference was held in Sharm El Shiekh, Egypt; 12-14 November 2005. The conference themes included hydrology of the Nile, rainfall runoff analyses, extreme events, sediment transport and watershed management; and water resources management. Of the 70

accepted paper, 27 were written by project implementing partners with Flemish counterpart being co-authors on more than half.

With respect to training, the FRIEND-Nile project has adopted a strategy of "training through research". Participants received extensive training on software, analytical methods, and theory pertinent to their themes in every research workshops. Several members of the FRIEND/Nile attended A Comprehensive Training programme on the Applications of the Water Strategy Man Model, Bologna, Italy in 2006. Plans are on the way to test the model applicability to the Blue Nile.

Significant amount of efforts and resources were devoted during 2006 to the preparation and launching of phase II project. A large phase II launch workshop was held in August 2006 and was attended by more than 70 researchers. Meetings were also held to prepare for a proposal to the EU-Twinning program, but unfortunately these efforts did not materialize into a proposal. The project management team also conducted missions to approach the NBI, including the participation of the director and manager in research advisory committee meeting of the NBI's applied training project. Missions were also conducted to expand the number of participating countries (Congo), and identify new members of research themes for phase II, particularly young researchers. Phase II will include 15 new young researchers from the original 5 countries and 12 new researchers from Uganda, 6 of which are young researchers.

V.4 FINDINGS AND LESSONS LEARNED

- The FRIEND-Nile project has gone through three distinct and significant phases: initiation (1996-2001), trust and network establishment (2001-2003), and capacity building (2003-2006). Networks require that members recognize common interests and trust each others by developing personal relationships, working together to solve common problems, identify priorities, and act upon these priorities. It is hard to imagine the level of trust and confidence that has been built between experts in the five participating countries without FRIEND-NILE. Flemish support is visible in project activities, workshops, and in press releases in local media.

- Working with common tools, while at the same time addressing the unique characteristics of each region, is a very important aspect of integrated management in any international river basin. FRIEND Nile has effectively utilized Flemish financial and intellectual resources to provide a unified training and practice on a common set of modeling tools that are highly relevant to Nile basin management at local watershed and tributary scales.

- Meetings with Dr. Abdel Motaleb and with several junior and senior researchers and faculty members in WRRI in Egypt, along with reviewing several workshop presentations, indicate that the expertise gained through FRIEND Nile are being utilized at countries level to initiate new applied research studies. These studies cover hydrologic, water resources, watershed management, and erosion topics and use models and tools that were provided through FN training and research workshop. Of particular interest is the utilization of modern GIS, model calibration, and to some extent remote sensing observations. This is an important development that indicates the project's success in expanding research opportunities in participating countries.

- Several FRIEND initiatives have built good cooperation with important international research programs such as the WMOs Global Water and Energy Cycle Experiment (GEWEX) and Climate Variability (CLIVAR) study. While these initiatives do not provide funds, they allow researchers to exchange knowledge, particularly in areas related to translating small scale studies into large river basin scale and the use of remote sensing and models in water resources management, and in the exchange of data. With FRIEND-Nile initiative encompassing most of Nile basin, and having successfully built the capacity for research on various aspects of hydrologic modeling and analysis, the project stands closer to participating in some of these international efforts. It may be important to discuss this possibility with representatives from these programs and to consult with them regarding the development of workplans during phase II.

- One of the most positive aspects of FRIEND-Nile management approach has been the commitment to ensure that purchased equipment and software are given directly to participating researchers. The project management has demonstrated a great deal of flexibility and dynamism.

This allowed the project management to address issues related to delay in progress reporting, incomplete data, and priority identification.

- FN is seriously addressing an earlier concern about it being exclusive to its participants. The commitment to bring new young researchers on board is a very positive step in that direction. Another positive development would be to require some of the earlier participants to train the new members. This will assist in multiplying the impacts of the project.

- Finally, much of the project success in the past four years has been made possible by the diligence of Flemish counterpart. The secondment of Professor Bauwens has been very important to the project success.

V.5 CONSTRAINTS

- Based on survey of the papers submitted to the international conference and on reading various technical themes reports, this reviewer is convinced that some of the research projects yielded results that can and perhaps should be published in peer reviewed journals. According to the project director, few attempts were made, and resulted in two recent peer review publications, which is a good accomplishment. However, some attempts have been frustrated by negative reviews and by the lengthy and rather slow peer review process. While this is unfortunate, it is rather common in academia. This lack of strong interest in peer review publication has been a major frustration to Flemish counterparts who invest, voluntarily, significant amount of their time without realizing academic return proportional to their efforts.

- Consultant contracts were drawn to acquire data for several research activities. Some of these contracts were drawn before full exploration of candidate models, which resulted in the acquisition of incomplete data sets and at least in one occasion in slowing the progress of the research/training workshop. Software problems such as computer crash-down and code bugs were encountered occasionally. This highlights the need for improved communication with software vendors and more thorough assessment of training software and data sets prior to workshops. At the same time, the participants' ability to make the best efforts to compile and use scarce data is highly commended.

- A constraint facing FN is the slow pace of integration with existing regional initiatives. Although serious attempts were made to participate in NBI, these attempts were frustrated by the political and bureaucratic nature of NBI. The project management should be commended on their efforts, but more will be needed.

- At this stage, FN activities can not be sustained without the Flemish contributions. Although efforts are underway in several countries to secure external funds for research activities relevant to FN, these efforts remain country based. The efforts to write an EU twinning proposal did not materialize in a full proposal submission.

- The active and devoted participation of Flemish counterparts in this project is one of its strengths. One must guide, however, against the project being overly dependent on Flemish counterparts. Placing more emphasis on personal initiatives, particularly during the interim between two research and training workshop would be very helpful in increasing the opportunities for independent, yet collaborative research.

V.6 RECOMMENDATIONS:

- The reviewer strongly supports the extension of this project.

- Based on observations during the mission to Cairo, the reviewer believes that the project manager has gained significant experience, and has developed good networking skills. Full realization of his potential will require raising his executive and supervisory profile. The model used in FET-Water may be adopted to provide him with the opportunity to train on network formation in science and research.

- Data acquisition efforts, particularly those performed by consultants should only be initiated after thorough review of candidate models. Similarly, consultant should ensure the availability of at least one training data set required to fully test the various capability of each model and modeling system.

- UCO is well positioned to take advantage of UNESCO co-sponsored training facilities in the region to conduct training and research workshop. This will ameliorate the problem of software/hardware incompatibility that may occur during the onsite installation of software on some outdated laptops. Both UCO and IHP-HQ are strongly encouraged to discuss the maximum utilization of such facilities.

- The project management is encouraged to consider at least one training activity on the writing and preparation of peer review quality manuscripts. A survey of possible journals is highly recommended.

- The core team of project participants are important assets to their countries. The project is well positioned now to encourage them to provide training to younger generation of students.

- Given the cost of easy to use software packages, the training activities should probably focus more on public domain software. Such may be harder to use, but it would be the only option if trainees are to provide training to their own students. UNESCO-HQ, is well positioned through its current efforts to work with large vendors to facilitate donations. The FRIEND Nile project may wish to consult with ODIN Africa and IODE who have developed a great deal of expertise with public domain

- Gradual transition from baseline and assessment research projects to applied and basic research is also needed. The transition will increase the interest of more Flemish counterparts and to enable the continuation of the success towards the ultimate goal of building cooperative research program in the Nile Basin.

- FRIEND-Nile must accelerate the development of a usable website.

V.7 CONCLUSION

There remains a stressing need for research capacity building in areas relevant to integrated water resources management in the Nile Basin countries. Expertise in hydrologic modeling, statistical hydrology, sediment transport, and ecohydrology are essential and much needed in these countries. With the support from the Government of Flanders, and direct and active involvement from Flemish scientists, the FRIEND Nile program has been very successful in building such capacity. It targets areas of need, it accomplishes its goals through innovative "training-through-research" workshops, and it facilitates the development of a common technical framework among key experts in these countries. During the review period, a core group of more than 40 experts were trained on state-of-the art modeling and analysis tools. 30 additional members, who are not fully participants have also benefited from such targeted training. 27 research papers were written, and common data sets were built. There are reasons to believe that recent efforts to acquire additional external funds, although struggling, will eventually lead to positive results. Further Flemish support would be very helpful in continuing and enhancing the success of this project

The need for integrated management in the Nile Basin, and the efforts of the FRIEND-NILE to assist the basin's countries in developing local capacity to address this need, and taken into account the progress made in that regard by the project, the reviewer strongly recommends continuing support for a new phase of the project.

VI. THE FRAMEWORK PROGRAMME FOR RESEARCH EDUCATION AND TRAINING IN WATER (FETWATER)

VI.1 BACKGROUND INFORMATION

In 1996 the Department of Water Affairs and Forestry (DWAF) approached UNESCO and WMO to assist in assessing education and training needs in the water sector in South Africa. An assessment mission, was undertaken 1998. In addition to identifying chronic shortages in trained experts, the mission recognized the additional demand for experts created by the enactment of South Africa's National Water Act (NWA, Act 36 of 1998). NWA provide the legal framework for managing all of the component of the hydrological system in manners ensuring that use, development, management, and protection of the nation's water resources must adhere to three fundamental principles of (a) social equity, (b) economic efficiency, and (c) ecological sustainability. The new focus highlighted the emerging mismatch between existing educational and training programs. A further complication was the lack of strong coordination between the government and education providers regarding training needs. The mission's report strongly encouraged DWAF to establish a framework program for effective cooperation in education, training, and capacity building in the water sector.

