



Seventh International Workshop

***Sustainable Management of
Marginal Drylands – Phase 2 (SUMAMAD-2)***

Jodhpur, India – 22-23 November, 2009

Workshop Report

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I. Background

Within the framework of the second phase of the project “Sustainable Management of Marginal Drylands (SUMAMAD-2)”, UNESCO and the Central Arid Zone Research Institute (CAZRI) organized the project’s seventh international workshop, held in Jodhpur (India), from 22 - 23 November 2009. This workshop was the first meeting of the SUMAMAD Project team leaders within the second phase of the SUMAMAD project (2009-2013). The workshop was held in a back-to-back manner with the international conference on “Nurturing Arid Zones for People and the Environment: Issues and Agenda for the 21st Century”, 24 – 28 November 2009 (see <http://www.cazri.res.in/azconf2009/>) which was jointly organized by CAZRI and AZRAI (Arid Zone Research Association of India) to commemorate CAZRI’s fiftieth anniversary.

The SUMAMAD Project itself is implemented by UNESCO’s Man and the Biosphere (MAB) Programme and executed by the United Nations University – Institute for Water, Environment and Health (UNU-INWEH), thanks to funding provided by the Flemish Government of Belgium.

The workshop participants were invited from the project partner research institutions as follows:

<i>Bolivia:</i>	Universidad Mayor de San Andrés;
<i>Burkina Faso:</i>	Institut de Recherche en Science de la Santé (IRSS) Centre Nationale pour la Recherche Scientifique et Technologique (CNRST);
<i>China:</i>	National Committee for UNESCO-MAB Programme at the Chinese Academy of Sciences;
<i>Egypt:</i>	University of Alexandria and Omayed Biosphere Reserve;
<i>India:</i>	Central Arid Zone Research Institute (CAZRI);
<i>Iran:</i>	Research Society for Sustainable Rehabilitation of Drylands (REaSSURED);
<i>Jordan:</i>	The Royal Society for the Conservation of Nature (RSCN)
<i>Pakistan:</i>	Pakistan Council of Research in Water Resources (National Committee for UNESCO-IHP Programme) and National Committee of UNESCO-MAB Programme;
<i>Syria:</i>	Natural Resources Research Administration (NRRA);
<i>Tunisia:</i>	Institut des Régions Arides (IRA), Médénine ;
<i>Uzbekistan:</i>	Samarkand University.

Previous international SUMAMAD workshops have been held as follows:

- 1st workshop: Cairo and Alexandria (Egypt), September 2002;
- 2nd workshop: Shiraz (Islamic Republic of Iran), November 2003;
- 3rd workshop: Djerba (Tunisia), December 2004;
- 4th workshop: Islamabad (Pakistan), January 2006;
- 5th workshop: Aleppo (Syria), November 2006;
- 6th workshop: Xilinhot City (China), September 2007; and
- Planning workshop for the second phase of SUMAMAD: Amman (Jordan), June 2008

II. Objectives:

The seventh international SUMAMAD workshop brought together designated national project coordinators from the above-mentioned project partner research institutions and the members of the project core management group. As its main objectives, the workshop sought to:

- Review the implementation of the SUMAMAD Project and its national field project activities since the start of the project's second phase (2009);
- Discuss specific training needs for the individual projects sites;
- Provide training to SUMAMAD Project participants, in particular on scenario building, ecosystem valuation and adaptation to climate change.

The national project coordinators were invited to provide an overview of their SUMAMAD project activities in 2009 through funding provided by the SUMAMAD Project and following the workplan stipulated in the SUMAMAD-2 Project Document, as well as to propose specific training needs and/or study visits to other SUMAMAD project sites with an estimated costing.

SUMAMAD Project partners also had the opportunity to attend, if they so wished, the CAZRI international conference on "Nurturing Arid Zones for People and the Environment: Issues and Agenda for the 21st Century" (Jodhpur, 24-29 November 2009).

III. Proceedings:

Sunday, 22 November 2009

Inaugural Session

Lighting of the Lamp, Presentation of Bouquets

1. Dr RK Kaul of CAZRI opened the Workshop. Drs NV Patil, Ram Boojh, Richard Thomas, Donald Gabriels, and NL Joshi participated in the lighting of the lamp and presentation of bouquets.

Welcome Address

2. Dr NV Patil, Director of CAZRI, welcomed the participants. He recalled CAZRI's founding on the recommendation of UNESCO in 1959, and noted that CAZRI and UNESCO have a long history of collaboration. He highlighted the success of the SUMAMAD Project's First Phase, and expressed his hope that the exchange of knowledge through this Workshop and the SUMAMAD Project will benefit dryland populations internationally.

