



**Draft Report of the Sixth International Workshop
Sustainable Management of Marginal Drylands (SUMAMAD)**

Xilinhot City, China
6 - 13 September, 2007

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I. Introduction:

The Sixth International Workshop of the Flemish-funded international project “Sustainable Management of Marginal Drylands (SUMAMAD)”, was organized by the Institute of Botany the Chinese Academy of Sciences in Xilinhot City (China), from 6 - 13 September 2007 (including a series of site visits to other locations). The SUMAMAD project is a collaborative project between the UNESCO “Man and the Biosphere (MAB) Programme” and International Hydrological Programme (IHP), the United Nations University - International Network on Water, Environment and Health (UNU-INWEH), and the International Centre for Agricultural Research in the Dry Areas (ICARDA).

II. Objectives:

The main objectives of the workshop were to:

- Review the implementation of the SUMAMAD Project since the start of the Project;
- Discuss the preparation of a scientific publication presenting the results of the SUMAMAD Project since the beginning of the current Project phase;
- Prepare concrete inputs for a second phase of the SUMAMAD Project, in case the Flemish Government of Belgium will agree to finance such a second phase.

III. Saturday 8 September, 2007, Xilingol Hotel:

Opening session

Prof Gaoming Jiang welcomed participants from all eight participating countries (Egypt, Iran, China, Syria, Jordan, Uzbekistan, Pakistan, Tunisia) and three developed countries (Germany, France and Japan) to the workshop. Dr. Jiang gave thanks to the host institutions and sponsors of the workshop, including in particular Mr. Xiushun Wang, General Manager of the Xilinhot Hongyuan Seawater Desalination Company for their financial support which enabled the workshop to include an additional participant from each SUMAMAD participating country. Opening remarks were presented by Mr Shijun Zhang, CFDC (Chinese Foundation for Desertification Control), Mr Meng Ke, Mr. Siqin Bilige, Mayor of Xilingol, Prof. Iwao Kobori, UNU, Dr. Thomas Schaaf, UNESCO, Prof Kang Chong, CAS (read by Miss Hui Liu), Dr. Rudy Herman, Flemish Government of Belgium, Dr Yi Zhijun, UNESCO MAB, China and Dr. Zuhair al Massri, ICARDA.

Overview Presentations

Chair: Prof. Iwao Kobori, UNU

Dr Thomas Schaaf, UNESCO-MAB, presented the objectives of 6th International SUMAMAD Workshop, as listed above. The achievements of the project were reviewed, focusing on the promotion of international collaboration through exchange of scientific information amongst participating countries, study visits, collaboration amongst universities and through the annual review meetings and international workshops in various participating countries, culminating in this Sixth International Workshop in Xilinhot. These activities have fostered synergies amongst the partner organizations. Dr. Schaaf highlighted the international outreach and publications already achieved from these meetings, as well as the two international conferences that were supported by the project, and called on participants to consider how the overall visibility of the project could be further improved. With regard to the development of a new phase for the project, Dr. Schaaf outlined the potential scope and participation, including the possible inclusion of new regions and project sites, depending on donor support.

Dr. Zafar Adeel, UNU-INWEH, made a presentation on ‘Challenges in Drylands: Is sustainable management possible?’, reflecting on the fundamental issues dealt with in the SUMAMAD project, including the application of sustainable management to marginal drylands, the challenge to break the cycle of desertification-poverty-conflict, and the available opportunities to foster innovations and innovative livelihoods. Dr. Adeel focused attention on innovative options that can help reduce pressures that are associated with resource degradation and poverty in drylands, leading to desertification. The new phase of the SUMAMAD project can take the opportunity to pursue these innovative approaches. Finally, Dr. Adeel highlighted a related parallel initiative, led by UNU-INWEH to support global knowledge management on Sustainable Land Management, through which expertise from the SUMAMAD project may be connected to knowledge management activities supported by the Global Environment Facility.

Ms Caroline King, UNU-INWEH, presented an overview of the SUMAMAD project contributions to sustainable development of drylands, including scientific contributions to the evaluation of sustainable management practices, as well as shared experiences in working with dryland communities to improve both environmental and socioeconomic conditions through the improvement of sustainable dryland livelihoods. Selected examples from the SUMAMAD study sites to illustrate these achievements were presented. The successes of the SUMAMAD project teams in influencing policy and sharing lessons with international audiences were also illustrated with examples from the project, to be presented in more detail by the SUMAMAD Team Leaders in Session 2.

Session 1: Technical Presentations on Innovations in Water/Soil Management

Chair: Dr. Rudy Herman, Flemish Government of Belgium

Mr Xiushun Wang, General Manager, Xilinhot Hongyuan Seawater Desalination Company presented a brief introduction to the project for diverting water westward from the Bohai Sea. This presentation was complemented by a video, showing the pumping of water to an altitude of 1,300m, and then enabling its transportation by gravity into the drought areas of Inner Mongolia, Gansu Province and Xinjiang, where it will be desalinated. Participants in the international workshop expressed interest in the likely environmental impacts of this scheme, and how they would be assessed.

Prof. Donald Gabriels, University of Ghent, presented a study on soil erosion and conservation tillage in the loess plateau of northern China. This Chinese-Belgian project examined the influence of tillage practices on soil of water at a series of experimental plots under different tillage treatments, in natural and artificial rainfall conditions. No-till method was found to be most effective for reduction of runoff and erosion, followed by subsoiling, reduced tillage and conservation tillage. However, the use of straw residues also had an effect on reducing the effects of tillage.

Prof. Dirk Raes, U.K. Leuven (Belgium) presented the progress of his work on crop water productivity. This study considers the enhancement of crop growth to produce more biomass per unit of water used in semi-arid regions. This is possible through careful management of environmental and agronomic conditions. Improved irrigation techniques that can reduce runoff, percolation and direct evaporation and careful planning of the timing and amount of irrigation applied, eg through deficit irrigation, can also help to increase the volume of crop yield per unit of water. Prof. Raes presented examples of crop production under different water availability conditions from Turkey and Bolivia, followed by a review of the application of the AquaCrop model to capture the water productivity of various crops under different water stress conditions.

Prof. Atsushi Tsunekawa, ALRC, presented a brief introduction to the Arid Land Research Center and the Global Center of Excellence (GCOE) Program at Tottori University. The GCOE program aims to create a global academic network on dryland science. Cooperating organizations include ICARDA and DRI, and both their respective networks. Prof. Tsunekawa expressed the wish on behalf of the GCOE to engage with the SUMAMAD network and researchers.

Session 2: Presentation of Project Activities by National Coordinators

Chair: Dr. Muhtor Nasyrov, Samarkand University

During this session, each of the nine SUMAMAD Team Leaders presented an overview of the achievements at their study site during the four-year duration of the project, 2003-7. Following each presentation a brief discussion was held amongst the workshop participants on points of interest raised by the presentations. The presentations and points of particular interest to the workshop participants and other Team Leaders are summarized below.

Professor. Gaoming Jiang, Chinese Academy of Sciences, presented the achievements of the SUMAMAD project in the Hunshandake Sandland (HS), China. Before the SUMAMAD project began, a plan using natural process to recover the degraded grassland was proposed by the Chinese Academy of Sciences and accepted by Zhenglan Banner. The study team calculated the degree of desertification in each Gacha (village) of the Banner, based on plant heights, reproductive branches and edible grass production. A natural restoration area was then created in the year 2000 in Bayin Hushu Gacha. The SUMAMAD project studied soil and water conservation in this area, and worked with local people to introduce alternative income generating activities. The study team studied soil seed banks, to demonstrate the potential of the land for natural restoration. Net Primary Production was measured, and Rainfall Use Efficiency calculated. Alternative income generation was supported through the creation of a cooperative company to produce forage, milk, meat and other animal produce including chickens and eggs, as well as to pursue ecotourism activities. Results reported from this site included income generated for local households. This project has made a series of high profile international publications, and has been able to provide recommendations for policy-makers with regard to sustainable grassland management.

Dr. Jinxiu Li, CAREERI, presented the achievements of the CAREERI-supported research team working in the Heihe River Basin (HRB), China, on integrated water resources management 2001-4. The most crucial problem in this inland river basin was the water-use competition between the upper, middle and lower reaches. The research team worked to support the Heihe River Basin Administrative Bureau (HRBAB) River Allocation Plan. Activities addressed improvement of water use efficiency in the middle of the river basin, which was found to consume 70% of the water for irrigation. Flood irrigation efficiency was increased through reduction in the size of irrigation plots and improvements in scheduling through introduction of water right cards and a Water Users Association. Activities in the upper basin addressed grassland rehabilitation through reducing grazing pressures, and increasing income through cooperation between herders and farmers for fodder preparation, breeding, market, labor, investment and sharing of risks. In the lower basin, ecological water requirements were studied, and fencing and enclosure introduced to support riparian forest recovery, as well as medicinal plant production and ecotourism activities. A follow-up project is now focusing on ecohydrology and ecological water requirements at the basin scale.

Prof. Boshra Salem, University of Alexandria presented the achievements of the SUMAMAD project at the Omayed Biosphere Reserve (OBR) and Moghra Oasis, Egypt. The presentation included highlights from activities on soil, vegetation and water conservation and activities to improve local livelihoods through the introduction of sewing activities for women and securing identity cards. The creation of a participatory GIS system and other decision-support applications of activities from this site were emphasized. In particular, the Team Leader has developed management scenarios for communicating to decision-makers, and an approach to the valuation of ecosystem services at the study site. Dr. Salem observed a range of environmental and social factors to be taken into account in the continuing development of these studies in order to ensure ecologically optimal land-use while also taking into account the lifestyle and development needs of the local community. Impacts on decision-making already

achieved by the project were listed, including uptake of the water desalination technology demonstrated during the project activities and planning for the designation of Moghra oasis as a protected area. Workshop participants expressed interest in the economic aspects of the desalination technology. Other Team Leaders expressed concern with regard to the likely environmental impacts of water development projects around the study site that are so far beyond the influence of the project activities, such as the introduction of an irrigation canal.