Following the signing of agreement between UNESCO and the Government of South Africa in 2002, a series of workshops, consultative meetings, and dialogue resulted in selection of the network model as a capacity building approach. An interim management committee representing DWAF, the Water Research Commission (WRC), the Council for Scientific and Industrial Research and consultants from the private sector was selected along with the appointment of an executive coordinator. Their main objective was to determine training priorities and assist in the development of the (FETWater) as a program for effective cooperation in research, education, training, and capacity building initiatives to achieve integrated water resource management in South Africa. The Government of Flanders approved a $207,900 support level for FETWater Phase I (2002-2005) with commitment for $274,599 fund matching from the Government of South Africa and $44,800 from UNESCO. The objectives of phase I were to:

1. Develop effective co-operative approaches to building human resource capacity related to integrated water resources management

2. Assist the transformation process in the water sector by building the capacity of previously disadvantaged groups and individuals

3. Provide and facilitate capacity building, training and education opportunities in the water sector

4. Financially support networks that reflect the general principles and priorities identified within FETWater

5. Strengthen national, sub-regional and international co-operation of academic and research institutions

6. Contribute to unity, understanding and mutual respect within the sub-region

7. Support and complement existing national and sub-regional initiatives, programs and activities in line with the identified needs

8. Support innovative initiatives to address identified capacity building and training needs in the water sector.

The primary focus of FETWater is on training activities. This includes capacity audits to identify training needs, development of training material, co-sponsoring and coordination of training sessions, and co-sponsoring visits and mobility training for network coordinators. The beneficiaries of the program are diverse and they include regulatory institutions, watershed management agencies, professionals in public and private sectors, higher education institutions, research institutions, and other relevant organizations

and agencies. This allows the program to capitalize on existing activities while at the same time initiating new ones.

In 2005, the FUST steering committee approved the extension of the FETWater activities to 2006. However, a proposal for Phase II was submitted and later approved to launch phase II (2006-2010), with a total budget of $2,424,700, of which $1,041,700 was approved for funds by the Flemish Government. Although phase II has identical goals to phase I, the proposal calls for initiating new networks. More importantly, a refined and expanded set of activities were identified and include, in addition to those associated with phase I, provisions for linking with other networks, improving inter-disciplinary collaborations.

VI.2 MANAGEMENT STRUCTURE

Facilitating FETWater is the responsibility of UNESCO's science coordinator in Windhoek, Namibia, and IHP headquarters. The activities of FETWater are coordinated by an executive committee (EC) composed of representative of key agencies as well as representatives of training providers. Both the temporary and permanent ECs held regular meetings. Since its formation in 2004, the permanent has convened on quarterly basis. The EC has the oversight responsibility of network activities. It evaluates the activities of existing networks as well as proposals for new activities. Each of FETWater networks is coordinated by a network coordinator who is appointed by the EC. Network coordinators have management, liaising, partner-coordination, assessment, reporting, and dissemination of outcome responsibilities.

The annual meeting of FETWater partners is perhaps the most important element of its management structure. These meetings are the forums where current and potential network partners, along with scientists from Flemish universities and representatives of the Flemish Government, and from UNESCO discuss training priorities and approve on principle the establishment of new networks. The annual meetings are generally concluded with a field trip to provide the divers group with on-site view of water management challenges in South Africa and its relationship to public health, economic, and social development issues.

VI.3 PROGRESS AND ACCOMPLISHMENTS

The 2002 review was conducted at an early stage of the FETWater project. This review, however, covers a very active period of the project. It encompasses almost the entirety of phase I and the initiation of Phase II. During the review period, three major training networks were launched and became active. These are the Resource Directed Measures (RDM) network, the Groundwater training network, and the Beneficial Use of Water network.

VI.3.1 Resource Directed Measures Training Network (RDM- 2003)

Within the NWA framework, resource directed measures (RDM) are water resources protection measures that include (a) classification of water resources, (b) resources quality objectives, and (c) reserve. RDM are distinguished from other protective measures such as source directed controls and management of emergency incidents. Because RDM entails complex hydrologic, ecologic, and analytical studies, the RDM training network it was selected as the first of the networks to be co-sponsored under FETWater. Since its formation, the network, which includes members from four major universities, two research institutes, and a private environmental consulting group, has conducted a major capacity audit by surveying all universities and technikons in the country, held 6 working and planning sessions, and carried out 19 training sessions in 8 provinces. These training sessions covered both introductory and advanced RDM training, and included an experiential training course (Orang/Senqu basin). Approximately 321 trainees representing DWAF staff and professionals from private firms and other public agencies were trained. In 2006, RDM network collaborated with WaterNet, IUCN, and GWP-SA to provide a 10 days course to 34 professionals representing 10 different Southern Africa Development Community (SADC) countries.

In addition to training activities, the RDM Network also developed a curriculum for a Masters program in Environmental Water Requirements to be provided through cooperation between four institutions (Zululand, Grahamstown, Nelson Mandela Metropolitan, and Cape Town universities). The network held an RDM symposium attended by 70 stakeholders and the network coordinator participated in the WaterNet/WARFSA Conference in 2004.

VI.3.2 Groundwater Training Network (GRDM 2003):

This network brings together experts from 6 universities, WRC, and private training service provider. The network held several meetings, but the most important contribution has been in the preparation of the Ground Water training manual. The first version was produced in 2004 and used in 5 training course benefiting 72 professionals and DWAF staff in 5 provinces. During 2005 and 2006, the network focused on finalizing the manual, which has been approved officially by DWAF and is now available on DAWF website, where this reviewer acquired a copy of it. In addition to these activities, the network organized student tours and purchased, with assistance from FETWater equipment to develop groundwater test site in the Pienaras River. The site is jointly used by the University if Venda and the University of Pretoria.

VI.3.3 Beneficial Use Network (BUW -2004)

As defined by the policy paper (White Paper on Water Policy in South Africa), the value of competing uses of water is to be determined based on optimum economic and social benefit. This doctrine, which became a fundamental aspect of the NWA, requires interdisciplinary framework combining policy, environmental, hydrologic, and social and management sciences. The beneficial use network was formed to provide the necessary training on these issues with emphasis on water managers, academics, and major service providers. The network membership represents 3 universities, DWAF, and a private consulting firm. It held several work sessions and completed a capacity audit late in 2005.

Three additional networks were approved within the framework of FETWater phase II: Wetlands, Disaster Management, and Catchment Management Agencies (CMA) networks. The three networks are expected to become active during phase II with the CMA having the potential to evolve into a cluster network.

VI.3.4 Mobility Training

FETWater co-sponsors mobility (exchange and visits) activities. Prior to 2004, the executive coordinator received training in several countries including Belgium on networking and network coordination. Flemish acadmics participated in subsequent visits to South Africa and assisted in formulating FETWater. During the period of interest in this report, mobility activities included training of network coordinators, visits by representatives of the Flemish Government and academics to attend the annual meetings and to assist in drafting the proposal for phase II. Two network partners attended IWRM training in Belgium, France, and the Netherlands. And a South African Scientist visited Belgium as part of a joint project between the University Limpopo, the University of Ghent, and the University of Antwerpen.

VI.4 FINDINGS AND LESSONS LEARNED

- During the evaluation period, both phases of FETWater can be characterized as highly successful. The project accomplished almost all of its objectives. The visibility of the Flemish contribution is clear. DWAF newsletters, and publications available on the web clearly mention FETWater and the fact that it is a joint UNESCO/Flanders/South African funded initiative that is contributing, visibly and significantly, to building capacity in integrated water resource management in South Africa. A large number of trainees representing almost all provinces of the country, and including trainees from previously disadvantaged groups benefited from the project in its first phase with more being expected to benefit in phase II. In this regard, the development of the curriculum for Masters in environmental water requirement is an important step towards effect multiplication.

- The halt of ground water training sessions pending the finalization and expansion of the ground water manual is reasonable. The beneficial use network has not yet activated any training session beyond capacity audit. This may be due in part to the inter-disciplinary nature of the beneficial use doctrine, but further elaboration would be helpful.

- The reviewer is impressed with the quality of the groundwater training manual. The 140 pages manual is a comprehensive, yet concise document that provides practitioners with an overview of NWA and the associated groundwater resource directed measures). Definitions, rules of thumb, calculation procedures and analyses methods are also well covered and adequate for practitioners.

- Several times during the preparation of this report, this reviewer visited the website of the international association for impact assessment (South Africa). On each of these visits, the employment opportunities page had mo less than 20 available career opportunities for junior, mid-career, and senior environmental specialists. All of these opportunities were in the private sector. Confirming concerns expressed by several Flemish scientists during the Brussels meeting, and articulated by UNESCO representative, there is a great competition from the private sector for experienced and well trained staff. On the one hand, this would place pressure on the project considering that many of its public sector trainees may switch to the private sector, and consequently, DWAF interest in continuing the joint effort may be reduced. Yet, from a capacity building point of view, all trainees will contribute to improving the quality and sustainability of water resources in the country, be it as regulators, researchers, and/or consultants.