About the Workshop

3. Dr Ram Boojh, UNESCO-New Delhi, presented the Workshop. He thanked CAZRI for hosting this Workshop and recalled the UNESCO-MAB meetings held two years ago at CAZRI and the Jodhpur Declaration that was then issued. He introduced the Workshop content and highlighted its focus on learning from each other and supplementing presentations with on-site experience. He reminded participants of the context of the Workshop in the run-up to UNFCCC COP-15 in Copenhagen, and promised that UNESCO would take lessons from SUMAMAD to Copenhagen.

About the SUMAMAD Project

4. Dr Richard Thomas, UNU-INWEH, presented a background on the SUMAMAD Project. He recalled that SUMAMAD-I was a four-year project funded by the Flemish Government of Belgium, and that the success of the first phase led to the design and launch of Phase 2. He highlighted the important role played by national co-financing for the project, and noted that the SUMAMAD Project functions to build and add value to existing work through networking. The primary goals of the project are to foster good research on drylands; develop policy-relevant information to bring to decision-makers; and promote alternative livelihood strategies for dryland populations. He emphasized SUMAMAD's importance for spanning disciplines and exchanging information on dryland management. The primary outputs of SUMAMAD-II should be the continued promotion of better dryland practices; building of capacity through training and education; awareness-building of the project at the national level; and promotion of concepts and principles developed through SUMAMAD at the international level.

Inaugural Address

5. Prof Donald Gabriels inaugurated the meeting on behalf of the Flemish Government of Belgium, recalling the principles of the Flanders-UNESCO Trust. He noted the excellent reviews given the SUMAMAD project by experts, and the important role played by the project in fostering cooperation and scientific collaboration. He reminded participants that there is no simple solution to the complex problems of drylands, and that a participatory approach and the effective communication of scientific knowledge are essential.

Vote of Thanks

6. Dr NL Joshi of CAZRI offered a vote of thanks to all project partners – the management team and participants and the CAZRI organization team.

Session I – Country Presentations

Introduction

7. Dr Richard Thomas introduced the Country Presentations by recapping SUMAMAD history, highlighting the publication of the SUMAMAD Synthesis by UNESCO and Policy Brief by UNU. He recalled the project objectives of promoting dryland research, producing policy-relevant guidelines, and supporting the development of alternative livelihoods for dryland populations. He described how the baseline assessments of SUMAMAD-I served as a foundation for the development of management approaches and practices to deliver project outputs, and he reaffirmed the broad themes of the project as Land, Water, and Livelihoods. Dr Thomas urged participants to explore opportunities for coordination, promotion of sustainable practices, enhanced capacity building through training and exchanges, and promotion of project activities at the national level (through National Workshops, participatory activities, awareness raising, and stakeholder involvement) and the international level (through SUMAMAD Workshops, site visits, project syntheses, and presentations at international events).

Bolivia – Jorge Cusicanqui

8. The Bolivia project is focused on ‘Managing Sustainability of New Quinoa Production Systems through Farming Systems Management and Market Insertion’ and complements the Flemish-funded ‘Quinaqua’ project.
9. Mr Cusicanqui explained the characteristics of the altiplano environment where the project takes place. Quinoa production is concentrated in the center-south of the altiplanos, where the 380mm of annual rainfall comes mostly between December and March, though the rainy season has been shifting with climate change.
10. Quinoa has been shifting from a food security crop to a cash crop. In 1950 there were 19,000 Ha under quinoa production, and in 2008 this area had grown to 50,000 Ha. Yields, however, have remained roughly 400-600 kg/Ha. The expansion of quinoa production is supplanting grazing land for llamas and alpacas and altering the ecosystem. Irrigation can improve quinoa yields, and the focus of the Bolivia project is on promoting intensification, as opposed to extension, of quinoa production.
11. The goal of SUMAMAD-Bolivia is thus to strengthen quinoa production in arid highlands with Deficit Irrigation and market management as an adaptation option to climate change. The project is working to develop an understanding of the ecosystem

- and the drivers of ecosystemic change, as well as livelihood changes in response to risk perception. The project has evaluated climate variability and the validity of current weather information, including temperature, evapo-transpiration, and water deficit. The project is also conducting a baseline assessment of livelihoods and risk perception through a community livelihood survey and evaluation of local indicators. Agreements with communities have been signed to this effect. A participatory evaluation of quinoa market insertion and potential is to be carried out through community workshops, and results of the project will be disseminated through the organization of the annual national workshop as well as training workshops and seminars.
12. The main constraint faced this year by the project is that the Southern Hemisphere agricultural year runs from November to April. They are now in the sowing period, but the first year of the project has officially finished – so the project implementation timeline and ecological realities do not match up
 13. In discussion, use of chicken manure compost for quinoa was highlighted, as was the fact that the quinoa market is largely concentrated on organic production. As the market demand for quinoa has increased, so has the area under production, but yields have not increased. This expansion of production is thus threatening grazing land and ecological systems, thus this project seeks to intensify production in order to respond to market opportunities in an environmentally sustainable way. Irrigation can increase yields, but water is scarce, so irrigation must be done sparingly. Salinity is also an issue. Deficit irrigation irrigates through furrows (or could work through drip irrigation) at specific times during the growth cycle to maximize yields. The project should experiment with furrow length to minimize water loss and maximize irrigation efficacy.