IV. Sunday 9 September, 2007, Xilingol Hotel:

Session 2 (continued)

Chair: Prof. Dirk Raes, KU Leuven

Dr. Mehrdad Mohammadnia, FARS Research Center, presented the achievements of the SUMAMAD project at the undulating area South West of the Gareh Bygone Plain (GBP), Iran through water harvesting and aquifer management activities. The project activities at Ahmed Abad village required the villagers' participation. Gaining their support was considered one of the greatest challenges for the project at this site, and was a major achievement, enabling the construction and management of a floodwater spreading system. Researchers motivated the villagers to participate in the project through demonstration activities and involved them in the selection of locations for floodwater spreading structures through the creation of a rural cooperative NGO. In addition to decision-making, planning and implementation, this NGO will share resources generated through the project activities and conduct maintenance and monitoring. The project team has made efforts to include women's participation in the project activities. Dr. Mohammadnia presented a series of scientific studies that have been supported through the SUMAMAD project focusing on environmental aspects of the floodwater spreading and groundwater recharge activities. These studies include biodiversity monitoring, jojoba plantation, and extraction of pharmaceutical components from *acacia victoriae*. The latter two studies may provide the basis for additional income generating opportunities at this site. Other SUMAMAD Team Leaders expressed interest in the jojoba plantation and the economics of this activity. Other studies included a study on a less polluting potential replacement for the current use of petroleum mulch for sand dune stabilization. This research involves analysis of body fluids from sowbugs, which provide an effective adhesive for sand.

Mr. Mohammad S. Al-Qawabah, RSCN Jordan, presented the SUMAMAD achievements from the Dana Biosphere Reserve (DBR), Jordan. Highlights from the project achievements included a socioeconomic study conducted in the villages around the Dana Biosphere Reserve, to examine socioeconomic conditions, income sources and options to assist the local community. Following the completion of the socio-economic studies, the project identified an opportunity to support the contribution to local livelihoods that is made by orchard gardens in Dana village. Activities were carried out with local people to improve the terracing and irrigation systems in the gardens. The results of environmental monitoring of water quality, soil erosion and vegetation were presented. The main alternative income generating activities at this site included olive oil soap production and its broad marketing, and ecotourism developed in cooperation with the local community. These experiences were appreciated by local decision-makers and researchers who took part in the National Coordination Seminars held at this site. Mr. Qawabah highlighted in particular the recent success of the 2007 National Seminar.

Ch. Muhammad Akram, PCRWR, presented the SUMAMAD achievements from the Cholistan Desert, Pakistan at Dingarh and Lal Suhanra Biosphere Reserve (D/LSBR). The project activities at this site have addressed the use of saline water for fish farming and vegetable production. A range of scientific experiments have been carried out to demonstrate the potential of these innovative income generating activities in drylands; the potential for broader application of these approaches beyond the study site are being investigated. Scientific results were reported concerning approaches necessary to optimize the

growth of fish and vegetables. The innovative nature of these approaches – previously untried by local communities at the study site – was the subject of considerable interest amongst participating Team Leaders. Questions raised concerned both the scientific aspects of the studies, with regard to management of water quality and health in the fishponds, and also the socioeconomic aspects of the technologies.

Dr. Zuhair Al Masri, ICARDA, presented the achievements of the SUMAMAD project at the Khanasser Valley Integrated Research Site (KVIRS), Syria. Using a new approach to Integrated Natural Resources Management, Farmer Interest Groups were used at this site to pursue participatory technology development for olive production, vetch and barley breeding. Income generation at this site is primarily dependent on cash crops such as wheat and cumin. Livelihood improvements to reduce household expenditures and reduce vulnerability can include the introduction of olives and other fruits and vegetables grown in home gardens. Village saving and credit associations (sanadiq) were also considered in this presentation by Dr. Masri as relevant means of improving local livelihoods and resource management practices. Techniques explored by scientific teams at this site to improve sustainable resource use included micro-catchment water harvesting, small recharge check dams, efficient irrigation, manure use and phospho gypsum as a soil amendment. Dr. Masri presented the results of a survey of different stakeholder groups with regard to the prioritization of these various options to improve the management of marginal dry areas. Farmers' views as to the relative prioritization for exploration of new varieties, provision of micro credit, and improvement of water harvesting differed to those expressed by policy-makers. Therefore an important development for the project was the establishment of working groups through use of a multi-stakeholder process during the National Seminar. This activity was part of a larger effort involving other projects, that is developing a common understanding of the multiple aspects of the use of the environment to support livelihoods. Varied stakeholders included in this process are, farmer groups, government and non-government organizations and the private sector for eco-tourism.

Mr. Mohamed Ouessar, IRA, presented the achievements of the SUMAMAD project activities at the Zeuss-Koutine Watershed (ZKW), Tunisia. Techniques for soil and water conservation highlighted from the project activities included an ongoing study on the use of waste products (margin) from olive processing for soil stabilization and fertility improvement. Results from the project teams studies on groundwater recharge structures (including socioeconomic studies), floodwater harvesting and rangeland rehabilitation were also presented by Mr. Ouessar. The project teams' achievements in contributing to the development of local action plans for combating desertification in Beni Khedache (Medenine) and Chareb Segui were identified as a major contribution to improving policies, involving the team in studies of development issues and challenges in the region associated with the fragility of natural resources, lack of infrastructure, over-dependence on the agricultural sector, limited involvement of local associations and institutions and the large-scale exodus of population through economic migration. Other Team Leaders working on groundwater recharge expressed interest in the studies of recharge structures, and in the quality of recharge water at the study site.

Dr. Muhtor G. Nasyrov, Samarkand University, presented the SUMAMAD project achievements from Karnab Chul (KC), Uzbekistan. This presentation reflected achievements in both environmental data collection, through remote sensing and field surveys, and also in socioeconomic data collection activities focusing on the local human and livestock populations. Several layers of information were incorporated into a GIS database, including climate, soil, biomass, land-use/cover change and socioeconomic characteristics to provide thematic maps. The long-term observation of biomass production in the rangelands showed a decline of plant productivity over the last two seasons, which corresponded to the increasing of total number of domestic animals per grazing area. Simple, affordable and low cost techniques for transplantation, including atriplex from other SUMAMAD sites, were demonstrated to improve the availability of fodder plants. Income generating activities explored at the study site included wool processing, milk derivatives and plant and flower culture. In the design of alternative income generating activities at this site, the study team focused on the needs of women to work from home in

order to be present to care for children, while contributing to housekeeping and strengthening of the families.

IV. Field Visits

A series of field visits to the SUMAMAD project sites and associated landmarks was arranged by the workshop organizers. These included the following:

Sunday, 9 September, 2007, pm: Field trip to Xilingol Biosphere Reserve and the Field Research Station of the Institute of Botany, the Chinese Academy of Sciences.

Monday, 10 September, 2007, am: Field trip to Hunshandake study sites and lunch at Bayinhushu Village

Monday, 10 September, 2007, pm: Visit to Yuanshangdu ruins, second capital of the Yuan Dynasty built by Jenghis Khan

V. Tuesday, 11 September 2007: Yuanshangdu Summer Palace Hotel:

Session 3: Reflections on the Project Achievements and Shortcomings

Chairs: Thomas Schaaf, UNESCO-MAB and Zafar Adeel, UNU-INWEH

During this session, the SUMAMAD Team Leaders were asked to provide their summary comments on the following aspects of the SUMAMAD Project during Phase-1 from 2003 to 2007:

1. scientific accomplishments
2. livelihood improvements
3. capacity building and training
4. policy relevance
5. shortcomings

These comments followed on from the presentations made on preceding days of the workshop on the achievements in each of the participating countries. The following summary incorporates highlights from the presentations and Team Leaders' comments. Tabulated details of the comments made by Team Leaders are included in Annex 2 to this report.

Summary of Scientific Accomplishments During the SUMAMAD Project 2003-2007

The scientific achievements of the SUMAMAD study included data collection, analysis and publication on a range of topics. These may be summarized as follows:

Environmental Monitoring and Data Collection

All eight study teams collected environmental data on different aspects of the water, soil and vegetation conditions at their study sites. In some cases, new environmental monitoring programmes were created, eg for biodiversity monitoring on the Gareh Bygone Plain floodwater spreading area, and for erosion monitoring in Dana Biosphere Reserve. At the Moghra Oasis new studies have been carried out to characterize plants and other resources. In addition, various existing long-term monitoring programmes were supported and enhanced, eg through the purchase of a water quality testing kit for Dana Biosphere Reserve water quality monitoring programme, and continuation of biodiversity monitoring activities in Zeuss Koutine Watershed. Results from studies on soil seed banks, NPP and RUE in the Hunshandak Sandland have demonstrated the previously under recognized potential of the Steppe ecosystem to

regenerate itself, and to perform more efficiently than other ecosystems in terms of water-efficiency, NPP and carbon sequestration. Overall, the availability and quality of scientific data on the environmental characteristics of the selected dryland study sites has been considerably enhanced over the course of the project.

Databases and Decision-support Applications

Digital databases were created to enable the integrated analysis of both environmental and social data. For example, in Uzbekistan, the research team explored the relationships between vegetation characteristics and animal pressures in order to demonstrate to farmers that smaller flocks can be more productive. Both types of information were collected and analyzed in GIS. In Egypt, a participatory GIS (PGIS) system was created to analyze a range of environmental and social data. In Tunisia, a database of digital maps and statistics on water harvesting structures was produced, incorporating socioeconomic data. A multi-criteria decision analysis on groundwater allocation was also developed at this site. The collection, storage, and analysis of this data has created a considerable resource for ongoing scientific investigation in the study areas. In Egypt, these resources have been used for the development of policy-oriented management scenarios.

Scientific Testing of Soil and Water Management and Conservation Technologies

Management approaches have been tested and refined at each of the participating study sites using scientific methods to assess their effectiveness and to identify ways to optimize their performance. For example, at the Gareh Bygone Plain, Iran, a range of studies have explored the effects of groundwater recharge on water quality and biodiversity, while in the Khanasser Valley and Zeuss Koutine Watershed, scientific studies have examined aspects of the effectiveness of check dams and other means for groundwater recharge. In the Heihe River Basin, studies have focused on water use efficiency. At Zeus Koutine Watershed, tests on the use of olive waste product 'margine' for soil stabilization have been supported. At the Gareh Bygone Plain, the use of the body fluids from sowbugs are being explored as a potential sand dune stabilization treatment to replace the current use of polluting petrol mulches for this purpose. Local communities were directly involved in carrying out scientific experiments in the Khanasser Valley, Syria, to improve nutrient management and crop productivity. These scientific activities have directly contributed to enhancing local capacity for natural resource management.

Scientific Testing of Potential to Improve Productivity in Marginal Drylands

Many of the management improvements proposed at the study sites have led to improvements in agricultural and rangeland productivity through improved management of water and removal of overgrazing and other pressures. These increases in productivity have been scientifically observed by the study teams (eg increased wheat production at GBP, increased forage production at HS, etc). Further experiments have been carried out on new products. Tests on saline fish farming and vegetable growing were carried out by PCRWR, Pakistan, to determine optimal cultivation methods for the production of these products. At Karnab Chul, researchers have experimented with the extraction of lanoline from wool to identify the best techniques for local use. At the Khanasser Valley Integrated Research Site, experiments were carried out on tomato plants to identify responses to water and nutrient application. At the Gareh Bygone Plain, Iran, studies have explored the production of high value pharmaceutical products from plants, including jojoba and acacia victoriae. The results were reported to the project and to local communities.