- Other challenges include the anticipated expansion of the project's geographic region from South Africa to the larger SADC region, the initiation of the FUST supported IOC coordinated FET-REMSEN, and new financial accountability legislation in South Africa. These challenges may add pressure on the project team and should be addressed appropriately. The first year of phase II indicates that these challenges are manageable as FETWater is successfully beginning to build cooperation with other regional initiatives such as WaterNet, IUCN (the world conservation union), and the global water partnership (GWP-SA).

VI.5 RECOMMENDATIONS

- This reviewer strongly supports the continuation of this project.

- This project is well positioned to take advantage of the FET-REMSEN. Interlinks between the two projects can be enhanced.

- With the increasing competition from the private sector for experienced and well trained specialists, FET-Water would be well advised to expand its discussions with private sector firms as possible donors, or perhaps fee payers for training activities. UNESCO-HQ and EB affairs is well positioned to advise on the feasibility of such approach.

- Establish a follow up mechanism regarding trainees training activities in their own institutions.

VI.6 CONCLUSION

The FETWater project has been consistent in its contribution to Integrated Water Resource Management capacity in South Africa. During phase I, and the early part of Phase II, more than 300 staff representing most provinces and including members of previously disadvantaged communities were trained. The number of training networks continues to expand brining online more training relevant to improving the country's opportunity to meet the goals of its National Water Act. Flemish financial and technical support of this project has been well directed, well managed, and effective. And this reviewer recommends its continuation.

VII. WATER CENTER FOR ARID AND SEMI-ARID ZONES OF LATIN AMERICA AND THE CARIBBEAN- CAZALAC

CURRENTLY FORMALLY CONSTITUTED AS A CENTER UNDER THE AUSPICES OF UNESCO

VII.1 BACKGROUND INFORMATION

The establishment of CAZALAC was based on the request of the Government of Chile to the UNESCO International Hydrological Programme Intergovernmental Council. This request was supported by numerous IHP National Committees from the Member States of the region and worldwide. An Agreement was signed between UNESCO and the Government of Chile to provide the basis for the formulation of a research and training workplan aimed to strengthen the institutional capacities for the sustainable management of water resources in the arid and semi-arid zones of Latin America and the Caribbean (LAC). By 2002, with Chile offering substantial support for the Centre, including facilities at the University of La Serena and annual funding from the regional government of Coquimbo and National Government. The Government of Flanders approved $425,000 of FUST funds to support center's establishment during an initial phase (2002-2005). Initially, FUST fund was to provide support for three years for three researchers, 18 scholarships, 4 research projects (in 4 countries), and courses with invited lecturers. The approval of FUST funds marked the start of actual activities of the center during the second half of 2002. Later, the center's by-laws were approved by the Department of Justice of Chile in 2003, which established the center as independent entity and in 2005, UNESCO's General Conference approved incorporating CAZALAC into category II centers under Auspices of UNESCO. Formal agreement was signed by the Director General and the Ambassador of Chile in February 2006.

The main objective of the initial support was to support the establishment of a regional center that will systematically address the serious problems caused by extreme water shortage and impairment in arid and semi-arid environments and will develop favorable conditions for regional cooperation and exchanging experiences regarding these issues. By 2006, CAZALAC, had developed its legal status, institutional consolidation, an identifiable corporate image, and a communication strategy, It had established agreements with domestic and foreign universities and institutions.

In January 2006, the Flemish Government approved renewal of support ($715,000) for Phase II (2006-2009). The main objective of this phase is to reinforce the Region's technical, social, and educational development, based on the improved use and management of water resources in arid and semi-arid zones of Latin America and The Caribbean. In addition, CAZALAC to increase the communities' role in the development of a water culture through the operations of a regional center that coordinates activities, projects and programs. More specifically phase II aims to

1. Encourage scientific research on water issues and management problems in arid and semi-arid zones of Latin America and The Caribbean.

2. Encourage greater contact between researchers working in the Regional water resources field.

3. Disseminate results obtained from research carried out on water resources in arid and semi-arid zones of the Region.

4. Provide education and training on sound water management practices and encourages the improvement of regional researchers' skills.

In addition to FUST, the operation and activities of CAZALAC are supported by the Government of Chile and in-kind support from some participating institutions. These include the University of Serena, the regional government of Coquimbo, and the ministry of public work (directorate of water). Chilean associated institutions include the notational association of forestry, the University of Talca, the Catholic University of Valparaiso, and the University of Chile. CAZALC activities include joint research projects bringing together scientists from 27 regional countries, training workshops, development of training materials, and acquisition of research equipment. As of April 2007, CAZALAC has moved to a permanent location on the campus of the University of La Serena.

VII.2 MANAGEMENT STRUCTURE

As a category II UNESCO center, CAZALAC is managed in accordance with its by-laws. The center has a leadership team consisting of a director, and 2 lead engineers (technical unit, projects), and an on-going projects' manager. The center governance and oversight is provided by a governing body comprised of the sitting director of National Water Office, the regional governor of Coquimbo, and the president of the the University of La Serena. FUST and UNESCO support to the center is managed through the UNESCO-Montevideo office and coordinated by Dr. Maria Concepcion Donoso (Regional Hydrologist). The center holds an annual evaluation meeting that is usually attended by representatives from its associated institutes, UNESCO, the Government of Flanders, and Flemish counterparts. The team also invites other experts to these meetings. The annual review meetings serve as the main platforms to assess the center's progress and provide advice regarding its activities.

VII.3 PROGRESS AND ACCOMPLISHMENTS

VII.3.1 Phase I

During the establishment phase (2002-2005), CAZALAC made significant progress in establishing research, education and training, and knowledge dissemination initiatives. The flagship of the center's research efforts has been the on-going development of a regional Map of Arid Zones. 27 countries are participating in this project which involves training workshops, data collection, guideline development, software, and extensive modeling and data analysis of climatic information (e.g., precipitation, evapotranspiration, and temperature) to develop a map that combines aridity, climatic variability, and water regime information. Another research projects include the initiation of a study on Methodologies to determine Water Use Efficiency, with emphasis on a case study in the Region of Coquimbo. The study investigated current water use techniques in three watersheds and assessed water use efficiency at local and regional levels. An assessment of the present situation was also conducted by means of interviewing water users and obtaining lessons learned from users with high efficiency rates. The study resulted in the formulation of recommendations and guidelines to guide users on improved efficiency of water use.

To support experimental studies, CAZALAC participants from the University of La Serena collaborated with Flemish counterpart (Prof. Donald Gabriels, U-Gent) on the construction and testing of rainfall simulator capable of simulating low, moderate, and severe intensity storms. The rainfall simulator was instrumental in collecting data for two theses studies under the academic guidance of Professor Gabriels. These include a study on the "Evaluation of the infiltration process in water Harvesting systems in drylands of Chile", by Marjolein De Weirdt (2005) and a study on the "Evaluation of to water erosion risks in drylands of Chile", by Arne Baert (2005). Additional studies were conducted using data obtained from the simulator in collaboration with researchers from Chile and the University of Gent.

Phase I training and education activities included 9 workshop and courses addressing issues that included, among others, developing strategic research vision for CAZALAC, soil physics /soil Hydrology, ground water management, applied hydrolgeology, mining and the environment, groundwater pollution, and forest restoration. These course, were well distributed throughout phase II and were organized by CAZALAC and an increasing number of partners including European, Central and Latin American, and Israeli Universities. Capacity building efforts during this phase included several internships for both Flemish and Chilean students to participate in field studies using the above-described rain simulator. Training also was provided to a CAZALAC engineer on the STIMULATE library package at Vrije University in Brussels. A Flemish Ph.D. candidate from Gent University now resides in CAZALAC through cooperative agreement to conduct studies on soil erosion and to assist in the development of new proposals.

VII.3.2 Phase II

Despite of the short period since the initiation of the implementation phase (phase II), CAZALAC is already making progress on all fronts. With respect to research, efforts to finalize the Arid Zones map continued after the regional map was presented at the World Water Forum in Mexico City. National maps,

which were initially extracted from the regional map are now being assessed and enhanced by experts within each of the 27 participating countries. In some countries, the assessment and enhancement process involved specialized workshops. Supplemental efforts concerning the development of climatic data base that is accessible through web-mapping interface have been initiated to support continuing updating of relevant maps and data sets. The utilization of the rainfall simulator, coupled with soils analyses to further understand infiltration and soil erosion processes in Chile continued and has so far resulted in two additional reports "Estimation of sediment transport in a watershed in an arid region of north Chile. Bram Vandekerckhove; D. Gabriels; W. Cornelis (2006)and "Evaluation of infiltration furrows for the captation of runoff water in a semiarid region in Chile" Katrijn Alaerts; D.Gabriels; W. Cornelis - (2006). These studies were conducted with the assistance of Flemish and Chilean student interns. Two students from the University of Ghent (Flanders, Belgium), one student from Talca, Chile and two Venezuelan students (Universidad Central de Venezuela and Universidad Francisco de Miranda) participated in these research and internship activities. Similarly, 77 students and professionals attended a continuing education course on Key Factors in the Environmental Assessment of Mining Projects in La Serena. The course was taught by instructors from various universities in Spain, Chile, and Argentina. Additional 27 Chilean students and professionals along with 15 undergraduate students from Germany attended an international course on Applied Hydrogeology, Underground Water Management in Arid Zones. The course was taught by faculty from Bochum and Darmstadt universities in Germany. Furthermore, a course on water and soil preservation in Andean countries was given in 2006. The course, which addressed local farmers and family members of the community of Namza, Huigra, Alausí (Ecuador), was jointly coordinated by Professor Gabriels and Dr. Pedro Cisneros from the local Water and Soil Management Program.