China: Hunshandake Sand Area/Xilin Gol Biosphere Reserve – Jiang Gaoming

14. The Chinese presentation focused on improving sandland productivity, water and nutrient use efficiency, socioeconomic studies, income generation activities, training, a national seminar, policy, and planned activities.
15. In terms of improving sandland productivity, water and nutrient use efficiency, the project compared land productivity and rainfall use efficiency between cattle manure and chicken droppings, employing a large chicken farming experimental platform. They evaluated the fertilization effect of droppings, the efficiency of chicken meat production in terms of grain requirements, and the vegetation effects on the grassland of cattle versus chicken production. The project also explored the use of a light trap to trap insects for the chickens to eat.
16. Regarding new income generation activities, the project helped found the Zhenglan Zhongke (Chinese Academy of Sciences) Scientific and Development Company with support of the local government to carry out chicken production. Farmers have been trained in income generation activities, with 11 house farmers participating in the project and 22,000 chickens rented by farmers; the Company has around 30,000 chickens. Project activities have included training local farmers to raise the birds.
17. At the 2009 National Seminar, the Deputy President of CAS attended and the conference took place at a high level. The seminar included discussions on the management of chickens in grassland, ecotourism and marketing, and national policies on the restoration of degraded sandlands.
18. The SUMAMAD project has collected data on soil organic matter, and water content, and has conducted an analysis of fertilization effectiveness. There have been several publications related to SUMAMAD work. Many project activities have continued from SUMAMAD-I, and new activities such as the investigation of chicken manure's

- effect on productivity are being carried out. Of particular note is the new company formed for chicken production. In terms of difficulties, the project faces losses of chickens to wild animals. Farmers are happy to work for the company, but then finding the market for the birds is a difficult step at first.
19. The main project benefits are for the land and labor of the local people. Families participating in the income generation scheme earn more money per hectare from raising chickens than from cattle, and families also benefit from hay harvesting. International media and national media have reported on the project. The next important task is expanding and connecting to the market, which could be supported with government investment.
 20. Chicken-raising has been shown to cause little harm to grassland compared to cattle or sheep production. The Ministry of Agriculture and other government bodies have shown an interest in learning from and growing the project. In 2010, a comparative study is planned of economic output and ecological impact of chicken farming versus traditional grazing. Also foreseen are studies on plant and water conservation practices. The project team is planning a national seminar based on achievements of the project and the promotion of livelihoods through organic chicken farming, dairy production, and greenhouse vegetables.
 21. In discussion, participants commented on the potential impacts of large-scale chicken farming and risks of large chicken populations in terms of bird flu and other illnesses. Organic production techniques were explained, including the procurement process for organic grain.
 22. The Vice President of Zhingong Party showed particular interest in new income generation activities in Inner Mongolia. He suggested his party will inform the top officials of the Communist Party in order to expand the demonstration areas.

Egypt: Omayed Biosphere Reserve – Boshra Salem

23. Dr Salem recounted her experience presenting the SUMAMAD project at the International Conference on Education for Sustainable Development, April 2009 in Bonn, Germany. Dr Salem has also been awarded the UNESCO Michel Batisse Prize for Biosphere Reserve Management.
24. The major ecosystems in Omayed Biosphere Reserve (OBR) are coastal dunes, a saline depression, rocky ridges, a non-saline depression (site of irrigated agriculture), and an inland plateau (site of grazing). Previous SUMAMAD work identified problems of loss of biodiversity, habitat fragmentation and loss and land degradation in the biosphere. Current land transformation in OBR is affecting ecosystems, and this will be aggravated with climate change.
25. Dr Salem explained a satellite image analysis that shows changing land uses as irrigated vegetation and urban development take over coastal dunes and desert background. Irrigation is coming from an extended Nile canal. The effects on ecosystem services of habitat transformation were highlighted. Food and fiber of rangelands has decreased, fuel wood and medicinal plants have been depleted and groundwater has been drawn down. Traditional cultures are also affected. However, summer resorts do provide jobs and an influx of people means more visitors to OBR. The outputs of SUMAMAD activities Phase I include an M.Sc. Thesis on Valuation of Ecosystem Services in Drylands and a report on Climate Change in OBR.
26. In the climate report, analysis of climactic data shows an increase in average maximum temperature, though not exceeding 0.2 degrees Celsius. Rainfall regimes are changing. Bird migration through the BR has been observed to change which may be related to changing climactic conditions in Europe. The report noted shifts in plant