Scientific Publications

On the whole, the scientific work of the project teams has been captured in four workshop proceedings. These publications have been broadly disseminated through the networks of the project partners. Numerous publications in Chinese and international scientific journals were made by the research team working in the Hunshandak Sandland, China, demonstrating the success of the natural restoration approach to combating desertification and sandstorms in China. The OBR project team published two

journal articles on the assessment of vegetation through remote sensing. The GBP team has published three papers on carbon sequestration in plants and soil and soil microbiology in accredited Iranian scientific journals. In addition, two papers on nitrate remediation in the floodwater spreading system are in preparation by the Team Leader for submission to an international journal. Another paper on the theoretical design of stilling basins for the artificial recharge of groundwater using large flows is also under preparation at this site. These publications represent groundbreaking contributions of international significance to dryland science. In addition to these refereed publications, numerous MSc and PhD dissertations have been produced by the project (see below). Several of the SUMAMAD Team Leaders presented their work to the International Scientific Conference on the Future of Drylands, Tunis, June, 2006.

Summary of Livelihood Improvements Achieved During the SUMAMAD Project 2003-7

Demonstration of Potential Alternative Income Generating Activities

Many of the productive activities explored by the project (see previous section) have the potential to provide additional sources of income, eg through improved agricultural productivity (KVIRS, GBP), improved rangeland productivity (KC, HS), improved survival of animals (KC, HS) or production of alternative crops, such as fish (D/LSBR), vegetables (D/LSBR, DBR, KC), jojoba (GBP) and poultry (HS). Other potential sources of income demonstrated during the project include the processing of dryland products, such as wool (KC), milk tofu (HS), soap (DBR, KC). The use of dryland plants for perfume and medicinal purposes have been explored (DBR, KC, GBP). At a number of sites (ZKW, KC, HS, DBR, GBP), the potential of ecotourism as an alternative source of income in marginal drylands has been explored and promoted. At Karnab Chul, this demonstration has led to a partnership created between local farmers and hotel owners. These activities have demonstrated the potential interest of alternative income generating activities to be pursued by local communities.

Contributions to Household Income

Some of the SUMAMAD study teams have quantified the income generated from alternative income generating activities. The research team working at the Hunshandak Sandland, China analyzed household income and expenditures before the project, and compared them to the income created through project activities. Before the SUMAMAD project, families in Bayin Hushu Gacha earned around 15,000 yuan per year from cattle farming, after spending 10-13,000 yuan on fodder. However, following the creation of the nature reserve, fodder production increased, enabling families to feed their animals and also to sell additional fodder. This generated an income of around 12,000 yuan per family for the seventy two families in the village. In addition, poultry raising activities introduced by the project generated an income of around 60,000 yuan for each family. The project team calculated the potential income on a per hectare basis, where traditional cattle breeding could yield 300 RMB/ha, while chicken raising could yield 2700 RMB/ha (a nine-fold increase). If families processed the milk from their cattle to make traditional tofu, the value could be increased by 20%, to earn a profit of around 5500RMB per family. Regarding potential income from ecotourism, one family in Bayin Hushu Gacha made 7920 RMB from visitors in 2006. Other study sites also reported figures for potential income generation. Estimates were provided from Gareh Bygone for the total value of wheat (US\$120/ha) and eucalyptus crops to be irrigated through floodwater spreading and the use of artificial recharge water. Total revenues from sewing activities in Egypt were also reported. The Karnap Chul study team reported that the value of olive and cypress trees distributed to local families could equal the price of one lamb. These figures reported to the project, whether directly on a household basis, or for collective income for local communities, give an indication of the benefits achieved and demonstrated, particularly where the income from alternative sources is compared to that generated from traditional sources.

In-kind Contributions to Local Livelihoods

Livelihood benefits generated by the SUMAMAD project activities include in-kind benefits to enhance livelihoods as well as cash. For example, the provision of drinking water to communities at the project sites in Egypt (OBR) has improved children's health, and removed the need to buy expensive and unhygienic water supplies from tankers. Vegetables grown at D/LSBR, Pakistan, have contributed to the diet and health of local communities, reportedly increasing energy levels and reducing hunger. At the Dana Biosphere Reserve, growing of fruits and vegetables in orchard gardens was a traditional activity to supplement livelihoods in previous generations. These activities have been revived through local outreach work to rehabilitate the gardens around Dana Village. Forage grown at Hunshandake Sandland is used by local people to feed their animals, where previously they had to buy forage. These benefits have been assessed through informal surveys, and reported to the project. These contributions are more difficult to quantify and compare than income generated, but well appreciated by local people. Due to the participatory nature of the SUMAMAD project implementation, local people have played an important role in the selection and targeting of activities for livelihood improvement.

Targeting of Livelihood Improvements to Priority Groups

Project teams have focused on creating opportunities for priority groups within the local communities, eg women (OBR, DBR, KC, KVIRS), underemployed youth (OBR) and handicapped people (ZKW). The Egyptian team has focused on sewing activities for women, and has also assisted 150 Bedouin women to receive official identity cards.

Studies on Livelihood Diversification

Detailed studies have been reported to the project from Dana Biosphere Reserve and Zeuss Koutine Watershed on trends in the diversification of local livelihoods and dependence on natural resources for income generation. These studies have contributed to understanding of livelihood strategies in the marginal drylands, in order to better target efforts for improvement.

Creation of NGOs and Associations

The Chinese study team created a cooperative company in Bayin Hushu village for the production and marketing of local produce, including chickens. The research team provided their own funds to start up this company, and training for local people to run it for themselves. In the Gareh Bygone Plain, Iran, a cooperative was formed to manage the floodwater spreading activities through the signature of an agreement with local people. During 2007, an NGO was created. A student NGO was created in Egypt. Various pre-existing NGOs were included in the project activities in Tunisia. Farmers Interest Groups were engaged in the project activities in Syria.

Capacity Building and Training Achievements During the SUMAMAD Project 2003-7

The SUMAMAD project has included capacity building and training activities of a range of different types and levels. These activities have included capacity building of the project teams through training in addition to their involvement in the project research activities and annual workshops. For example, the DBR project team was trained on biodiversity, ecology, and sampling vegetation attributes, as well as on writing of management plans. OBR project team received training on GIS. Other capacity building and training activities supported by the project have included support for students enrolled in formal studies (including members of the project teams). Masters and Doctoral students from Karnab Chul visited universities in other countries. The Team Leader was also supported to visit U. of Leuven to prepare a thesis, which will be completed shortly. Foreign students came to the KC study site to collect data. An MS student member of the OBR project team received training in Belgium. At Gareh Bygone Plain, three PhD students and five MSc students have received support during the project. At KVIRS, the work of two Masters students has been supported by the project. Two Masters dissertations have been based on the project activities at ZKW on water harvesting structures.

While the project teams have received training and capacity building from the project, they have also provided opportunities for other groups to benefit. The following is a list of examples of different capacity building and training achievements from the SUMAMAD project:

Trainings for Farmers and Local NGOs

A range of different training and capacity building opportunities have been provided to local people by the SUMAMAD teams. KC study team provided training for farmers on the identification of degradation in rangelands through the observation of plants, and on reseeding activities. D/LSBR ran several workshops, each attended by around 100 farmers from the Cholistan desert, to demonstrate the increased income that can be generated by saline fish farming and vegetable production. DBR provided training for local people on orchard management, including soil and water conservation techniques, in Dana village. GBP provided training for local people on water conservation. OBR and KVIRS provided training through participatory mapping KVIRS involved local extension workers and farmers in project activities and data collection. OBR provided training for Bedouin communities on how to manage water desalination units. ZKW provided training for local NGOs on projects for combating desertification.

Training of Local Technicians

Specialized training has been provided by some of the project teams to local technicians. For example, ZKW study team provided training for technicians in local development offices in GIS and remote sensing. GBP provided training for technicians in range management, forestry and biodiversity monitoring.

Capacity Building for Decision-makers and Researchers

Capacity building and training for decision-makers and researchers in each participating country have been provided through the national seminars, which offer these groups the opportunity to learn about new approaches to dryland management, demonstrated by the project. For example, the Karnab Chul national workshops explored the potential use of rare vegetation. National seminars (eg OBR, GBP, KVIRS and DBR) have included local decision-makers and researchers in brainstorming and national prioritization activities on promising topics to improve dryland management. This has resulted, for example, in the development of a steering committee to review the use of a wetland area near the the KVIRS in Syria. This committee brings together for the first time, all stakeholders and the co-development of sets of recommendations for various ecosystem functions that the wetlands provide. In addition to the national seminars, various other tools are used by the project teams to raise awareness of dryland management issues amongst decision-makers. For example, at OBR and ZKW videos were produced. A website, including an Archaeological Information System for promotion of ecotourism was created at Karnab Chul. Publications from OBR have appeared in local newspapers and popular media, as well as the UNESCO newsletter. DBR has become a showcase for integrated management, and is visited by groups from other countries in the region, eg Yemen, Turkey, etc.

Policy Relevance and Policy Impacts of the SUMAMAD Project 2003-7

Targeting of Policy-makers

The final reports submitted by the Team Leaders contain policy-oriented recommendations intended for policy audiences. In addition, the study teams produced various policy-relevant studies and recommendations throughout the duration of their activities. Selected studies were presented at the International Conference “Desertification and the International Policy Imperative,” held in Algiers (17-19 December 2006). Other decision-support applications of scientific findings from SUMAMAD study teams are detailed above. At the Zeuss Koutine Watershed, a contingent valuation of land degradation prevention was produced. The development of a methodology for valuation of ecosystem services by the OBR study team will also provide an important tool for communicating the policy-relevance of resource

conservation to decision-makers. The effectiveness of valuation of natural resources for communication of their importance to policy-makers has been proved by the SUMAMAD team at GBH, Iran, where artificial recharge water was valued in terms of its wheat-production potential. Considerable government support was subsequently received for this water conservation activity.