CAZALAC also participated in coordinating several other international courses, workshops, and meetings such as the Water and Culture workshop and the UNESCO-WET workshop. The center's presence during the Fifth Water Forum in Mexico City provided a platform to launch the Arid Zones Map as well as an unprecedented opportunity to expand its network connections. Another significant activity was the workshop held to discuss the incorporation of the Elqui basin into UNESCO's Hydrology for the Environment, Life and Policy (HELP) program.

VII.4 FINDINGS AND LESSONS LEARNED

- The success of CAZALAC establishment and implementation phases is evident. A large number of students and professionals benefited from its training and capacity building efforts. A good number of technical reports, graduate research thesis, and training material has been developed in areas highly relevant to improving water management in this critical region. Both Flemish and Chilean researchers are participating in major scientific research encompassing field studies as well as modeling and data analysis studies.

- A unique characteristic of CAZALAC has been its ability to enjoy significant international support particularly at the political level. UNESCO in general, and more particularly IHP, has been both an advocate for and a partner in establishing the center. Combined with the commitments from the Chilean Government and the support from the FUST fund, the center enjoyed the good will and support that enabled it to take actions on a large number of activities shortly after its formal induction.

- However, support alone is not sufficient. It is the opinion of this reviewer that CAZALAC was able to capitalize on this support by ensuring delivery of its targeted products. For example, the center has established an outstanding website, it has been able to hold its training activities and initiate a continent wide project that improved the center's standing in its region.

- The construction of the rain simulator is not a trivial issue. The experimental apparatus has provided excellent opportunities to improve the center's capacity to host major research projects. Granted, the dedication and active participation of the Flemish counterparts has been as important in this regards as it is for all other FUST activities.

- The center is to be commended for reaching out to other centers, universities, and agencies worldwide. These efforts are likely to further advance the center's standing.

VII.5 CONSTRAINTS

- It is difficult to clearly map CAZALAC activities to its mission. The mission itself is rather ambitious, which raises concerns about the center's ability to accomplish all of its goals with only four permanent staff members. The lack of clarity concerning the academic profile of the center within the University of La Serena may further complicate the situation.

- CAZALAC training activities appear to be ad-hoc and target of opportunity based. A strategy for identifying future training courses and workshops has not been adequately demonstrated, particularly with respect to gauging input from regional partners. For the center to continue its evolution into a regional center, further efforts to design regionally important courses will be needed.

VII.6 RECOMMENDATIONS

- Increase the participation of Latin American and Caribbean students, particularly at the post-graduate level in research activities.

- Consider the establishment of procedures to host interested faculty on sabbatical from relevant programs within the region. Efforts to clarify CAZALAC academic profile can be helpful in that regard. Models available in many other countries allow faculty to be affiliates of the center without receiving salaries from the center.

- The reviewer encourages CAZALAC to consider the development of training course and/or tool kit on the construction and operation of the rainfall simulators.

- Continue the commendable efforts to expand the center's partnerships, particularly with similar centers such as SAHRA.

- Accelerate the finalization of the Arid Zones map procedures to link the map with hydrologic, water resources, socio-economic, and policy implications.

- CAZALAC is encouraged to invite leaders from the FETWater program to exchange expertise on the development of training networks.

- CAZALAC should establish closer linkages to the growing network of UNESCO category 2 centers, especially those with strong water-and dryland related ties such as the Regional Centre for Training and Water Studies of Arid and Semi-arid Zones (RCTWS-Egypt). CAZALAC should also inform and attempt to benefit from the anticipated approval of five additional water related centers during the 34th session of the General Conference of UNESCO.

VII.7 CONCLUSION

CAZALAC has been very successful. It has developed a solid portfolio of capacity building activities that includes work-study opportunities, internships and scholarships along with a wide variety of courses and workshop. These activities have resulted in training 450 students and professionals by well academics from well recognized universities and research institutions. The center is on its way to becoming a truly regional center with impacts and interests beyond the academic field. While much more remains to be done, CAZALAC is now a major player within the network of institutions related to water and environmental management. The centers' mission, approaches, and products are consistent with UNESCO priorities and mirror an important development goals in such critical region.

Based on CAZALAC's performance to date, the significance of its current and future role, and the centers' efficiency in carrying out its activities, the reviewer recommends the continuation of financial and technical support to this important project.

VIII. SUSTAINABLE MANAGEMENT OF MARGINAL DRYLANDS SUMAMAD

VIII.1 BACKGROUND INFORMATION

In 2004, the Government of Flanders approved the co-sponsoring of the UNESCO' Man and the Biosphere (MAB) Sustainable Management of Marginal Drylands (SUMAMAD), which started in 2002. The project was approved for 4 years duration (2004-2007) at $800,000 support level. The project is also co-sponsored by UNESCO-MAB, IHP, the UN University, the International Center for Agricultural Research in Dry Areas (ICARDA), and the Chinese Academy of Science. The total project support is $ 1,538,000. In addition to the sponsoring agencies, the K.U. Leuven and Ghent University, the project involves the following research sites: Zeuss-Koutine Watershed in Tunisia, the Omayed Biosphere Reserve in Egypt, Dana Biosphere Reserve in Jordan, Khanasser Valley Integrated Research Site in Syria, Gareh Bygone Plain in Iran, Dingarh/ Lal Sohanra Biosphere Reserve in Pakistan, Karnab Chul in Uzbekistan, Haihe River Basin, and Hunshandake Sandland/Xilon Gol Biosphere Reserve in China. SUMAMAD's overall targets are:

1. Improved and alternative livelihoods of dryland dwellers.
2. Reduced vulnerability to land degradation in marginal lands through rehabilitation efforts of degraded lands
3. Improved productivity through identification of wise practices using both traditional knowledge and scientific expertise.

At the heart of SUMAMAD concept is the recognition of the three primary component of sustainable management of Drylands: water, land, and livelihood. To accomplish these objectives, SUMAMD researchers collaborate with dryland users and dwellers in each of the 9 selected sites to identify sustainable management approaches that integrate land, water, soil, biodiversity of resources and allow the to use their natural resources in sustainable manner. Capacity building in dryland research is achieved through training, resource inventory studies, management practice assessment studies, and socio-economic surveys. The evaluation of the effectiveness of existing and practices is based on a common methodology applied to all the selected study sites within the project. The methodology consists of three key elements: (a) state of existing natural resources, (b) characterization of stresses, and (c) description of indigenous, adaptive and innovative approach. The homogenized approach allows the project researchers to compare results and learn from each others and from the traditional practices in other sites. An interdisciplinary approach to the methodology brings together local and Flemish experts in ecology, economy, soil and water science, agriculture, pastoralism, and forestry. These are supplemented by experiences in environmental conservation, dryland ecosystem research, and dryland agriculture available to UNESCO, UNU, ICARDA. SUMAMAD supported activities aim to:

1. Facilitate the sustainable and integrated management of marginal drylands and their natural resources, in collaboration with dryland users
2. Investigate alternatives and non-conventional sources of water and encourage their use
3. Promote healthy living conditions
4. Support efforts of researchers and scientists in the targeted region in strengthening the conservation of their natural resources and protecting the environment through rehabilitation of degraded marginal lands and increased knowledge sharing
5. Support on-going scientific capacity-building programmes, with emphasis on south-south collaboration
6. Disseminate scientific findings through the networks of UNESCO, UNU, ICARDA, thus ensuring a transfer of knowledge to other arid and semi-arid regions of developing countries

7. Local outreaching by way of national workshops

Support is provided to each sub-project to cover the expense of data collection, surveys, exploration of income generation and conservation practices. Support is also provided for scientific exchanges, annual workshops, publications, and annual training activities at country level. Through small scale projects within the FUST framework, SUMAMAD participants are also provided with the opportunity to attend and participate in major conferences pertaining to dryland management.

VIII.2 MANAGEMENT STRUCTURE:

The core management group of is composed of UNESCO, ICARDA, and UNU. Project financial management is conducted by UNESCO-HQ SUMAMAD office led by Dr. Thomas Schaaf. For each country, a national coordinator will oversee and ensure project implementation in the country. The core management team, the national coordinators, and representatives from the Government of Flanders form a Steering committee that meets once a year during the annual SUMAMAD conference/workshop. The steering committee may invite other Flemish and International dryland experts to attend the meeting and provide advice and guidance on project implementation. In addition to coordinating the implementation at country level, national coordinators are responsible for progress reporting, annual workplan proposal, and funding requests. An annual evaluation of the project progress is conducted during the annual workshop. These workshops serve as platform to exchange experiences, identify lessons learned, and report and synthesize scientific findings. Annual training workshops are held in each country with local community, elders, women, and opinion and decision makers. Conservation and income generating practices are discussed in these workshops.

VIII.3 PROGRESS AND ACCOMPLISHMENTS

The SUMAMAD project involves a wide range of diverse research priorities. Although a common methodology may have been adopted by the project participants for assessment of dryland stresses, income generating activities, and water management, there remains significant site-to-site variations which complicate the process of detailed site-based progress evaluation.