- and animal distribution, precipitation and evaporation patterns, changes in species interaction, shifting seasons, changes in coastal margins and rising sea temperatures.
27. In continuation of SUMAMAD-I work, indigenous seeds were collected for germination and transfer. Germination success was studied.
 28. Different scenarios for site management were explored. The preferred method is to divide the area into two sectors – northern and southern. In the more degraded northern sector, five core locations will be selected for full protection. In the less-impacted southern sector, more opportunities to control future development exist.
 29. A stakeholder analysis was carried out, consisting of stakeholder identification and categorization and stakeholder interviews. A participatory national workshop was organized to discuss climate change impacts in the area. Collaboration has been initiated with a local NGO for community development. Recommendations were developed for climate change adaptation, including continued rehabilitation of Roman cisterns and the use of halophytes for sustainable systems.
 30. The project has collaborated with the Bibliotheca Alexandrina to train young scientists on drylands research techniques.
 31. In terms of income-generating activities for local communities, the communities are interested in having women involved in handicraft production. The project is supporting them to establish a training workshop. The target is to train 200 young women. The project continues to supply women with sewing machines. For men, the project is proposing to provide men with olive trees for producing oil and fruit. The project is also working to provide fresh drinking water in collaboration with EHDA (an environmental science NGO) through solar desalination units. The project has already installed a dozen units.
 32. The project also continues to work on the rehabilitation of Roman cisterns – there are 26 cisterns, and three have already been rehabilitated. The project is looking to rehabilitate another 4.
 33. OBR is working to provide fresh drinking water through an EU project that uses a RE-NF-MSF System (which utilizes solar and wind energy in a ‘multi-flash’ system). Production is 5 cubic meters per day for a system. This is combined with nanofiltration. The pilot system could be installed in one of the villages of OBR.
 34. In discussion, financial mechanisms for rehabilitating cisterns were clarified – NGO grants have helped support work on the cisterns, first from the environmental NGO established in the first phase of SUMAMAD. Now a community NGO has accepted to maintain the rehabilitated cisterns. Quantification of income benefits from alternative livelihood schemes was discussed – many of the benefits are projected around a new market for tourists to be opened near the OBR. The new Nile canal has had enormous socio-economic and environmental impacts, but data in terms of salinity, sea-water intrusion, and water levels are with the Ministry.

Pakistan: Lal Suhanra Biosphere Reserve and Cholistan Desert – Zamir Ahmed Soomro

35. Dr Bhim Adhikari stood in for absent SUMAMAD partner Dr Zamir Ahmed Soomro of Pakistan to share the presentation he had provided. Dr Soomro’s presentation showed the results of the application of irrigation on rangeland and the positive impact of rain gun irrigation on biomass production. The presentation included information on the national seminar held in Pakistan with over 200 participants. The seminar agreed upon the construction of rangeland users’ committees. With regard to training needs, a training course of 2-3 weeks on rangeland management is needed.

Jordan: Dana Biosphere Reserve – Ma'en Ahmad Al-Smadi

36. Dr Richard Thomas stood in for absent SUMAMAD partner Dr Ma'en Ahmad Al-Smadi of Jordan to share the presentation from the Jordan team. The team is working in the Dana Biosphere Reserve. The project is preparing and implementing a comprehensive baseline livestock and rangeland use survey. The project is also reviewing relevant literature on participatory approaches and accessibility to communities, and is planning to hold a technical workshop for exchange of information. Additionally, the project is seeking to characterize pastoral communities using the resources of Al Bara area across socio-environmental criteria.

India: Arid Western Plain, Rajasthan – NL Joshi

37. Rajasthan has nearly 62% of the hot arid areas in India. The region suffers drought 3 out of every 5 years. The soils are predominantly sandy, low in organic carbon and phosphorus, and medium to high in potassium. Certain areas suffer from deficiency of micronutrients. The vegetation generally consists of poor condition grasses and shrubs. The drier western part of the region is dominated by rangeland, while the slightly wetter eastern part is dominated by crops.
38. The project investigates the degradation status of rangelands and runoff farming systems (khadin systems); improvement strategies for rangelands, khadins and arable farming; alternative income generation activities; crop diversification and integrated arable farming; and policy relevant analysis. The project is implemented in two rainfall situations – crop diversification studies for arable farming in the 200-400mm rainfall area, and rangeland and runoff farming studies for the <200mm rainfall area. The project is also exploring rangeland rehabilitation and restoration, planting of medicinal plants, and agri-horti systems.
39. The workplan for the first year included crop diversification through selection of sites, awareness building, water harvesting, an action plan for farmer participation, and the initiation of agricultural diversification studies. For rangeland and runoff farming systems, the plan called for identifying rangeland and khadin sites and characterizing the sites; conducting a Rapid Reconnaissance Survey of the sites, community consultations, and workshops to develop a sustainable management plan; and selection of village sites.
40. Despite a late start on activities, good progress was made on the workplan. In the higher rainfall region, exploratory sites were visited by the team and two village clusters were selected. Soils, land use, and livestock populations were characterized. Team members visited the villages regularly to raise awareness and develop a rapport with the communities for the project. With participation of farmers, the action plan for the project was prepared, calling for the construction of water harvesting structures, crop diversification, and alternative livelihood generation. Many of these activities have yet to be initiated pending arrival of funds. CAZRI is currently focusing to complete four major activities under the SUMAMAD project: construction of water harvesting structures, crop diversification experiments, establishment/mortality replacement of perennial plants and organization of the national workshop.
41. In the lower rainfall region, the village site was selected, secondary socio-economic data were gathered, a rapid reconnaissance survey was carried out, and spatial and point data were digitized. Fencing of the experimental site is in progress. Pending initiation are a participatory rural appraisal, documenting of traditional practices, and stakeholder workshops.
42. Training needs of the project team have identified and potential resource persons are being discussed.