Replication of SUMAMAD Models through National Policies

A number of the approaches demonstrated by the SUMAMAD project teams have been taken up by policy-makers for replication across a wider scale:

- Syria: Decision to replicate KVIRS model by Syrian Government Ministries in 3-4 other marginal dryland regions with different socio-economic conditions and discussion of State Development Planning Scenarios by the project team with Head of State Planning Commission, Syria. Development of a Steering committee headed by the local governor of the region to develop recommendations on the uses of a wetland area.
- China: Adoption of 'Using land to nurse itself' approach by Chinese State Council, June 2006 – investment of 27.4 billion Yuan in Inner Mongolia, Xinjiang, Ningxia, Qinghai, Tibet Province, following demonstration of the potential of natural restoration to restore grasslands and contribute to local livelihoods;
- Egypt: Uptake of manufacture of solar desalination units by Egyptian government Sakr Industrial Company for introduction to governorates in the Western and Eastern deserts and Team Leader invited to contribute to National Desalination Strategy for 2025, following demonstration of solar-powered desalination units at the SUMAMAD study site;
- Iran: Iranian Government has decided to replicate the aquifer management activities on 1.5 million hectares of marginal drylands 2006-11
- Pakistan: Punjab Province Fishery Department offered subsidies and technical guidance to increase uptake of dryland fish farming following demonstration of techniques at SUMAMAD study site.

Although the project cannot claim sole responsibility for the achievement of these policy changes in the policies of participating countries, the SUMAMAD project played its role in supporting the project teams' work to demonstrate the viability of the management approaches.

Engagement of SUMAMAD Teams in National Policy Formulation Processes

Amongst the SUMAMAD study teams, levels of access to policy-makers and policy-making processes vary, due to the roles and mandates of their home institutions. For example, in Tunisia, the SUMAMAD team at IRA contributed to Local Action Plan for combating desertification and development in the regions of Beni Khedache and Sabria oasis and Chareb watershed. This is due in part to the institutional mandate of IRA, as well as to the efforts of the SUMAMAD team. The level of interaction achieved with national policy makers at each site is generally reflected in the participation in the National Coordination Seminars. Progress in increasing access to and coordination with policy-makers by the research teams has been visible over the course of the project, and is visible in the increasing participation by decision-makers in national coordination seminars.

Contributions to International Policy Debates

A number of the SUMAMAD Team Leaders were supported by the project to take part in the Joint International Conference on 'Desertification and the International Policy Imperative', held in Algiers 17-19 December, 2006. The proceedings of this event include a written account by Prof. Jiang Gaoming of the SUMAMAD China project team's particular success in influencing Chinese policy for combating desertification, culminating in the change of policy in 2006. Members of the SUMAMAD project teams also contributed to the drafting of policy oriented synthesis publications for the Millennium Ecosystem Assessment Desertification Synthesis and the UNU-INWEH policy brief on 'Rethinking Policies to Cope with Desertification', in which they drew on their experiences from the SUMAMAD project.

Shortcomings Identified During the SUMAMAD Project 2003-7

The discussion on short-comings and difficulties provided the opportunity to openly discuss areas that could benefit from further improvement, with a particular view to enhancing plans for the future phase of SUMAMAD. In general, team leaders observed that they had learned a lot from visiting other sites, but that more opportunities for scientific exchanges, also including other study team members, would be useful. Team Leaders also identified other practical difficulties experienced with the implementation of project activities, as described below.

SUMAMAD Budgets and Innovation in the SUMAMAD Project:

The Management Team reminded participants that the SUMAMAD approach to funding activities was designed to be complementary to ongoing activities. The low budgets avoid dependence on external funds and encourage innovation. Muhtor Nasyrov (Samarkand U.) observed that people with ten times the budget of SUMAMAD, often still say that their budgets are not enough, and thus encouraged the project to build partnerships. The Uzbekistan team works with ESRI and USAID and sends students to the US. Boshra Salem (U. Alexandria) observed that one single successful application, based on achievements demonstrated through the SUMAMAD project enabled the study team to get a grant from the Toyota Foundation for US\$150,000. Dr. Salem encouraged other Team Leaders to visit the Foundation website. Other potential sources of additional support were mentioned. Iwao Kobori (UNU) indicated that institutions such as the Arid Lands Research Center, Tottori, and JICA may be interested to contribute to SUMAMAD capacity building activities. Mohammad Qawabah (RSCN Jordan) pointed out that activities such as olive oil soap production help generate sustainable income. They should not remain as funded research only, but should be handed on to business people.

The following recommendations were proposed to improve the management of budgets and encourage innovation during the proposed new phase of the SUMAMAD project:

- The SUMAMAD project should seek an increase in budgets for activities at study sites and for increasing exchange of ideas between sites;
- Reporting cycles should be reviewed;
- Project workplans should be further reviewed within the project, including feedback from the management group, to ensure efficient use of resources and interaction between sites;
- Effective means for targeting policy-makers are likely to include more economic analyses of benefits achieved by the project;
- Studies of economic viability of management activities, and the creation of markets require the introduction and sharing of expertise in these areas.

The following recommendations were proposed to improve capacity building and training activities:

- The project document for the new phase should clarify what is meant by capacity building and policy impacts, and should indicate how SUMAMAD can identify both direct results and also broader effects that crosslink to other activities;
- The international workshop could be used to provide additional capacity building opportunities;
- All project teams should engage with partners from universities;
- Capacities available within the project –eg Team Leaders’ expertise – should be mobilized for capacity building within the project;
- An assessment of capacity needs for exchange of expertise between study sites should be carried out.

Session 4: SUMAMAD Publications

Chair: Zafar Adeel (UNU-INWEH)

Two publications have been proposed for the SUMAMAD project. An open discussion on the content and structure for the publications was held amongst workshop participants.

- 1) UNESCO report consisting of chapters already submitted by each study team, and an opening chapeau to be circulated by UNESCO in the month of October. Feedback will be requested from all of the teams within 2 weeks. This publication must be produced before the project closure deadline at the end of the year.
- 2) Policy brief (see draft outline in Annex 3). This will be a concise readable document of around 30-50 pages, aimed at a wider audience across the development community. All team leaders are invited to send contributions to UNU by the end of November. An updated draft will then be circulated for comments. UNESCO will request to use any funds left over at the end of the project to finance the production of the policy brief. This publication will be produced before June 2008. Boshra Salem offered to contribute to translating a resume of the policy brief in Arabic.

Session 5: Preparation of Project Document for SUMAMAD Project Phase-2

Chair: Thomas Schaaf (UNESCO)

Zafar Adeel (UNU-INWEH) began the discussion of the plans for the new phase of SUMAMAD, indicating that all project teams would be invited to write proposals for the new phase. The management group will provide guidelines for the proposals by the end of the year, including an approximate figure for the budget. A planning workshop will then be held in June 2008. Dr. Adeel observed that new project teams might be added, as well as new donors, in addition to the Flemish Government of Belgium. UNU-INWEH will discuss the possibility of bringing the Canadian International Development Agency (CIDA) on board as a supporting partner. There is also a possibility to approach the Japanese Government. A fourth potential partner for the capacity building side of the project is the Arid Land Research Center at Tottori.

Rudy Hermann (Flemish Government of Belgium) presented some reflections on behalf of the Flemish Government, stating that the Flemish Government gives the mandate to UNESCO to select the countries. If there are additional donors coming in, this would be a positive sign because it would show broader interest in and acceptance of the value of the project. If other donors have priorities for other countries, then those should be added in through consultation within the project Management Group. Regarding the project outline, the SUMAMAD project is characterized by its approach to building on ongoing activities. This should be the same for the next phase proposal because it reflects added value of the project. This should be clarified in the proposals submitted from the study teams. Study team proposals should also specify the nature of capacity building activities that the teams would benefit from (these may be funded through separate budget lines).

Dirk Raes presented a proposal to include researchers from the Bolivian Altiplano region between Peru and Chile. Dr. Herman indicated that new countries have to be informed of the SUMAMAD approach, so that they can immediately benefit from the knowledge that has been gained so far. Achieving that synchronization should be the objective of the first workshop. The Flemish Government will consider a proposal to provide funds for organizing such a workshop for 2008.

Regarding the timeline, SUMAMAD is part of the Flemish Government trust fund agreement with UNESCO. It is a five-year agreement. The Flemish Government is now conducting an evaluation of the Trust Fund for the past five years, which will help decide whether to fund the next phase. The Flemish Government would follow the schedule presented below:

| | |
|--------------------|--|
| 25 September 2007: | draft evaluation presented |
| 15 October 2007: | final report submitted to the Flemish Government |
| Nov 2007-: | Flemish Ministry negotiates with UNESCO on next 5-year agreement 2009- |
| End April 2008: | Anticipated completion of negotiations |
| June 2008: | Call for proposals for new or ongoing projects (including SUMAMAD and others) |
| July 2008: | Proposals submitted from projects |
| August 2008: | Proposals circulated to Flemish universities for comments. Support by Professors is added to the proposals |
| September 2008: | A ranking of projects is created, based on support from Professors and submitted to the Flemish Ministry for approval of the budgets |
| Sept-October 2008: | Process concluded |
| January 2009: | Approved projects start |

In light of this schedule, 2008 can be considered as a year for planning of the future phase without project activities funded by the SUMAMAD project.

An offer to host the planning workshop in June at Dana Biosphere Reserve was received from the Jordanian team. This offer was warmly accepted by the group.

Discussion of the draft project document:

A draft document outlining the new phase had been prepared before the workshop by the Management Group (see Annex 4). The overall objective identified for the new phase is to support the efforts of dryland researchers to transfer their scientific findings for use both by land users and for policy-level decision-making to improve the sustainable management of marginal drylands.

Overall objective of the project and thematic focus of activities

The draft document was based on the outcome of discussions held in Aleppo during the previous workshop, which highlighted three main themes or approaches for the project: scientific studies, policy-relevant analysis and promotion of sustainable and alternative livelihoods. Also in Aleppo, priorities within these themes had been identified. Participants were consulted to determine whether the thematic focus still held true, and whether it could be further tightened, particularly with regard to the scientific studies and the choice of income generating activities, which ranged widely during the first phase of the project, due to the participatory identification of relevant activities with local communities. While the interests of the current team leaders are best captured by retaining the broad articulation of thematic focus, as identified in Aleppo, more focus can be introduced in the nature of assessment methods used to capture management and livelihood benefits and to report them to the project. Methods for the identification of results from income generating activities, as well as other outcomes and impacts from the project should be fleshed out in the project document.

Identification of study sites

Proposals for new study sites will be considered, as long as they can provide the same level baseline assessment that is available from the SUMAMAD sites of the first phase. Proposals may also include scaling up from the existing sites.

Project team proposals

Team leaders were encouraged to include in their proposals for the future phase suggestions on how they would go about measuring the results of their activities – through both economic studies and studies of social acceptability, including specification of team members that would work together. Needs and opportunities for capacity building should also be outlined in the proposals from Team Leaders.