Overall, however, SUMMAMAD accomplished much of its annual work plans, which were drawn during each annual project workshop. The project held three annual workshops during the evaluation period, and in each workshop, participants provided country report including a synthesis of research progress in each country.

In the third project workshop (first since Flemish support started), which was held in Djerba, Tunisia, 2004, most participants provided technical progress report, with emphasis on site characterization efforts, including (1) assessment of environmental degradation in the Heihe River Basin (china), (2) the role of nature reserves in combating desertification in the Hunshandake Sandland (China), (3) utilization of remotes sensing, GIS, and site-surveys in assessing habitat degradation (Egypt), (4) natural bioremediation of floodwater pollution (Iran), (5) socio-economic surveys, sustainable management and income generating activities (Jordan, Syria, and Tunisia), and climate change and desertification (Uzbekistan). Flemish counterparts (Prof. Dirk Raes, KUL and Prof. Donald Gabriels from Ghent University) reported the results of joint research efforts in Iran and Tunisia with participation from local researchers. The workshop also included a self assessment session, during which participant identified the reasons for slow progress in compiling site assessment data. They also identified training needs in data collection and scientific exchanges and visits. Together the project management and participants emphasized the need for timely reporting and for homogenized reporting formats. At a project level, a joint presentation by Dr. Zafar Adeel, and Ms Caroline King initiated the project-wide discussion of Assessment Methodology for Sustainable Management of Marginal Drylands. Discussions led to identifying three key assessment indicators that are common among all sites (1) land degradation (2) rehabilitation and (3) water management.

The fourth project workshop, held in Pakistan (2006) was delayed from its original intended time (2005) due to the devastating 2005 Earthquake in the country. The workshop, organized in cooperation with the Pakistan Research Council in Water Resources provided striking examples of the significant progress in each of the SUMAMAD projects. All projects have progressed from site characterization studies, which

dominated the first three years of the project into extensive community based actions on rehabilitation, sustainable management, income generating activities, and empowerment of Drylands dwellers within study sites. In China, for example, a study utilizing several years of data from the Hunshandake Sandland protected area assessed the role of natural soil seed banks in habitat regeneration efforts. The team reported the results of an innovative approach that replaces tree planting and aerial seeding with a natural plant succession that incorporate naturally occurring habitat with site protection to reestablish vegetation in degraded land. Similarly, in Egypt, the participatory approach used by the SUMAMAD project team achieved national prominence and recognition after it has successfully identified and addressed one of the most stressing needs of dryland dwellers in the Omayed Biosphere reserve, which is access to clean drinking water. The solution proposed and adopted by the team relies on innovative, cost effective, small-scale solar powered systems to desalinate ground water for drinking purposes in several sites. The team combined this approach with income generating activities that empowers women (sewing) as well as with efforts to provide local women with identification cards leading to improved protection of their rights including inheritance. In Iran, and facing difficult situations brought on by apparently illegal land acquisition, the extension team, which includes female members, conducted detailed technical surveys, and held numerous meetings with locals, in order to initiate the development of Aquitopia cooperatives based on artificial ground water recharge (ARG) to support subsistent farming of marginal Drylands in the Gareh Bygone Plane. The project team also continued to investigate the relationship between plant cover and soil's physical and chemical characteristics. In Pakistan, SUMAMAD researchers conducted and evaluated an innovative supplementary income generation activities based on saline fish farming in the Lal-sohanra Bio-sphere Reserve. Their study included assessment of ground water sources salinity, establishing and stocking fish ponds in four different sites, and monitoring pond conditions, fish growth and process productivity. The conclusion drawn from the teams' research identified a system combining live-stock and fish farming as an effective mean to improve the livelihood of dryland inhabitants, particularly when a major saline ground water source may be available. In Syria, the SUMAMAD-ICARDA team investigated, within a participatory learning approach, several nutrient recycling strategies that include, among others, the utilization of green manure, crop rotations and crop selection. In addition, the team investigated the feasibility of relying on small dams to provide water for both usage and ground water recharge. A national workshop on Sustainable Management of Rural Drylands was also held with participation from policy makers, researchers, planners, extension workers, and farmers.

The technical proceedings of fifth workshop, which was held in Aleppo, Syria, Nov, 2006, were not finalized by the time of this evaluation. However, the workshop report indicated notable achievements in study sites, particularly in the area of exploration and promotion of traditional and innovative practices for dryland management. Some projects reported extending their research and site assessment activities to additional environmentally threatened sites. In Egypt, for example, the SUMAMAD team conducted water quality monitoring at the Moghra oasis and a socioeconomic survey on the prevalence of waterborne diseases at Burg el Arab. In Gareh Bygone Plain, Iran, studies continued on the effects of artificial recharge activities on water quality and nitrate contamination. Studies in the Zeuss Koutine Watershed, Tunisia included a survey of water harvesting infrastructures and assessment of their environmental and socio-economic sustainability. Techniques to improve water and nutrient management in an area of intensifying agricultural production around Jabboul Salt Lake, Syria, were evaluated through Participatory Learning Action Research with local communities. In Karnap Chul, Uzbekistan, the impacts of grazing pressure on bio diversity was being studied and approaches to alleviate these impacts were being discussed. Finally, the workshop identified three themes and focus areas for a potential phase II. These are

Scientific studies
- Restoration/rehabilitation of degraded drylands
- water conservation/water harvesting
- improvement of dryland agriculture
- improvement of dryland husbandry/livestock

Policy studies/schemes
- scenarios for land use changes
- economic valuation of dryland services
- environmental education/outreach
- hybrid knowledge system

Alternative income-generating activities
- ecotourism
- handicraft production

- medicinal plants
- diversification options

In addition to the large scale project, FUST provided resources through small scale initiatives to allow SUMAMAD partners to present their projects in international conferences. These activities included support for participation in the international scientific conference on "The Future of Drylands" held in Tunis (Tunisia) from 19 to 21 June 2006 within the context of the International Year of Deserts and Desertification and the international conference on Desertification and the International Policy Imperative (DIPI), Algiers, 17 to 19 December 2006. In both cases, several SUMAMAD partners were actively involved in the conference by presenting papers on their respective work and/or by chairing conference sessions.

Several exchange and training activities were also carried out during the evaluated period. Flemish students Mr. Wouter Belien (K.U. Leuven) and Mr. Peter Corens (K.U. of Leuven) were supported to conduct field research and studies in Pakistan and Iran, respectively. Ms Marsa Waseem (Egypt) studied in Belgium; and Dr Muhtor Nasyrov (Uzbekistan) visited Belgium on an exchange visit. Flemish scientists were also actively involved in each of the project's annual workshops. Other small scale initiatives will be discussed separately in subsequent section.

VIII.4 FINDINGS AND LESSONS LEARNED

- Sustainable Management of Marginal Drylands is one of the key challenges that will face humanity. Marginal dry lands are highly susceptible to climatic variability. Increased desertification, due to direct human activities or indirectly through climatic change will only exacerbate the situation. SUMAMAD research, being a combination of physical and socio-economic scientific research presents potentially viable models for sustainability. These models take into account the physical and human dimensions of the problem and include a truly participatory learning and development approach. UNESCO, the Flemish Government, the Chinese Academy of Science, ICARDA, and UNU are all to be commended for supporting these activities.

- Before FUST support, SUMAMAD project was only able to support partial activities such as holding an annual conference and minimal site characterization studies. After FUST support, the various sub-projects were empowered to expand their activities into an international program.

- There is a significant support for SUMAMAD activities among beneficiary countries. This support is manifested at local level and national levels. On several occasions, reports indicate participation and occasional intervention by high level decision makers on behalf of SUMAMAD efforts. The participatory approach, national workshops, and the positive impact on the lives of local residents have contributed to SUMAMAD's credibility.

- UNESCO HQ is commended for the effective management of the project. The team is also commended for the excellent editorial support its members provide to the project proceedings and other publications.

- Continuation of SUMAMAD, at least for the near-future, will depend on the continuing support from the Flemish Government. However, the role of Flemish counterparts is different than their roles in other FUST projects. In SUMAMAD, interested Flemish Scientists are conducting interdisciplinary research in direct partnerships with local researchers as demonstrated by the workshops' proceedings. The existence of biosphere reserves infrastructures, along with immense local knowledge and expertise provide a great potential for young Flemish scientists to conduct innovative research on drylands management and for SUMAMAD partners to become more exposed to research conducted in Flemish universities.

- Taken individually, SUMAMAD sub-projects may appear disconnected. UNU's efforts in synthesizing the accomplishments of individual projects and in coordinating the development and implementation of a common assessment framework played a major role in improving the coherence of projects. However, and as noted by the project partners during the Aleppo workshop, more concerted efforts will be needed in that regard.

- At the technical level, and as demonstrated by the proceedings of the third and fourth workshops, SUMAMAD research projects are models of interdisciplinary studies. The reviewer is impressed with the thoroughness of the site characterization studies, socio-economic surveys, and participatory approaches. Cognizant of the fact that SUMAMAD activities are basically pilot demonstration projects, this reviewer would take a cautious approach towards the generality of income generating outcome and policy implications pending more detailed project synthesis and economic studies.