43. In discussion, definitions of drought and soil deficiency were clarified and rainfall intensity measures explained.

Iran: Gareh Bygone Plain – Mansour Esfandiari Baiat

44. The first phase of SUMAMAD in Iran produced results including the international exposure of the merits of artificial groundwater recharge, the formation of local cooperatives, and the formation of the NGO 'REaSSURED', among other achievements.
45. Specific objectives of the project are supplying irrigation and safe drinking water; construction of a green village and providing livelihoods for 110 households; implementing integrated action research projects; and proving that degraded rangelands and floodwater can provide a decent livelihood.
46. The project constructed FWS's (flood water spreading systems), prepared land for irrigation, introduced soil and water conservation techniques, etc. The main expected outputs are providing safe water to about 2500 villagers and 500 nomads and irrigation water for 451 Ha; achieving sustainable income generating alternatives; and improving water use efficiency.
47. For 2009, one main objective was monitoring the forest and range plants in a floodwater spreading system. The research showed that more palatable species have replaced less valuable plants in the system, with positive impacts for the rangeland. The effects of the sowbug on desertification control were assessed. The sowbug is known to increase aggregate size and stability of soils. The project also sought to empower local organizations for participating in Aquifer Management.
48. The major problems in the project area according to participatory rural appraisal are a shortage of drinking water in the region, unemployment, shortage of groundwater for agriculture, little income, lack of trust between local people and local executives, and so forth. Various measures are proposed including supporting the village cooperative, transferring land and works to the cooperatives, and improving private sector investment. In seeking to promote income-generating activities, a study of alternatives was undertaken.
49. The project also investigated the effect of floodwater irrigation on the performance of jojoba. The experiment was carried out in two adjacent sites. The study found that floodwater irrigated plants in fact did not do as well as those plants in the elevated area.
50. The project is examining the feasibility of producing organic honey. The study found that enough nectar and pollen are available for bees throughout the year. Twenty hives were prepared and the results of production and quality studies will be reported next year.
51. Groundwater recharge is also under study. Floodwater spreading systems were constructed on 162 ha with SUMAMAD and Iranian Government funds in 2009.
52. The first National Workshop of SUMAMAD-II was held 20 October 2009. The participants discussed the PRA process and appropriation by villagers of the advantages of the water management systems. Organic honey production was also discussed in further detail.

Tunisia – Mohammed Ouessar

53. Dr Ouessar presented the context of Tunisia's ecology and the Arid Zone Observatory (sites studied by the Institut des Régions Arides - IRA).
54. The Bou Hedma Biosphere Reserve was added for this SUMAMAD Phase, complementing other Flemish and MAB projects. The SUMAMAD Project in Tunisia

- also interacts synergistically with for instance EU projects DESURVEY and DESIRE. The Tunisia team is organized in Research (IRA-IO/U Ghent) and Development (CRDA-National Park/NGOs) subteams.
55. The project carried on work from Phase I, examining the effects of olive waste water 'marginés' on cropping performances of barley. The results will be reported in 2010. Another activity relates to groundwater recharge structures. Upstream and downstream structures and silting were studied. The project carried out an inventory and attribute estimation of *Acacia tortilis raddiana* (a unique local subspecies) populations using satellite data and examined the influence of afforestation on soil properties in the Bou Hedma BR. IRA also established a meteorological station in the area.
 56. Dr Ouessar presented activities related to the Education Kit for Dryland Regions and suggested the development of a kit more suitable for primary/secondary school students. IRA has made an agreement with a secondary school and agreed on the installation of a botanical garden. They have provided the school with working materials and a plantation of medicinal and aromatic plants (MAP) is in progress, but UNESCO has not been responsive on carrying forward the project.
 57. The National Workshop was held on 11 November 2009. The Workshop ran contiguously with the LUPIS land policy workshop and a training workshop on desertification monitoring. There are also training needs to be discussed with partners.
 58. In discussion, the benefits of having education kits specifically suited to particular regions were highlighted, as well as the reasons for choosing Bou Hedma for activities in the second phase of SUMAMAD. Bou Hedma's ecological diversity, its status as a protected area, and the chance to synergize with a Flemish project for acacia plantation were attractions in choosing Bou Hedma. Dr Ouessar also elaborated on sustainable development activities. One plan is to enhance the benefits of the park for the local population by developing eco-tourism facilities and infrastructure.