Project Team composition

There should be a team leader and a deputy. Research teams should include young researchers and scientists, with a view to build capacity. Gender issues should be taken into account in the composition of study teams.

Outline of proposed activities

The proposal for strengthening of exchanges between study sites in the new phase proposal generated considerable interest. Electronic means were suggested to supplement these exchanges. For the physical exchange of young researchers, there was a suggestion that the partner institutions should access bilateral funds from universities to cover accommodation, while SUMAMAD funds would be used to cover travel costs only. Concerning local coordination, it was suggested that teams could make use of international days of environment, earth, desertification, etc

Proposed outputs

A long list of possible outputs had been gathered from consultations on the new phase. Participants were consulted as to the prioritization of proposed outputs in order for the list to be revised. Boshra Salem (U. Alexandria) proposed that the outputs should be categorized according to the target audience: decision-makers, communities and the scientific community. Some of the proposed outputs, such as educational materials were considered valuable, but would have high requirements for time, budget and expertise.

Proposed outcomes and impacts

Results based management has now become a standard approach in most international projects, and is actively used by all UN Agencies. Accordingly, the Management Group agreed to define Outcomes, Impacts and Indicators for the new phase project in a systematic manner. Considerable support was expressed by the Team Leaders for the specification of indicators to be measured throughout the project.

An example of a tabular presentation of Outcomes, Impacts and Indicators was presented by Dr. Zafar Adeel (UNU-INWEH) (see Annex 5). A similar table will be included in the project document, with revised objectives and corresponding impacts and indicators.

Timeline for development of the new phase proposal

UNESCO and UNU will prepare a revised version of the new phase document by mid December 2007, and will circulate it to Team Leaders with guidance on how to write the project-site proposals.

Team Leaders will return their comments on the overall document, and proposals for their study sites by end of February 2007. Before the June workshop, the Management Group will prepare a revised version of the new phase document.

Closing Session

Chair: Gaoming Jiang (CAS)

Closing remarks were made by Mr Siqin Bilige, Deputy Head of Zhenglan Banner, on behalf of Mr Ba Genna, the Head of Zhenglan Banner. Mr Ba Genna expressed friendly greetings to the participants of the SUMAMAD workshop, and appreciation for the development of the economy and society of the banner. Mr Ba Genna spoke of the recovery of the Hunshandak sandland, thanks to ecological management efforts, and of the hopes of the Banner to list the Yuan Shangdu ruins as a World Cultural Heritage site. Finally, Mr. Ba Genna wished the SUMAMAD participants success, and thanks.

Dr. Rudy Hermann, on behalf of the Flemish Government of Belgium, thanked the organizers for the invitation to Zhenglan Banner. Dr. Hermann expressed his good wishes for the SUMAMAD project continuation and expressed the hope that the new SUMAMAD project should contribute to the assimilative capacity of drylands – including the carrying capacity and also the socioeconomic capacity. Dr. Herman observed that the results that have been achieved in the first phase of the SUMAMAD project look very promising. The Belgian experts were impressed with the SUMAMAD model. The new improved proposal that was discussed during the workshop can be presented to the Flemish government through the UNESCO channel. Dr. Herman observed that the group benefits from each other's experiences and knowledge. The effects of SUMAMAD will continue long into the future.

Dr. Zafar Adeel, on behalf of UNU, thanked Zhanglan Banner, the Chinese Academy of Sciences and UNESCO for organizing the meeting. Dr. Adeel expressed gratitude for the support provided – not just financial but moral and scientific support from the experts and colleagues from Belgium. He expressed the hope that the workshop had provided a launching pad for the future phase of SUMAMAD. Dr. Adeel indicated that despite the critical discussions, the underlying fact is that the Management Group is very proud of the project achievements. A lot has been achieved towards improving the livelihoods of people who live in the marginalized dryland regions. The project will make that happen by continuing to work together. Dr. Adeel took the opportunity to express appreciation for the remarkable contribution made to the project by Ms. Caroline King while working as the UNU Project Manager. She has contributed to the scientific synthesis of the project's achievements. She is leaving UNU-INWEH but will continue to be engaged, particularly in developing the policy brief.

Dr. Zouhair Massri, on behalf of ICARDA, thanked Thomas Schaaf of UNESCO, Zafar Adeel of UNU-INWEH, Rudy Herman of the Flemish Government of Belgium and Atsushi Tsunekawa of the Arid Lands Research Center. Dr Massri expressed his personal appreciation as a researcher with the Syrian SUMAMAD team for the opportunity to join the international workshop. Dr. Massri indicated ICARDA's willingness to welcome the expansion of the SUMAMAD project to Latin America, where ICARDA is already active in efforts to improve the condition of the poor people in the dryland areas. Finally, Dr. Massri thanked the Chinese colleagues and the Chinese people, for the knowledge and the memories generated during the workshop.

Dr. Thomas Schaaf, UNESCO Representative expressed gratitude to Mr Sichin for the words on behalf of Mr Ba Genna, sent thanks to Mr Ba Genna for hosting the workshop. Dr Schaaf also wished to thank the Secretary General of the Communist Party for honoring the meeting with his presence the previous evening. Dr. Schaaf expressed his pride to follow the footsteps of Marco Polo, who greatly enlarged understanding and knowledge in the Far East, just as the SUMAMAD participants, in their turn, had enhanced knowledge and understanding in the context of SUMAMAD. Dr. Schaaf thanked the Chinese Academy of Sciences and the Xilinhot Hongyuan Seawater Desalination Company for bringing additional participants to the workshop. Specific thanks were reserved for Dr. Jiang Gaoming and his team, who did a wonderful job (and a lot of work) hosting the workshop. Dr. Schaaf also thanked UNU for continuing the excellent collaboration between UN Agencies, and ICARDA for sending a new face to

the discussions. In thanking the Flemish Government of Belgium, Dr. Schaaf mentioned that Dr. Rudy Herman has facilitated the work of the project as a friend, and not just as a funding partner. He thanked Dr. Herman for all his constructive comments and contributions to the understanding of dryland management. Finally, Dr. Schaaf concluded that the SUMAMAD project was as much fun as work, and that this is important, not only to work together but also to enjoy life together.

ANNEX 1: Workshop Agenda

| Saturday, 8 September 2007: Xilingol Hotel | |
|---|--|
| Meeting room locates in the fourth floor | |
| 9:00–10:30 hrs | <p>Opening session:</p> <ul style="list-style-type: none"> • Prof. Jiang Gaoming, Institute of Botany, Chinese Academy of Sciences; • Mr Meng Ke, Deputy Governor of Xilingol League; • Mr Y. Aoshima, Director, UNESCO-Beijing Office; • Rector, UNU; • Dr Mahmoud Solh, ICARDA; • Prof. Ma Keping, Director, Institute of Botany, Chinese Academy of Science; • Dr Rudy Herman, Flemish Government of Belgium. |
| 10:30–11:00 hrs | Coffee/tea break |
| 11:00–12:30 hrs | <p>Overview Presentations:</p> <ul style="list-style-type: none"> • Dr Thomas Schaaf, UNESCO-MAB: Objectives of 6th International SUMAMAD Workshop; • Dr Adeel Zafar, UNU-INWEH: Challenges in Drylands: Is sustainable management possible? • Ms Caroline King, UNU-INWEH: overview of SUMAMAD project contributions to sustainable development of drylands. |
| 12:30–14:00 hrs | Lunch |
| 14:00–15:30 hrs | <p>Session 1 Technical Presentations on Innovations in Water/Soil Management</p> <ul style="list-style-type: none"> • Mr Xiushun Wang, General Manager, Xilinhong Hongyuan Seawater Desalination Company; • Prof. Donald Gabriels, University of Ghent (Belgium); • Prof. Dirk Raes, U.K. Leuven (Belgium). |
| 15:30–16:00 hrs | Coffee/tea break |
| 16:00–17:30 hrs | <p>Session 2 Presentation of project activities by national coordinators</p> <ul style="list-style-type: none"> • Dr Gaoming Jiang (China): Hunshandake Sand area; • Dr Jinxiu Li (China): Heihe River area; • Dr Boshra B. Salem (Egypt): Omayed Biosphere Reserve. |
| | <p>Evening reception Hosted by Mr Siqin Bilige, Mayor of Xilingol.</p> |

| Sunday, 9 September 2007: Xilingol Hotel | |
|---|--|
| 8:30–10:00 hrs | <p>Session 2 (continued) Presentation of project activities by national coordinators</p> <ul style="list-style-type: none"> • Mr. Mehrdad Mohammad (Iran): Undulating area SW of the Gareh Bygone Plain; • Mr. Mohammad S. Al-Qawabah (Jordan): Dana Biosphere Reserve; • Dr. Muhammad Akram Kahlowan (Pakistan): Lal Suhanra Biosphere Reserve and Cholistan Desert. |
| 10:00–10:30 hrs | Coffee/tea break |
| 10:30–12:00 hrs | <p>Session 2 (continued) Presentation of project activities by national coordinators</p> <ul style="list-style-type: none"> • Dr. Zuhair Masri (Syria): Khanasser Valley; • Mr Mohamed Ouessar (Tunisia): Zeuss-Koutine Watershed; • Dr. Muhtor G. Nasyrov (Uzbekistan): Karnab Chul area. |
| 12:00–14:00 hrs | Lunch |
| | <p>Field trip Xilingol Biosphere Reserve and the Field Research Station of the Institute of Botany, Chinese Academy of Sciences.</p> |
| Monday, 10 September 2007: Field trip | |
| 8:00–14:00 hrs | <p>Field trip Hunshandake study sites. <i>Lunch provided in field.(Bayinhushu Village)</i></p> |
| 14:00–18:00 hrs | <p>Visit to Yuanshangdu ruins The second capital of Yuan Dynasty built by Jenghis Khan in Hunshandake study sites. * We will have 10-20min break in Shangdu Town and then go to the historic site out of the town.</p> |
| 18:30–20:00 hrs | <p>Evening Reception Hosted by Zhenglan Banner Government.</p> |
| | Stay in Yuanshangdu Summer Palace Hotel (three stars hotel) |

| Tuesday, 11 September 2007: Yuanshangdu Summer Palace Hotel Conference room, 3rd floor, end of the east corridor, Yuanshangdu Summer Palace Hotel | |
|---|--|
| 8:30–10:00 hrs | Session 3 Open discussion on main accomplishments of SUMAMAD Project during Phase-1. |
| 10:00–10:30 hrs | Coffee/tea break |
| 10:30–12:30 hrs | Session 4 Open discussion on content, structure and timetable for SUMAMAD Publication. |
| 12:30–13:30 hrs | Lunch |
| 13:30–15:30 hrs | Session 5 Preparation of Project Document for SUMAMAD Project Phase-2 (2008 to 2011). <ul style="list-style-type: none"> • Dr Rudy Hermann, Flemish Government of Belgium: Reflections from the Flemish Government; • Dr Thomas Schaaf and Dr Zafar Adeel: Opportunities for development of SUMAMAD focus and scope of activities; • Comments from all project members; • Open discussion. |
| 15:30–16:00 hrs | Coffee/tea break |
| 16:00–17:30 hrs | Closing Session <ul style="list-style-type: none"> • Mr Ba Genna, the Head of Zhenglan Banner; • Dr Rudy Hermann, Representative of the Flemish Government of Belgium; • Prof. Iwao Kobori, UNU; • ICARDA Representative; • UNESCO Representative. |
| | Evening reception Hosted by Mr Ba Gane on behalf of Zhenglan Banner. |
| Wednesday, 12 September 2007: Return to Beijing | |
| 9:00–16:00 hrs | Return to Beijing 6-7 hours by bus |
| | Stay in Xiyuan Hotel |
| Thursday, 13 September 2007: Departure of international participants | |