VIII.5 CONSTRAINTS

- All of SUMAMAD projects rely on participatory research and capacity building. As demonstration projects, they are poised to make local and regional impacts. One must guard however, against excessive visits by dignitaries, students, and other project participants to these demonstration sites. Such visits may create unrealistic expectations, contribute to the stakeholder fatigue phenomena, or decrease the interest of local communities in continuing participation.

- While sub-projects receive only modest financial contributions, the number of activities required from each project is substantial. This issue is raised in every annual workshop and has been a source of concern among partners who feel that they can provide better contributions if they are to focus on no more than two of the standard project activities. The reviewer agrees with their assessment.

- Delays in fund disbursement have initially affected the project. UNESCO-HQ, working with UNU managed to resolve this issue satisfactorily.

- Despite of several discussions of training needs and priorities, the level of joint training activities remains below what the community has identified as necessary. Several of SUMAMAD partners are in fact training providers. Yet the project does not seem to utilize these training opportunities at maximum potential.

- The geographic diversity, the large number of sub-project activities, and the complexity of drylands soil, vegetation, hydrology, and human dimensions, have constrained the ability to synthesize the results of SUMAMAD projects into a coherent document that address scientific and well as policy issues. As noted by project partners, without such document, SUMAMAD's ability to attract additional funding sources and capacity to extend pilot demonstration projects into actual projects will be curtailed. Both Flemish counterparts, UNU, and UNESCO are well positioned to assist in the preparation of such document. Furthermore, ICARDA's experiences in the process of converting research results into applications would be of great help.

VIII.6 OBSERVATIONS FROM THE SITE VISIT TO ALEXANDRIA EGYPT

- The site visit to Egypt's SUMAMAD project highlighted the importance of the charisma, dedication, and technical and administrative competence of project coordinators. Many interviews with local residents, researchers, university faculty, local policy makers, and technical partners emphasized the personal impacts of Prof. Boshra Salem's, and her capacity to authentically demonstrate the above qualities, on the success of the project. Noteworthy is also the commitment of Mr. Andreas Schneider, the technical lead on the Solar Powered Pilot System development and manufacturing.

- Sincere local outreach efforts to residents, policy makers, NGOS, the press, and decision makers can yield un-expected support to FUST projects. A case in point is the ability of the highly dynamic SUMAMAD project coordinator in Egypt to integrate the project's activities within local environmental protection, health improvement, and development efforts.

- Participatory approach, coupled with beneficiaries' financial and labor investment in projects are important facets of development and life improvement projects. During a visit to a local beneficiary of the solar powered desalinization systems, the home owner and family patriarch took great pride in demonstrating his knowledge of the basics of the system and his adult children

demonstrated their ability to troubleshoot some system problems. At risk of stating the obvious, these visits demonstrated that technologically rooted solutions are more likely to succeed and be adopted if the technology can be operated and understood by locals.

- Subtle efforts can empower women in semi-sedentary communities. The effective participation of female students in the project's research, data collection, and outreach activities, are important and commendable. The efforts to obtain identification cards for local women, provide them with sewing machines are also important. It is noteworthy that similar efforts are undertaken in other SUMAMAD projects. For example, female extension workers in Iran actively participate in the project. In the process, and similar to their Egyptian colleagues, they provide excellent models for younger generations.

- Involvement of the National MAB committees yields advantages. The Egyptian MAB committee is very supportive of the project and its leaders, members, and staff, actively assist in project activities.

- There is a great opportunity to form NGOs and civil society initiatives around ecological and environmental conservation and rehabilitation. Young members of the project team in Egypt are cautiously proceeding toward the formation of such NGO. Their cautions are well justified in order to ensure the integrity and independence of such NGOs from political and economic interests.

VIII.7 RECOMMENDATIONS

- SUMAMAD is well positioned to accelerate the dissemination of best-practices and assessment methodology developed at the projects' nine sites to wider audiences. SUMAMAD participants are well positioned, individually, and collectively to assist UNESCO in various training and knowledge transfer activities pertinent to sustainable dryland management. More coordination with programs such as GWADI are strongly encouraged.

- There is a great interest in sustainable management of Drylands in the United States and Australia. UNESCO is encouraged, through the US's and Australia's relevant commissions (IHP and/or MAB) to gauge their possible participation in SUMAMAD. The model adopted by the Chinese Academy of Science can be presented to both countries as a viable model for participation.

- There is a great need for coordinated efforts to synthesize the policy and technical implications of SUMAMAD research over the past 4 years. The reviewer encourages UNESCO, UNU, and Flemish counterpart to provide any reasonable support to this effort. A good start id duly noted in the fifth annual SUMAMAD meeting. The donors and management are strongly encouraged to explore the most effective means to perform such study and to produce the desired document.

- UNESCO and the donors are well positioned to explore increasing the level of training activities associated with SUMAMAD.

- Expanding the on-going scientific exchanges and visits between the 9 participating centers will improve their ability to integrate the work. The participants themselves hold the key to increasing such participation. There are indications that the process of establishing close bilateral relationships between centers with common interests is beginning to emerge. The project management should encourage such efforts and foster these relationships.

- SUMAMAD centers are well positioned to host more visits of Flemish Scientists and to work jointly on research. Both the Flemish scientists and project participants are encouraged to identify means that maximize such opportunities.

VIII.8 CONCLUSION

SUMAMAD has been successful in implementing it goals. The 9 demonstration projects have all been highly successful in improving knowledge of the requirements for sustainable marginal dryland

management. The SUMAMAD network of research centers and biosphere reserves is now poised to make significant contributions to the science of dryland assessment and management through their design and implementation of common assessment framework and the exchange of experiences in sustainable income generating activities. The project is an excellent candidate for continuation as well as for increased financial support. It is also a good candidate for expansion of its geographic extent. The various projects have been highly effective in utilizing Flemish, UNU, and ICARDA support to conduct activities that are relevant to UNESCO's priorities.

IX. DOCUMENTS REVIEWED

IX.1 FUST-GENERAL DOCUMENTS:

1. Agreement on the UNESCO/Flanders Trust Fund for the Support of UNESCO's Activities in the Field of Sciences, Phase II, June 09, 2006
2. Agreement on the UNESCO/Flanders Trust Fund for the Support of UNESCO's Activities in the Field of Sciences, July, 2006
3. The Flanders UNESCO Trust Fund (FUST 1999-2003) - Evaluation Report - August 2002, Prepared By: G.L.Holland and H.S.Wheater
4. UNESCO/Flanders Funds-in-Trust for the Support of UNESCO's activities in the Field of Science, 12th Meeting of the Steering Committee, 11 December 2006 at Oostende, Briefing Note
5. UNESCO/Flanders Funds-in-Trust for the Support of UNESCO's activities in the Field of Science, 12th Meeting of the Steering Committee, 11 Dec. 2006 at Oostende, Financial Statement
6. Sustainable Management of Marginal Drylands (SUMAMAD), Progress Report, Dec. 2006
7. Networking in the water sector: Suggestions and examples for best practice, Report of the Community of Practice on Networking for W-E-T (Water-Education-Training). IHP Document.
8. *UNESCO/Flanders Funds-in-Trust for the Support of UNESCO's activities in the Field of Science.* Eleventh Meeting of the Steering Committee. *24 May 2006*
9. UNESCO/Flanders Funds-in-Trust for the Support of UNESCO's activities in the Field of Science. Tenth Meeting of the Steering Committee. 8 December 2005
10.

IX.2 ODINAFRICA

11. UNESCO/Flanders Funds-in-Trust for the Support of UNESCO's activities in the Field of Science. Tenth Meeting of the Steering Committee. 8 December 2005
12. UNESCO/Flanders Funds-in-Trust for the Support of UNESCO's activities in the Field of Science. Eleventh Meeting of the Steering Committee. 24 May 2006
13. Ocean Data and Information Network for Africa - Third Phase (ODINAFRICA-III) Project Proposal for Submission to the Government of Flanders (FUST 2004-2007).Version 23/20/03
14. Ocean Data and Information Network for Africa: Progress Report May 06
15. Ocean Data and Information Network for Africa: Progress Report Oct 06
16. Ocean Data and Information Network for Africa: Progress Report Dec 06
17. ODINAFRICA Project Management Committee Meeting. Summary Report. 30 January - 3 February 2006. IOC/INF-1225
18. ODINAFRICA Project Steering Committee Meeting. Summary Report. 26-28 April 2006 IOC/INF-1230
19. First ODINAFRICA-III Training Course in Marine Data Management, Oostende, Belgium, 11-29 April 2005. IOC Training Course Report No. 79.
20. First ODINAFRICA-III Training Course in Marine Data Management. Oostende, Belgium. April 11 – 29, 2005. IOC Training Course Report No. 60
21. Marine Information Management Training Course: ODINAFRICA. Ostende 14 Aug-4 Sept 2005.
22. IODE/GOOS/JCOMM Combined Modeling and Data Management Training Workshop ("Jamboree"), Oostende, Belgium, 5-10 September 2005. IOC Training Course Report No. 86.
23. First ODINAFRICA-III Training Course in Website Improvement Training Course Progress Report. Oostende, Belgium, December 5-9, 2005
24. Second ODINAFRICA-III Training Course in Website Improvement: Training Course Final Report. IOC Training Course Report No. OWIP2
25. ODINAFRICA: Marine Biodiversity Data Mobilisation Workshop on Molluscs. Oostende, Belgium. March 13-22, 2006 Training Course Report No. 88.
26. ODINAFRICA: Marine Biodiversity Data Mobilisation Workshop on Sponges. Oostende, Belgium. November 4-18, 2006. Training Course Report N° 89.
27. ODINAFRICA Marine Atlas Project - Data Mining and Coordination Workshops. Oostende, Belgium. June 6-23, 2006. IOC Training Course Report.
28. ODINAFRICA Marine Atlas Project - Data Assembly Workshop. Oostende, Belgium. November 28-December 1, 2006. IOC Training Course Report.
29. The African OceanPortal. Report of the Special OceanPortal Editors Meeting held in Nairobi, Kenya. 7-10 February 2007
30. Report on UNESCO/IOC and NEPAD COSMAR Coordination and Cooperation Meeting. Oostende, Belgium. 1 to 2 February 2006
31. Development of an African repository for electronic publications. Project Proposal for Submission to the Government of Flanders (FUST 2004-2007). 23 October 2003