Burkina Faso: Mare aux hippopotames Biosphere Reserve – Jean-Noel Poda

59. Rainfall patterns have been shifting in Burkina Faso and climatic and land management conditions have deteriorated. Populations have had to develop adaptations to these climate and environmental changes. Upon learning of SUMAMAD funding, information and organization activities were undertaken with the MAB Focal Point, UNESCO National Commission, and stakeholders.
60. For first year activities, an evaluation of land use and local knowledge was carried out. Experimental fields were chosen and organic manure was tested. Pioneer model farmers were identified. Demonstration sites have been identified for agroforestry, building on activities of a GEF/MAB project. A second activity was the anticipation of scenarios and environmental education. Climate change indicators were documented. Environmental education activities were revived in the school of Bala near the Biosphere Reserve. Finally, regarding establishment of income-generating activities, these activities were listed in collaboration with a women's cooperative in a riparian village. These activities are various and initiated by several stakeholders. The women are aware of the importance of conservation in income-generation strategies.
61. The National Training Seminar sought to plan the five-year implementation of the project in association with the government, technicians, and local communities. Water and soil preservation, range management, and biosphere reserve models were also topics of the training. Training activities for subsequent years were identified including training of cattle breeders, crop producers, female farmers, fishermen, and primary school teachers.

62. The project is working through a participatory and consultative approach, and builds synergies with relevant on-going projects and community organizations. The participatory approach should be directed towards activities relating to land-use practices. Environmental education is the basis for the sustainability of project actions, and UNESCO education materials can be used towards this end. Diversification of incomes is key to developing livelihoods and ensuring the sustainable management of dryland regions.
63. In discussion, participants appreciated the clear definition within the presentation of where in the project SUMAMAD funds were used. Income-generating activities for women were further explained. Continuation of previous activities from the GEF/MAB project through SUMAMAD activities was highlighted.

Session II – Training Needs/Study Visits

Open Discussion on training needs and study visits among SUMAMAD Project sites

64. Dr Ram Boojh opened the session, remarking on the importance of training for the success and advancement of the project, and asked participants to consider follow-up mechanisms to trainings to ensure uptake at the site level.
65. Dr Boshra Salem recalled that brief trainings have been very useful for partners in the past. She suggested as a first priority training on time series analysis of climate data. As a second priority, training on land-use change monitoring, which is something Dr Salem could offer. As a third priority, training on ecosystem valuation. As a fourth priority, training on ecological footprints.
66. Prof Gabriels described the Bou Hedma meteorological station's effort to develop specific evapo-transpiration data on-site to correlate with field observations. These particular and unique data are more relevant than data from distant climatological stations. Prof Salem found similar data problems between the macro and micro level for assessing sea-level rise in Alexandria, and the same problem has emerged in the Bolivian case where at high altitudes the evapo-transpiration models do not work under extreme conditions. Participants agreed that selecting appropriate data and time series is vital.
67. Dr Esfandiari called for more formal education in developing countries on climate change and dryland issues.
68. Dr TK Bhati noted that CAZRI has a strong research base on rangeland management.
69. Dr Jiang Gaoming proposed training on climate change and Poverty Reduction Strategies; sustainability science; and organic agriculture. He also recommended strengthening collaboration with other international projects and organizations for a training meeting.
70. Dr Thomas noted that a number of partners are already highlighting linkages with other international programs. He underscored the interest of the partners in looking at climate change at the local level and micro-climate research. He noted that the topic of land-cover change ties into CAZRI's expertise on rangeland management. A training could be built related to local climate and land-cover change, using experimental evidence from within the project.
71. Dr Raj Singh suggested focusing on increasing usefulness of dryland resources.
72. Dr Ouessar noted differences between research priorities, technical/development priorities, and farmers' priorities in determining training priorities.
73. Dr Adhikari suggested training on integrating dryland issues into policy such as poverty reduction strategies.
74. Prof Gabriels emphasized the importance of training trainers.