ANNEX 2: Team Leaders Comments

| TABLE 1: Team Leaders' Comments on Scientific Accomplishments | |
|--|---|
| Study Site | Comments |
| Zeuss Koutine Watershed, Tunisia: M. Ouessar | The project research dealt with soil, water and vegetation. Main results were obtained by Drs Taamallah and Mounir. The work on margine application is still going on. On recharge structures for water harvesting, the team worked with Prof. Donald Gabriels (U. Ghent). The main problem is siltation. The project also addressed vegetation, rangeland management and impact on vegetation dynamics. With regard to the socioeconomic aspect, Dr. Mongi Sghaier worked on the evaluation of water harvesting structures and the optimal allocation of natural resources at the watershed level. |
| Karnab Chul, Uzbekistan: M. Nasyrov | The project research focused on soil vegetation cover assessment. The research explored the relationships between vegetation and animal pressure. This is particularly important because no feed supplements are available at the research site. The project team would like to encourage grazing in a wide area, not just around water points and to increase sheep flock numbers while decreasing the number of flocks by working with farmer associations. |
| Dingarh / Lal Suhanra Biosphere Reserve, Pakistan: M. Akram | The project research has focused on the use of saline groundwater for the production of vegetables and for saline fish farming. These are new ideas being introduced in the desert. |
| Dana Biosphere Reserve, Jordan: M. Qawabah | Scientific activities have included the refinement of a pre-existing water quality monitoring programme, and the introduction of a soil erosion monitoring programme. |
| Gareh Bygone Plain, Iran: M. Mohammadnia | Scientific activities have examined various aspects of aquifer management, developing a new area to harvest water. Effects on the groundwater quality have been explored. Recharge can supply fresh water for human use and consumption. The development of an agreement with local people was one of the greatest achievements of the project at this site. |
| Omayed Biosphere Reserve, Egypt: B. Salem | The main scientific achievement at this site is the creation of PGIS – a public information system. The project team has determined the value of each species in the area. A preliminary assessment of a series of management scenarios has been developed. Detailed studies have been undertaken of Moghra Oasis, in order to advocate the management of this area as a protected area. |
| Khanasser Valley Integrated Research Site, Syria: Z. Al Massri | As part of this and other complementary projects, many technologies were applied by ICARDA and its partners. The aims of the participatory action research were to involve land users more in research and trigger interest from decision makers at all levels. The project activities focused on the design of check dams. Also, a report on farmers' Participatory Learning Action Research on nutrient management supported by the project is in preparation linked to a M.Sc. thesis. |
| Hunshandak Sandland, China: J. Gaoming | The research team has investigated and quantified the biomass of the study area, including comparison with other grassland ecosystems. The results of this research have demonstrated that the study area is highly productive when compared with the surrounding area or temperate grasslands. A detailed investigation of soil seed banks has been carried out to determine the numbers of species. |
| Heihe River Basin, China: L. Jinxiu & S. Qingwei | The target of activities undertaken at this site is to save water in the middle river basin to give more flow to the lower river basin. This project is trying to use both technical and non-technical strategies such as community participation and water use association to reduce conflict and introduce more active canal maintenance. In the lower river basin the project team is working to break the boundary between herders and farmers so that they can share their resources. |

| TABLE 2: Team Leaders' Comments on Livelihood Improvements | |
|--|--|
| Study Site | Comments |
| Zeuss Koutine Watershed, Tunisia: M. Ouessar | The income generation activities of the project focused on assisting NGOs. Three NGOs working on dryland ecotourism were assisted through the project. A small experiment on sand handicrafts was also introduced last year. |
| Karnab Chul, Uzbekistan: M. Nasyrov | The approach to income generating activities that is adopted at this site focuses on reuniting the community and family to bring back family members from other towns. Wool processing is a suitable activity for families, and can help to decrease the number of sheep needed to support a household. Ecotourism also has potential |
| Dingarh / Lal Suhanra Biosphere Reserve, Pakistan: M. Akram | The project research has focused on the use of saline groundwater for the production of vegetables and for saline fish farming. These are new ideas being introduced in the desert to enhance income generation. |
| Dana Biosphere Reserve, Jordan: M. Qawabah | Activities in orchard gardens have enhanced practices for soil conservation increased productivity, supplementing livelihoods. Two socioeconomic surveys conducted on nomads and landowners in the eastern part of the Dana Reserve focused on the transition to the cash economy from traditional activities including pastoralism, gardening and trading. Alternative income generating activities supported by the project have concentrated on olive oil soap production. |
| Gareh Bygone Plain, Iran: M. Mohammadnia | Due to the project activities on floodwater spreading and groundwater recharge, additional income has been generated for local people through agriculture and the introduction of new plant species. Brainstorming activities have also taken place to consider increasing the available potential for ecotourism. |
| Omayed Biosphere Reserve, Egypt: B. Salem | Livelihood improvements include the provision of drinking water to communities, which has improved childrens health. The project has provided women with work at home on sewing machines and also provided IDs for women. |
| Khanasser Valley Integrated Research Site, Syria: Z. Al Massri | The most significant improvement in livelihoods has occurred with lamb fattening enterprises and the increase in olive production in the area. These were stimulated as part of the overall integrated approach taken at the site through a number of projects. Yields of barley were significantly improved by the application of phospho-gypsum amendments but these interventions only benefited the relatively better off farmers. The project has demonstrated however that viable livelihoods from agricultural activities are possible in this marginal area. By linking the SUMAMAD project to a larger development project locals have increased confidence in their ability to obtain more secure livelihoods from the area. |
| Hunshandak Sandland, China: G. Jiang | The project has investigated the livelihood benefits of natural restoration at this site. While in the 1990s, local families had to buy forage, since 2002, all families have enough forage and no longer need to buy it. Some families can even generate income through the sale of forage. Through the creation of a local cooperative company for food product processing (chickens and traditional tofu products), the project supported 5 families during the first year of the project, but now all 72 families in the village are supported and a 46% increase in income has been reported. The government has also been persuaded to build a road to the village. Since 2002, the project has been supporting ecotourism activities. |
| Heihe River Basin, China: L. Jinxiu & S. Qingwei | Income generation alternatives that are under investigation at this site concern additional plant growth and higher value plants. In this way, the project teams hopes to both save water and increase farmer income. |

| TABLE 3: Team Leaders' Comments on Capacity Building and Training | |
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| Study Site | Comments |
| Zeuss Koutine Watershed, Tunisia: M. Ouessar | Capacity building by the project is reflected in various theses produced within the framework of the project, as well as the training of technicians in local development offices. |
| Karnab Chul, Uzbekistan: M. Nasyrov | This project team had masters and doctoral student exchanges, which contributed to building their capacity. In addition, foreign students visited the study site to collect data. The Team Leader had a chance to visit the University of Leuven with Prof. Dirk Raes to complete his thesis, which will be submitted at the end of this year. The project team in turn also provided trainings for farmers the identification of degradation in the rangelands through observation of plants. These techniques involve the examination of numbers of certain plants per square metre. Other activities for capacity building and influencing policies have taken place in the national workshops. These have explored the potential use of rare vegetation, including the selection of promising plants and applicable technologies. |
| Dingarh / Lal Suhanra Biosphere Reserve, Pakistan: M. Akram | At this site, 3-4 workshops gathered more than 100 dryland farmers from the Cholistan desert to demonstrate how desert people can increase their income by taking new scientific ideas eg fish farming and vegetables. The project team is now working to enable farmers to adopt these ideas for themselves. |
| Dana Biosphere Reserve, Jordan: M. Qawabah | Capacity building activities have included training on biodiversity and ecology for the team in the Dana biosphere reserve. Training on writing management plans has also been provided for the SUMAMAD team members, as well as training on sampling vegetation attributes and training for local people on implementing techniques for orchard management. The national seminars also build the capacity of local stakeholders and national decision-makers. The Dana Biosphere Reserve has become a showcase of integrated management in Jordan. A lot of groups come from the region – Turkey, Yemen, etc, to see the model of Dana. SUMAMAD has contributed to strengthening that model. |
| Gareh Bygone Plain, Iran: M. Mohammadnia | Three PhD students and five MSc students have received support during the project. The project has also provided training for technicians in range management, forestry and biodiversity monitoring. Training has been provided to local people in water conservation. Training has also been provided to decisionmakers. University staff have increased their capacity by taking part brainstorming during workshops on topics such as the promotion of ecotourism. |
| Omayed Biosphere Reserve, Egypt: B. Salem | Several training courses have been provided to the project team on GIS. A training course in Belgium was also provided for one of the MS students. SUMAMAD team members organized training workshops for staff of the university of Alexandria. The study team has also organized training courses for the local community for participatory mapping and on how to manage water desalination. For outreach, the study team held national seminars involving national level scientists. Seminars were held in the University of Alexandria with the different departments. |
| Khanasser Valley Integrated Research Site, Syria: Z. Al Massri | The project trained an MSc student. Capacity building for extension workers and farmers involved them in data collection in the study in the area. The method and data for site selection was a learning experience for the Ministry of Irrigation and the farmers. With the project activities on Participatory Learning Action Research (PLAR), the teachers, farmers, students and pupils were trained how to apply an improved technology in the village. When the farmers draw a map they improve their view point for the classification of the soil and crops in the villages. People came from the Ministry of Agriculture to participate in these activities. This has been extended to include teachers and farmers to attend a seminar related to the development of technologies. The application of manure has been so successful that farmers are now selling it. An additional MSc student is studying the application of manure on tomato plants. ICARDA changed the thinking of the policymakers in Syria. The most significant capacity building activity is the bringing together of all stakeholders and the establishment of a Steering Committee that is reviewing the use of surrounding wetland ecosystem through the national seminars supported by SUMAMAD. |