32. Development of an African repository for electronic publications. Progress Report May06
33. Final Report on the FUST Project "Development of an African Repository for Electronic Publications (ODINPubAfrica). Final Report Oct06
34. Integrated Expert and Training System for Oceanographic Data and Information Management ODIMeX: Project Proposal for Submission to the Government of Flanders (FUST 2004-2007). Version 1.2: 23 October 2003
35. Integrated Expert and Training System for Oceanographic Data and Information Management ODIMeX: Progress Report May06
36. Integrated Expert and Training System for Oceanographic Data and Information Management ODIMeX: Progress Report Oct06
37. Development of an "easy-to-install" deployment package of an electronic repository of marine science publications (e-repository in a box): Small Scale Activity Proposal.
38. ODINAFRICA WINDOW Newsletter Volume 17, Number 4, December 2006
39. ODINAFRICA WINDOW Newsletter, Volume 18, Number 1, May 2007
40. COSMAR News newsletter. December 2006 - Issue 9
41. COSMAR News newsletter. April 2007 - Issue 10

IX.3 FRIEND-NILE

42. Capacity Building and Networking of the Nile Countries: FRIEND (Flow Regime from International Experimental and Network Data) Final Report (Technical and Status Report), 2007
43. Capacity Building and Networking of the Nile Countries: FRIEND (Flow Regime from International Experimental and Network Data) Nile Project. Progress Report, Dec. 2006
44. Capacity Building and Networking of the Nile Countries: FRIEND (Flow Regime from International Experimental and Network Data) Nile Project (513RAB2042), Final Status Report, August, 2006
45. Support to Flow regimes from International Experimental and Network data of the Nile Project (FRIEND/NILE) Phase II, Progress Report, Dec, 11, 2006
46. Secondment of Prof. Willy Bauwens to IHP, Implementation Status Report, Dec. 11, 2006.
47. UNESCO/Flanders Funds-in-Trust for the Support of UNESCO's activities in the Field of Science, Eleventh Meeting of the Steering Committee, June 2006.
48. Report on the Third Project Management Meeting of the, February 2004, Aswan, Egypt
49. Report on the Fourth Project Management Meeting of, February 2005, Addis Ababa, Ethiopia
50. Report on the Fifth Project Management Meeting Nov. 2005, Sharm El-Shiekh, Egypt
51. Report on the Sixth Project Management Meeting Feb. 2006, Cairo, Egypt
52. Report on the Seventh Project Management Meeting, Jan. 2007, Entebbe, Uganda
53. Overall Completion Report On UNESCO/Flanders Funds in Trust Project (2002/2005) The FRIEND/Nile Project, 2006.
54. Proceedings of The 6th Steering Committee of The FRIEND/Nile Project, Feb. 2004, Aswan, Egypt
55. Proceedings of The 7th Steering Committee Of The FRIEND/Nile Project, Mombassa, Kenya
56. Proceedings of The 8th Steering Committee of The FRIEND/Nile Project, Feb. 2005, Addis Ababa, Ethiopia,
57. Drought and Low-Flows Analysis Component, Final Report, 2002-2005
58. Drought and Low-Flows Analysis Component, Annual Report, 2004
59. Drought and Low-Flows Analysis Component, Annual Report, 2005
60. Flood Frequency Analysis Component (FFA) Final Report, 2001-2005
61. Flood Frequency Analysis Component (FFA) Annual Report, 2004
62. Rainfall-Runoff Research Component, Finalw Report 2002 - 2005
63. Rainfall-Runoff Research Component, First Phase Report 2004
64. Final Report on the Sediment Transport & Watershed Management Component (STWMC), 2002-2005
65. Annual report on the Sediment Transport and Watershed Management Component, 2004
66. FRIEND/NILE BASIN PROJECT – STAGE II, TECHNICAL PROJECT DOCUMENT, June 2006
67. FRIEND/NILE BASIN PROJECT –TECHNICAL PROJECT DOCUMENT, April/May 2006
68. Data Availability in the Nile Basin, Report by Eng. Ahmed Fahmy prepared under contract from UCO/FRIEND-Nile August, 2006
69. Various Presentations on FRIEND-NILE by Drs. Al Weshah and Dr. Zaki
70. Proceedings (all papers) of the FRIEND Nile Conference "Towards A Better Cooperation", Nov, 2005, Sharm El-Shaikh, Egypt,
71. Introduction to GIS & Water Strategy Man (WSM-DSS), Training, Phase II, Launching Workshop, August, 2006, Cairo, Egypt
72. Two Dimensional Hydraulic Modeling of Complex Watersheds with SMS
73. Hydrologic Modeling Using GIS and the Watershed Modeling Systems WMS.
74. Stochastic Modelling Component & Time Series Analysis
75. The Soil and Water Assessment Tool, The Nile Catchment
76. Press Clips on the FN Project in Egyptian and other regional Newspapers.

IX.4 PALESTINE

77. UNESCO-Flanders Science Fund-In-Trust Project on Capacity Building and Training on Environmental Planning and Management in Palestine: Phase-II, Dec 11, 2006
78. Final Reports from Projects Sponsored under the first call for proposals
79. Final Reports from Projects Sponsored under the second call for proposals
80. Complete Training Course Materials (Presentations, Exercises, and Sessions) for
81. Groundwater wells in the Northern Governorates in the West Bank: siting, design, construction, testing & operation and maintenance & rehabilitation" , Dec, 2005
82. Spectroscopic and Chromatographic Instruments for Water Analysis" held at the Water Research Center, AlAzhar University Gaza, 03– 25 December, 2005
83. Integrated Water Project Management, Dec, 2005
84. Environmental Impact Assessment Training Course, Dec, 2005
85. Plan of Cooperation, UNESCO and the Government of the Palestinian Territories, July 2001.
86. Capacity Building and Training in Environmental Planning and Management, Phase II, Project Outline. Jan, 2001.
87. Report on the 2nd Steering Committee (SC) and 1st Technical Network Commission (TNC) Meeting, Cairo, Egypt, April 2003
88. Report on the 2nd Steering Committee (SC) and 1st Technical Network Commission Meeting (TNC), Cairo, Egypt, April 2004
89. Report on the 3rd Steering Committee (SC) and 3rd Technical Network Commission Meeting (TNC), Amman, Jordan, July 2005
90. Report on the 4th Technical Network Commission Meeting (TNC), Amman, Jordan, Dec. 2006
91. Report on Prof. W. Bauwens Mission to Palestine. May-June, 2005
92. Project InfoPack developed by Prof. W. Bauwens
93. Letters of Interest in the establishment of Phase III from various water sector actors in Palestine.

IX.5 FTE-WATER

94. Framework Programme for Research Education and Training in the Water Sector (FETWater) in Integrated Water Resource Management, Draft Project Proposal and Continuation of an existing Flanders UNESCO Science Trust Fund (FUST) project Phase 2
95. An integrated assessment of socio-economic and environmental issues of the Orange/Senqu River Basin, Training Report, ORASELEARN study tour 13-26 November 2005
96. Water Policy White Paper, South Africa, SECTION B: NEW NATIONAL WATER POLICYWATER RESOURCE MANAGEMENT IN SOUTH AFRICA- PRINCIPLES AND THE POLICY VISION From: http://easd.org.za/sapol/waterwp3.htm
97. FETWATER Progress Report, April 2006
98. FETWATER Phase II, Implementation Status Report, Dec, 2006.
99. FETWATER Progress Report, June 2007
100. Annual Report, Water Research Commission, South Africa, 2006-2007
101. Groundwater Resource Directed Measures Manual, Roger Parsons & Johan Wentzel, South Africa, Department of Forestry
102. CAPACITY BUILDING AND NETWORKING FOR WATER RESOURCES MANAGEMENT IN SOUTHERN AFRICA , 2002-2005, Follow up on the DWAF/UNESCO/WMO Mission (South Africa). WORK PLAN
103. PROPOSAL: A PILOT TRAINING NETWORK TO SUPPORT DETERMINATION OF RESOURCE DIRECT MEASURES FOR WATER RESOURCES, Prepared by H M MacKay, Water Research Commission, South Africa and A Hugo, Department of Water Affairs and Forestry, South Africa