75. Dr Adhikari pointed to the importance of mobilizing additional financial resources through innovative financial mechanisms for supporting sustainable management and development in dryland areas, and mentioned the expertise of the UNCCD Global Mechanism.
76. Dr (Mrs) Amtul Waris highlighted the importance of livelihood analysis and ecotourism.
77. Mr Gregory Thaler suggested considering trainings at country level for alternative livelihood projects on marketing and labeling strategies for sustainable businesses.

National-Level Training Needs

78. Dr Poda described the need to train the local population in Burkina Faso for sustainable dryland production. He highlighted research activities in the Biosphere Reserve as potential training grounds for high school students. He also pointed to the need to train students at the primary level within the Biosphere Reserve framework on the importance of sustainable practices as a foundation for the future.
79. Dr Thomas felt that the ideas for training all fell more or less under the three main objectives of the project: fostering research, developing policy-relevant guidelines, and promoting sustainable livelihoods. He asked countries to highlight priority training they most need to make their project successful in light of these objectives.
80. Dr Boshra Salem pointed to training needs for local populations on marketing, quality control, etc. She highlighted the need to train SUMAMAD students and staff in areas such as climate analysis, ecosystem valuation, and in-situ conservation. For decision-makers, Dr Salem noted a need for training on strategic management of drylands and linking up policy to community-level realities.
81. Dr Jiang Goaming affirmed a need for training for farmers on business and marketing. For research, training is needed on sustainability science for dryland management. For decision-makers, the project has a strong influence with the government through media, and the importance of media for affecting decision-makers should be kept in mind.
82. Dr Mohamed Ouessar said local farmers need training for ecotourism and on the added value of packaging and marketing of local products. For development technicians and engineers, there could be training on remote sensing and rangeland management. For research, he highlighted a need better to disseminate research results and outreach.
83. Dr NL Joshi suggested training for stakeholders, in addition to training trainers on rangeland management and watershed management, and training project scientists on water modeling and GIS applications, environmental stress related to animal productivity, and policy and scenario analysis for the social sciences. CAZRI can offer training on crop production, revenue generation, diversification in cropping systems, etc. to stakeholders and farmers related to watershed and rangeland management.
84. Mr Jorge Cusicanqui pointed to a need at the local level to focus on sustainable production and livelihood strategies for farmers. He suggested having training on drylands issues integrated into school curricula, and having teachers trained on these issues. For technicians, training on sustainable crop production is important, and for scientists, training on water management and water storage in relation to climate change is needed. Watershed management is an important field. It is difficult to work with decision-makers, but through media decision-makers can be affected.
85. Dr Mansour Esfandiari called for training the local communities on water, soil, range management, etc.; training students; training policy makers/decision-makers; training researchers on climate change and its effects on agriculture and environment; and training on scenario development for land-use and income generation.

86. Prof Gabriels asked partners to focus on weaknesses and project objectives when thinking about training needs. He highlighted the overlap of SUMAMAD with the three Rio Conventions, and pointed out the difficulties of assessing desertification through multiple indicators. He advocated focusing on a few clear weak points to address through training.
87. Dr Salem suggested each site produce a policy brief to be shared with decision-makers as an output of the SUMAMAD Project, and suggested that the response from decision-makers would indicate their needs. This policy brief would constitute outreach from the project.

Eighth International Workshop

88. Participants discussed the location for the next SUMAMAD International Workshop. They agreed to seek to combine the Workshop with another planned event if possible to facilitate logistics.
89. Dr Salem suggested in observance of the International Year of Biodiversity that each site produce a sheet on biodiversity aspects of its project work.
90. Participants agreed that linking the next SUMAMAD Workshop to the Conference on Biodiversity being organized with the Library of Alexandria would be a good way to tie SUMAMAD activities into the International Year of Biodiversity.
91. The Second Workshop of SUMAMAD-II will be held in Alexandria, Egypt in November 2010. Dates will be confirmed with Dr Salem.
92. New SUMAMAD partners Bolivia and Burkina Faso expressed their willingness to hold future workshops.
93. At the Eighth International Workshop, a one-day training will be organized in addition to the SUMAMAD Workshop for SUMAMAD Partners. Additional training and environmental education funds can be used for country level training initiatives.
94. Dr Gabriels suggested compiling publications referencing SUMAMAD or produced through SUMAMAD in order to show the production of the project. Dr Ouessar suggested these could be posted to the SUMAMAD website. This compilation could include multimedia materials as well. Mr Thaler and Dr Adhikari will explore options for revitalizing the SUMAMAD website.