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| <p>Hunshandak Sandland, China: G. Jiang</p> | <p>For capacity building and training, the study team has helped the local people to set up a business company and trained them on how to run it. Local people have been learning and expanding their activities to include ecotourism since 2002 (this is also assisted by the construction of the new road to the village). More than 15 doctoral and masters students have been working in Bayin Hushu Gacha at the project site. Many research institutes are working in cooperation with the project team, eg Peking University and Inner Mongolia University, Shangong Agricultural University and many others. Middle school students from around thirty have also visited the project site or received lectures about the project activities. The Team Leader has given lectures about the project in twenty five provinces to national officials. Four national seminars have also been held by the project team.</p> |
| <p>Heihe River Basin, China: J. Li & Q. Sun</p> | <p>At this site, capacity building has been undertaken through three types of activities: training demonstration and study tours. The river basin is very big, but small areas have been used for demonstration. The project team has been working with extension workers to train farmers for water conservation through the use of high value new species in order to save water. The project activities focus on training the trainers because the local technical staff know the problems. They are involved as students of CAREERI. After finishing they course they go back to work and use the techniques.</p> |

| TABLE 4: Team Leaders' Comments on Policy Relevance and Policy Impacts of Project Activities | |
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| Study Site | Comments |
| Zeuss Koutine Watershed, Tunisia: M. Ouessar | Regarding policy impacts, the project team at IRA works in close collaboration with local development agencies, and Ministries of Agriculture and Environment, which enables them to impact policy formulation both directly and indirectly. For the margine spreading, this is already applied by the office of the state owned land. They are applying this technique in the olive orchards. The project team has had a clear impact in the local action plans for combating desertification, through its role in their formulation. |
| Dingarh / Lal Suhanra Biosphere Reserve, Pakistan: M. Akram | The SUMAMAD studies are feasibility studies leading to megaprojects, once they have gained recognition at the policy level. The team at this site is now working on a new project on rainwater harvesting. They will create a PC Bank for managing water, rangelands and saline fish farming and vegetables. |
| Dana Biosphere Reserve, Jordan: M. Qawabah | The national seminars build the capacity of local stakeholders and national decision-makers. The Dana Biosphere Reserve has become a showcase of integrated management in Jordan. |
| Gareh Bygone Plain, Iran: M. Mohammadnia | Aquifer recharge has policy relevance, and has eventually achieved support at the policy level through the activities of the project. Initially, the Ministry would not support such projects, but now their position has changed. |
| Omayed Biosphere Reserve, Egypt: B. Salem | The project team has conducted numerous outreach activities, but has found it difficult to reach policy-makers at the level of international conventions. Outreach activities included national seminars involving national level scientists. Seminars were held in the University of Alexandria with the different departments. The project team produced a documentary film that is distributed free of charge, and also developed a website. At the regional level, the project team interacts with ARAB MAB. Publications and articles have been made in various journals, nationally and internationally. With regard to policy, SUMAMAD played a role in the 2025 national plan for desalination in Egypt. The SUMAMAD site in Borg el Arab is a showcase for successful solar desalination. The SUMAMAD team played a role in influencing NGOS in how they are providing services, and was also successful in involving the private sector and social clubs in these activities. |
| Khanasser Valley Integrated Research Site, Syria: Z. Al Massri | The methods and processes developed in the project are having a positive effect on policymakers in the region who are moving slowly towards greater decentralization of NRM decision making. Plans are being developed to scale up the KVIRS project other marginal zone locations. |
| Hunshandak Sandland, China: G. Jiang | The impact on policy has been very strong, due to the publicity that the project has been able to generate. Around 218 articles about the project activities have appeared in top newspapers eg The Peoples Daily, owned by the communist party. These articles include interviews that have been used by the news agencies eg Xinhua. The Vice Premier and the Premier are familiar with the achievements of the project. There has been television coverage through programmes lasting over 400 minutes. International newspapers including the New York Times and Chicago Tribune have also picked up on the story. Two books have been published and twelve papers and magazine articles. Top officers visit the project field site. There has been a significant policy change in the governments approach to sandstorm control since June 2006. This matter was previously under the State Forestry Department, but they wasted a lot of money on ineffective tree plantation schemes. Now it is under community control, following the Hunshandak sandland model. |
| Heihe River Basin, China: J. Li & Q. Sun | In terms of policy impacts, this project improved projects in the river basin – the 3 rd largest river basin in china. |

| Study Site | Comments |
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| Zeuss Koutine Watershed, Tunisia: M. Ouessar | The main difficulties concern reporting on ongoing activities and how to balance the budget constraints. It is difficult to manage an integrated project addressing soil, water and income generation. The team had difficulties to say that one activity has been conducted 100% by the SUMAMAD project. The EU gives a specific budget and deliverables for projects that they support. But the SUMAMAD project asks the Team Leaders to design and manage their own budget and activities within the framework provided by the project, to achieve the common objectives. Each site has a diversity of activities. Also, the exchange of ideas between the sites could be strengthened. |
| Karnab Chul, Uzbekistan: M. Nasyrov | Reporting and budgetary management are also the key challenges at this site. The reporting schedule does not match the vegetation cycle. It is a deadline problem. The content of the project activities varies from country to country, and not all sites can comply with the framework provided for reporting activities on soil and water conservation. This team should not report results on water management, as required by the project design, since water supply to the site is by rainwater. No activities are required to address this issue. The study team focuses on vegetation mapping. The structure for the final report should be suitable for all sites. It is a positive thing that the sites are different. The Team Leader has learned a lot from this during trips to the other sites, and by email. This should be continued, together with more training for young scientists. The project should make more use of the participating experts from each site, like Dr. Salem to provide training. Once trained, researchers can work for ten years more productively. |
| Dingarh / Lal Suhanra Biosphere Reserve, Pakistan: M. Akram | The reporting cycle for data reporting should be over two years, rather than one. One year is too short to obtain results. For example, the growing season for different vegetables varies. You may grow them in February; then they mature later. This does not fit to the annual reporting schedule. The Team Leader learned a lot from visiting the grasslands in Inner Mongolia. This gave him the idea to grow more grasses in the desert. Rangelands have all types of vegetation. |
| Dana Biosphere Reserve, Jordan: M. Qawabah | This project team observed a mismatch between the objectives and the size of the project. The objectives require a lot of activities and budget, eg to deal with rangeland problems. But the resources are not provided to match up to the objectives. But within the institutions, there is an overexpectation from the names of the institutions. It is assumed that the project will provide a lot of funding. The study team accords a low priority to projects for which limited resources are available, and chooses cheaper activities. For example, the best socioeconomic study would cost more money, so you will go to the second best or the third best one. As regards the management of the project itself, there is a healthy interaction between the coordinators. This enriches the study team. There should be more discussion of the workplans in the project, so that they are properly reviewed. In Jordan, there has been a difficulty to engage scientific contributions from universities. |
| Gareh Bygone Plain, Iran: M. Mohammadnia | The main difficulty encountered at this site concerned the need to convince local people of the value of the project. When you are working with people, you have to have their trust. It takes time. The Team Leader also agreed that there should be more harmonization of SUMAMAD activities. |
| Omayed Biosphere Reserve, Egypt: B. Salem | The Team Leader observed that the SUMAMAD objectives are very wide, and budget is very limited. That is why this team chose a site where information already exists, and the Team Leader had already been working. This helped to gain the trust of the people. This team has found difficulties to reach decision-makers. The Team Leader has concluded that the only way to talk to them is to talk money. The development of scenarios can show them the value of the natural resources. This should be the focus for the next phase. Each team should now focus their activities more and identify their capacity needs. |
| Khanasser Valley Integrated Research Site, Syria: Z. Al Massri | As note by others above, attribution of outputs and outcomes to this project is the most difficult as the SUMAMAD project is complementary to other on-going activities with greater inputs. This is particularly important when other donors are involved. I suggest that these other projects and donors are mentioned as contributors in SUMAMAD publications. |

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| <p>Hunshandak Sandland, China: J. Gaoming</p> | <p>This team found it hard to balance efforts between natural science and social science, since the study team is composed of scientists. The challenge to address socioeconomic issues was quite difficult. One major challenge concerns marketing. Although the activities have produced high quality products, there are not the funds to market them in big cities. Socioeconomic problems are more difficult than scientific ones. Introducing new ways to increase income can lead to strong conflicts with culture. Another challenge concerns political problems in China. The study team tells the truth, but the Ministry level, for example the State Bureau has the real power. There is poor linkage with other international projects. All organizations have interests in hot topics and repeat them. There is a need to address the issue of markets. The study team would like to find partners to carry out research on this topic, and to produce technological publications as well as the existing scientific ones.</p> |
| <p>Heihe River Basin, China: L. Jinxiu & S. Qingwei</p> | <p>Because this team receives no funding from the SUMAMAD project, its activities are built on ongoing projects. This team has been working on water sharing between 3 provinces. Decisionmakers appreciate this work. The shortcomings are at the household level, where there is a need to transfer. There is no funding available to do this. The study team wants to transfer its findings to the farmers. This team hopes that in the next phase they can do more on this issue.</p> |

ANNEX 3: Outline for Policy Brief Discussed During Workshop

People in Marginal Drylands – Managing Natural Resources to Improve Human Well-being

Section I: A Global Overview of the Challenges Faced by People Living in Marginal Drylands (2 pages)

- Geographical distribution of drylands
- Marginality and consequences for dryland dwellers
- Drivers of pressures in dryland ecosystems
- Integration of natural resource management and human well-being in drylands
- Rationale for implementation of the SUMAMAD project

Section II: Formulation of Strategies for Sustainable Management of Marginal Drylands (4 pages)

- Context of past experiences in dryland research
- The importance of participatory methods and socio-economic context to the success of dryland research initiatives
- Challenges to put into practice in SUMAMAD the lessons from these experiences
- Elaboration of the SUMAMAD assessment methodology

Section III: A Constellation of Dryland Conservation, Management and Research Centers (9 pages)

- Overview of study sites and their selection
- Institutional arrangements and partnerships at the study sites
- Comparative overview of environmental conditions
- Overview of socio-economic conditions
- Identification of major stresses on natural resources
- Identification of common drivers of land degradation