IX.6 CAZALAC

104. UNESCO / Flanders – Chilean Government Covenant: Water Center for Arid and Semi-Arid Zones of Latin America and The Caribbean Project., Support for implementing The Regional Water Center for Arid and Semi-Arid Zones in Latin America and the Caribbean – Cazalac, ACTIVITY REPORT APRIL 2006- APRIL 2007. Brochure
105. CAZALAC Mission Statement: http://www.cazalac.org/mensaje.php
106. Escuela Latinoamericana de Física de Suelos – Tema Hidrología de Suelos. (La Serena, 2 - 14 de noviembre de 2003) http://www.cazalac.org/elafis03.php
107. Construcción de un Simulador de Lluvia, http://www.cazalac.org/sim_lluv.php
108. "GUÍA METODOLÓGICA PARA LA ELABORACIÓN DEL MAPA DE ZONAS ÁRIDAS, SEMIÁRIDAS Y SUBHÚMEDAS SECAS DE AMÉRICA LATINA Y EL CARIBE" http://www.cazalac.org/documentos/Guia_Mapa_ZA_ALC.pdf

109. Evaluation of the infiltration process in water Harvesting systems in drylands of Chile, Marjolein DE WEIRDT; D. Gabriels - (2005)
110. Evaluation of water erosion risks in drylands of Chile Arne BAERT; Donald Gabriels - (2005)
111. Estimation of sediment transport in a watershed in an arid region of north Chile Bram Vandekerckhove; D. Gabriels; W. Cornelis - (2006)
112. Evaluation of infiltration furrows for the captation of runoff water in a semiarid region in Chile Katrijn Alaerts; D.Gabriels; W. Cornelis - (2006)
113. The effect of rock fragments on hydrophysical properties of a small watershed in north Chile J. Baetens; D. Gabriels; W. Cornelis - (2006)
114. Scale dependent influence of rock fragment cover on soil infiltration, runoff and sediment yield in arid zones of Chile L. Loosvelt; D. Gabriels; W. Cornelis -(2007)

IX.7 SUMAMAD

115. Sustainable Management of Marginal Drylands (SUMAMAD), UNESCO Project Document, May 2006
116. Sustainable Management of Marginal Drylands (SUMAMAD) Progress Report, May 2006
117. NU-UNESCO-ICARDA Joint Project on The Sustainable Management of Marginal Drylands (SUMAMAD) SUBSTANTIVE REPORT 2005, Submitted by Ms Caroline King, Project Officer, UNU-INWEH, November 29, 2005
118. Proceedings, Third Project Workshop Sustainable Management of Marginal Drylands (SUMAMAD) Djerba, Tunisia, 11-15 Dec. 2005
119. Proceedings, Fourth Project Workshop Sustainable Management of Marginal Drylands (SUMAMAD) Islam Abad, Pakistan, 27-31 Jan. 2006
120. Fifth Project Workshop Sustainable Management of Marginal Drylands (SUMAMAD) Aleppo (Syria) 12-17 November, 2006 Workshop Report
121. Proceedings of the Fifth Project Workshop Sustainable Management of Marginal Drylands (SUMAMAD) Aleppo (Syria) 12-17 November, 2006 (Published in 2007)
122. Development of A comprehensive Assessment Methodology, Presentation by Z. Adeel, C. King, and D. McNab, 3rd Projects Meeting.
123. SUMAMAD Workplan (2007)
124. Individual Country Reports (2005)
125. Individual Country Reports (2004)
126. A Creative Approach to Environmental Education, Teaching Resource Kit for Dryland Countries,
127. SUMAMAD Project Brochure.
128. Amal, A documentary film produced by the Egypt SUMAMAD Project concerning access to fresh water through Solar Powered Desalinization Unites.
129. Media clips from Egyptian Newspapers Regarding Egypt SUMAMAD
130. SUMAMAD Egypt progress report, 2004
131. SUMAMAD Egypt progress reports, 2005
132. SUMAMAD Egypt progress reports, 2006
133. SUMAMAD Egypt progress reports, 2007
134. Ecosystem Valuation in El Omayed Biosphere Reserve, Presentation by Ms. Marwa Gaber
135. Site Characterization activities in The Moghra Oasis, Presentation by Ms. Marwa Wassem.
136. Soils of the Northwestern Coastal Zones of Egypt, SUMAMAD Presentation by Dr. Moahamad Rashad.
137. Egypt SUMAMAMD, Comprehensive Overview Presentation by Prof. Boshra Salem.
138. SUMAMAD Outreach Activities, Project Presentation by
139. SUMAMAD Communication and Information Management, Project presentation by Dr. Cathy Lee
140. SUMAMAD A global overview, Project presentation by Dr. Tomas Schaaf
141. Outreach Activities – complementary to Projects: Sustainable Management of Marginal Drylands (SUMAMAD; code 513/INT/2000); and IHP projects CAZALAC (code 513/RLA/2040) and FRIEND/NILE (code 513/RAB/2042), Progress Report Dec. 2006
142. Socio-economical and Eco-hydrological approach for the restoration of the Merja Zerga lagoon; Morocco, Workshop Report, Nov. 2006

X. ACRONYMS

ACEP	African Coelacanth Ecosystem Programme
ADCP	Acoustic Doppler Current Profiler
AFRIAMSLIC	Africa Regional Group of International Association of Marine Science Libraries and Information Centres
AFRILIB	Collection of oceanographic publications from African libraries
AfrOBIS	African node for Ocean Biodiversity Information System
ASFA	Aquatic Sciences and Fisheries Abstracts
CAZALAC	Centro del Agua para Zonas Aridas y Semiaridas de America Latina y el Caribe
CLIVAR	Climate Variability (CLIVAR) study
COSMAR	Coastal and Marine Programme of NEPAD
DNA	Designated National Agency
DLFA	Drought and Low Flow Analysis
DWAF	Department of Water Affairs and Forestry, South Africa
EIA	Environmental Impact Assessment
EU	European Union
FETWater	Framework Programme for Research Education and Training in Water
FFA	Flood Frequency Analysis
FRIEND	Flow Regimes from International Experimental and Network Data
GEF	Global Environment Facility of the World Bank
GEWEX	Global Water and Energy Cycle Experiment (GEWEX)
GLOSS	Global Sea Level Observing System
GOOS	Global Ocean Observing System
GOOS-AFRICA	African GOOS sub-system
GTS	Global Telecommunication System
G-WADI	Water and Development Information for Arid Lands- A Global Network
GWP-SA	Global Water Partnership-South Africa
IAMSLIC	International Association of Aquatic and Marine Science Libraries and Information Centers
ICAM	Integrated Coastal Area Management
ICARDA	International Center for Agricultural Research in Dry Areas
IHE	UNESCO Institute for Water Education, Netherlands
IHP	International Hydrological Programme
ILMS	Integrated Library Management System
IMS	Institute of Marine Sciences
INSTM	Institut National des Sciences et Technologies de la Mer
IODE	International Oceanographic Data and Information Exchange
IOC	Intergovernmental Oceanographic Commission
IOCEA	IOC Central Eastern Atlantic
IOCWIO	IOC Western Indian Ocean
IT	Information Technology
IUCN	The World Conservation Union
IUPWARE	Flanders Inter-University Program In Water Resources
IWRM	Integrated Water Resources Management
JCOMM	Joint WMO/IOC Technical Commission of Oceanography & Marine Meteorology
MAB	Man and the Biosphere
MAMA	Mediterranean Network to Assess and Upgrade Monitoring and Forecasting Activity
MASDEA	Marine Species Database for Eastern Africa
MEDAR/MEDATLAS	Mediterranean Data Archaeology and Rescue (EU project)
MedGOOS	Mediterranean GOOS sub-system
MFSTEP	Mediterranean ocean Forecasting System Towards Environmental Prediction (EU project)
NWA	South Africa National Water Act
NBI	Nile Basin Initiative
NEPAD	New Partnership for Africa's Development
NODC	National Oceanographic Data Center
OBIS	Ocean Biogeographic Information System
OceanDocs	Electronic Repository Network on Oceanography and Marine Science
ODIMeX	Integrated Expert & Training System for Oceanographic Data & Information

	Management
ODINAFRICA	Ocean Data and Information Network for Africa
ODINEA	Ocean Data and Information Network for Eastern Africa
ODINPubAfrica	"Electronic repository" of publications on marine research and management in Africa
PMC	Project Management Committee
PSC	Project Steering Committee
RDM	Resource Directed Measures
RECOSCIX	Regional Cooperation in Scientific Information Exchange
RRM	Rainfall Runoff Modeling
ROSTA	Regional Office for Science and Technology in Africa
SADC	Southern Africa Development Community
SeaDataNet	Pan-European Marine Data Management Network
SMS	Short Message Service and Surface water Modeling System
STIMULATE	Scientific and Technological Information Management in Universities and Libraries: an Active Training Environment
STWM	Sediment Transport and Watershed Management
SUMAMAD:	Sustainable Management of Marginal Drylands
TOR	Term of References
UCO	UNESCO's Cairo Office
UNEP	United Nations Environment Programme
UNU	United Nation University
VLIZ	Vlaams Instituut voor de Zee (Flanders Marine Institute)
WIO	Western Indian Ocean
WIO LaB	Addressing Land Based Activities in the Western Indian Ocean (UNEP-GEF project)
WMO	World Meteorological Organization
WP	Work Package
WRC (Al-Azhar)	Water Research Center at Al Alzhar University, Gaza
WRRI	Water Resources Research Institute (Egypt)