Section IV: Exploration of Wise Practices for Dryland Management (4 pages)

- Description of management practices, both traditional and innovative
- Identification of sustainable management techniques through participatory research with local communities
- Testing and assessment of management practices through site specific research activities
- Testing management practices, generic approaches and findings
- Promotion of wise practices for wider uptake

Section V: Improving Dryland Livelihoods through Participatory Approaches (4 pages)

- Identification of alternative income generating activities
- Measurement of improvements in local livelihoods
- Identification and assessment of non-income benefits of ecosystem services
- Changes in dryland communities' livelihood strategies and perceptions
- Lessons from participatory research in drylands

Section VI: Sharing Knowledge from Participatory Research in Drylands (4 pages)

- Building networks for dryland management and research
- Exchanging findings, transferring lessons: successes and failures of the SUMAMAD project
- SUMAMAD project connections to policy formulation

Section VII: Strategies for the Future: Addressing New Challenges in Drylands (4 pages)

- Capturing the wisdom from a project like SUMAMAD
- Identifying traditional knowledge that is relevant to the contemporary management challenges
- Effectiveness of South-South collaboration
- Ways to influence policy formulation processes at national and international levels

Annex

- 1 Page abstract of each study site, including map and short description of key characteristics
- List of study team members
- List of publications

ANNEX 4: Draft Outline for New Phase Project Document Discussed During Workshop



Sustainable Management of Marginal Drylands (SUMAMAD)

Summary Draft Outline for Second Phase

I. Brief Project Description

In the light of the Rio Conventions, the project aims at enhancing the sustainable management and conservation of marginal drylands in Africa and Asia [and Latin America?]. Drylands are particularly vulnerable due to climatic and human pressures, yet they constitute some of the world's largest land reserves in terms of space and natural resources. The Millennium Ecosystem Assessment (2005) highlighted the challenges and opportunities for sustainable development in drylands through wise practices that both respect the conservation of the environment, and provide improved and alternative livelihoods for dryland populations.

The first phase of the SUMAMAD project (2003-2007) developed a harmonized methodological approach for investigation of conditions at selected study sites through socio-economic surveys to identify people's adaptation and traditional knowledge in coping with adverse dryland conditions. A suite of sustainable management approaches were identified and tested within the study sites through a range of testing methods.

As its overall objective, the -new phase of the project (2008-2011) will focus on building the capacity of dryland researchers to transfer their scientific findings for use both by land users and for policy-level decision-making.

As had been discussed and agreed upon at the 5th international SUMAMAD Project Workshop (Aleppo, Syria, Nov. 2006), overall project activities will be streamlined to facilitate comparative approaches among the participating project sites. Accordingly, the following themes will be addressed by all project sites:

(1) Scientific studies:

- Improvement of dryland agriculture including rangelands and livestock, with biodiversity and sustainable use of natural resources as a minor component.

- Restoration/rehabilitation of degraded drylands including sustainable water conservation and harvesting practices.

(2) Policy-relevant analysis:

- Developing scenarios for land use change (also in the context of global and climate change) including the assessment of trade offs, economic valuation of dryland services, environmental education and outreach.
- Interfacing with the relevant policy formulation institutions and processes in the respective countries.

(3) Promoting sustainable livelihoods:

- Alternative income generating activities – diversification of options including ecotourism, handicraft, medicinals, forages

Research activities will identify and pursue evaluation approaches to inform decision-makers on sustainable land and water management practices. As recommended by the Tunis Declaration (2006), future scenario development and evaluation of ecosystem services are two key tools for such assessments. These tools will be explored through a participatory, multi-stakeholder process approach, involving landowners, farmers and other stakeholders, with a focus on sustainable and indigenous dryland management practices. Analysis of current and ongoing community-level strategies for coping with dryland conditions will be an essential element of these evaluations.

II. Baseline Situation, 2007

At the outset of the project, an assessment of conditions at the participating dryland sites has already been developed by SUMAMAD research teams during the previous phase of the project 2003-2007 (if new sites are added to the project, they will be required to produce a similar assessment at the outset of the 2008-2011 phase).

The baseline assessment includes an overview of applicable approaches to improve the conservation of soil and water resources. These approaches are site specific, and vary amongst participating sites. In each case, 1-2 activities for alternative income generation (activities that enable income generation without increasing pressure on natural resources) are incorporated. These may be summarized as in the table below:

2003-2007 SUMAMAD Research Teams and Management Approaches under Exploration

| Site | Management approach under exploration* | Income generating activity |
|------------|--|--|
| China | Natural restoration | Ecotourism and cooperative marketing of local produce (chickens and tofu products) |
| Egypt | Ecological management scenarios for seasonal rangelands (Moghara Oasis) | Fruit drying, sewing |
| Iran | Artificial Recharge of Groundwater (ARG) | Apiculture, ecolabelling of honey, fish farming |
| Jordan | Nature reserve incorporating village and mobile communities | Olive oil soap production, organic gardening |
| Pakistan | Use of saline groundwater for fish farming and irrigation | Vegetable gardening, fish farming |
| Syria | Nutrient management on farms and in home gardens | Vegetable gardening |
| Tunisia | Water harvesting and spreading structures | Ecotourism |
| Uzbekistan | Rehabilitation of degraded rangeland through replanting native species and regulation of grazing | High value hot-house plant production, handicrafts |

III. Composition of Research Teams

SUMAMAD Research Teams are interdisciplinary, involving expert researchers in environmental and social fields, environmental conservation managers, as well as members of local communities (including NGOs where possible). It is essential that the project teams continue to span across disciplines and comprise nationally well-reputed scientists. The interdisciplinary nature and strengths of each participating team will be re-evaluated at the outset of the project through self-assessment by the Teams and Team Leaders.

During the 2008-2011 phase, each team will consist of a designated Team Leader, and a designated Deputy Team Leader, as well as other team members. This will help to ensure continuity in the project activities.

Where needs for strengthening research teams in particular fields are identified in order to take on the proposed project activities, additional partners may be invited to join the National Teams and/or training provided from within the project.

IV. Outline of Proposed Activities

A. Research Activities at Participating Study Sites

Under the 2008-2011 phase of the project, research teams will undertake the following activities:

1. Development of 3-4 management scenarios to inform decision-making on available management approaches at each site, including identified income generation activities and natural resource conservation. Although the management approaches and income generation opportunities already identified within the project vary, the evaluation approaches will be generic – focusing on evaluation of ecosystem services and livelihood benefits in a coordinated manner to enable comparison between options for each site, as well as to facilitate comparison between sites and their available management options.
2. Participatory research with local communities to determine their likely coping strategies, also in the context of global and climate change, under these 3-4 scenarios
3. Development of management analysis report based on the scenario development and participatory research; this report will provide quantified information about the cost-benefit analysis of the selected approaches.
4. Presentation of scenarios and reports to policy-makers and local people, and evaluation of relative merits according to local and national priorities

B. Exchanges Between Study Sites

Under the first phase of the SUMAMAD project, considerable interest in exchanges between project sites was identified. During the 2008-2011 phase of the project, these exchanges will be developed as follows:

1. Continued exchange of scientific findings and expertise between study sites through annual international workshops;
2. Increased exchange of junior researchers between study sites for training purposes;
3. Introduction of a new dimension to the project on comparative studies across the project to be led by Team Leaders in their field of interest. Team Leaders must propose these studies to the group for discussion during the annual international workshop. Eg:
 - Digital mapping in GIS of land-cover types across the project sites, led by Boshra Salem, Egypt
 - Comparative study of Rainfall Use Efficiency across a number of participating sites, led by Jiang Gaoming China
 - Comparative study of carbon sequestration across a number of sites, led by Muhtor Nasyrov, Uzbekistan
 - Comparative study on the development of co-management strategies that link land users more closely with decision or policy makers, Syria.

C. Local Coordination and Outreach at Participating Study Sites

Coordination activities at participating study sites will continue to include National Multi-stakeholder Seminars, organized by the Team Leaders on an annual basis. The profile of the National Seminars will be systematically raised during the second phase of the project, to improve engagement and participation by policy-makers. During the first international workshop of the new project phase, the Team Leaders and Management Group will develop a strategy for raising the profile of National Seminars, including a modest budget to be allocated to elements of this strategy, if required.

V. Proposed Outputs

The activities listed above should lead to the following expected outputs:

- a) A methodology for evaluation of integrated land management approaches through the development of management scenarios, which is applicable to other sites and case studies.
- b) A project report from each site presenting 3-4 illustrative scenarios of tradeoffs and choices for decision-makers and local communities with regard to sustainable land management, also in the context of global and climate change. These scenarios will include descriptions of local coping strategies and resource management priorities.
- c) A management analysis report based on the scenario development and participatory research, including a cost-benefit analysis
- d) Visual tools for education and communication of scenarios and choices to decision-makers, including maps, presentations and web-based materials developed through international collaborations amongst Project Team members.
- e) Peer-reviewed, scientific publications from each project site
- f) A published book on evaluation techniques for dryland management approaches. This will serve the benefit of communicating the findings to other on-going projects and may serve as a model for other African and Asian efforts to sustainably manage dryland areas.
- g) An accessible, brief, summary publication for decision-makers
- h) Other information materials designed by project members for high priority groups eg farmers, schoolchildren and NGOs
- i) Trained personnel for handling data collection and inventory techniques, as well as knowledge on proven management technologies, locally available to ensure the long-term sustainable management of marginal lands.
- j) A strengthened inter-regional network, facilitating cooperation between African and Asian [and Latin American] scientists and policymakers in the environmental field and biosphere reserve managers.

List of Annexes to Summary Draft Outline for Second Phase:

ANNEX 1: Team Leaders Suggestions for Next Phase of SUMAMAD
(Email consultation, 2006)

ANNEX 2: Priority-setting Exercise on Research Themes for the Second Phase
(Aleppo, 2006)

ANNEX 3: SWOT Analysis
(Aleppo, 2006)

ANNEX 5: Example Tabular Presentation of Outcomes, Impacts and Indicators

Objectives (activities), Outcomes, Impacts

Activities



| Objectives | Outcomes | Impacts |
|-------------------------------------|--|--|
| Dryland agriculture | Improved management of natural resources | Improved provisioning of ecosystem services |
| Restoration / rehabilitation | Demonstrated sustainably managed project sites | |
| Development of scenarios | Better understanding of the management options | Revision / improvements in management approaches and underlying policies |
| Interfacing with policy formulation | Better awareness in policymaking processes | |
| Alternative livelihoods | Improved capacity to undertake alternative livelihoods | Increase in income / decrease in poverty |

ANNEX 6: List of Participants

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