Monday, 23 November 2009

Session III – Training on scenario building, adaptation to climate change and ecosystem valuation

Payment for Ecosystem Services – KG Saxena

95. Dr Boojh introduced Prof KG Saxena, School of Environmental Sciences, Jawaharlal Nehru University, New Delhi, resource person for the session.
96. Prof Saxena began a discussion of payment for ecosystem services in the context of land management, climate change and livelihoods. He set the context of a decline in ecosystem services and a future characterized by turbulence and unpredictable change. The concept of ecosystem services was explained, breaking down provisioning, regulatory, cultural, and supporting services. Drylands often have low per capita GDP and low biodiversity, but they are frequently the sources of immense ecosystem services – see for example the Tibetan plateau, which provides water for much of Southern Asia.
97. Prof Saxena pointed out that inappropriate property rights, lack of information or awareness, and capital market imperfections contribute to the loss of ecosystem

- services. At root, ecosystems are mismanaged because many of their benefits are externalities from the perspective of ecosystem managers. Prof Saxena explained different perceptions of nature and natural resources as benign, tolerant, capricious, or ephemeral.
98. Payments for environmental services are a mechanism to translate external, non-market values of the environment into real financial incentives for local actors to provide such services – it may be in the form of an environmental subsidy or a user fee. Three steps to PES are first, an assessment of the range of ecosystem services of a particular area and whom they benefit; second, an estimate of the economic value of these benefits to the different groups of people; third, a policy, subsidy, or market to capture this value and reward landowners for conserving the source of ecosystem services. PES may be user-financed, as hydroelectric power producers/mineral water bottlers/or municipal water utilities that pay upland farmers. This model assumes the superiority of a market approach. PES may also be government-financed, as compensation for organic farming, agro-environment schemes, displacement from a National Park, working for water (South Africa), or forest carbon plantations. In traditional (isolated) communities there is not this differentiation of buyers and sellers – sustainable practices are adopted consensually.
 99. Scale is an important question in thinking about PES. Basic principles for calculating PES were discussed. The three approaches for estimating economic value are ‘revealed willingness to pay’ (market prices), ‘expressed willingness to pay’ (survey results), and ‘derived willingness to pay’ (circumstantial evidence). Uncertainty is an essential feature of all environmental predictions and calculations. Rehabilitation elements for ecosystem service protection and restoration were considered – basic cost-benefit calculations in Himalayan villages showed rehabilitation having higher costs than benefits over a period of less than five years.
 100. Sustainability must come through cooperation and collaboration, based on consistent definitions, standard methodologies, and critical and threshold values.
 101. In discussion, participants highlighted the importance of looking at ecosystem valuation, like climate change, on a variety of scales, and keeping in mind the importance of valuation dynamics at a micro level that is often lost in these discussions. Importance of tenure and the complexity of economic calculation of environmental goods were also emphasized.

Climate Change, Drylands and Ecosystem Valuation – Ram Boojh

102. Dr Ram Boojh presented on ‘Climate Change, Drylands & Ecosystem Valuation’. He described the impact of climate change on drylands. Speaking on the economics of ecosystems and biodiversity, Dr Boojh drew attention to ‘The Economics of Ecosystems and Biodiversity’ (TEEB) initiative of UNEP, which calls for making recognition of the value of ecosystem services a central policy priority. Noting the worldwide decline in ecosystem services, Dr Boojh recalled the TEEB Report estimate that we lose ecosystem services each year of a value of approximately 50 billion euros from land-based ecosystems alone. Countries that have made the connection between ecosystem services and investment are beginning to see benefits in terms of green job creation. Dr Boojh presented a number of suggestions for catalyzing a transition to sustainable economies and societies focusing on conservation and promoting innovative sustainable financing mechanisms.

Climate Change Adaptation and SUMAMAD – Richard Thomas

103. Dr Richard Thomas spoke to participants about adaptation to climate change in the context of the SUMAMAD project. He emphasized the likely future impacts of climate change and increased water stress, leading to increasing desertification. He suggested that in drylands, adaptation to climate change will mainly mean improving water management. Water scarcity has been induced by policy failures.
104. Adaptation strategies can be divided into four categories – increasing human development, building response capacity, managing climate risk, and confronting climate change. SUMAMAD activity along this continuum includes livelihood diversification for increasing human development, floodwater spreading to build response capacity, or promotion of drought tolerant crops to manage climate risks. SUMAMAD is not currently involved in ‘directly confronting climate change’. Institutional adaptation measures include payments for ecosystem services, clarifying land and water rights, mainstreaming environmental policies, encouraging public-private ventures in adaptation and job creation, etc. Specifically, adaptation strategies can include integrated water resources management, desalination, and rainwater harvesting as already practiced in SUMAMAD sites, as well as demand management in terms of efficient usage and disaster forecasting and management. The public discourse on climate change offers opportunities for further awareness raising on dryland issues, rethinking water demands, and including desertification, water, and adaptation on the agenda. Climate change can be the context for addressing developmental challenges, as it magnifies existing threats and problems and will not be solved without addressing the root causes of vulnerability.
105. In discussion, it was suggested that SUMAMAD partners could provide a valuable service by demonstrating climate change mitigation and adaptation strategies in a way that can educate and appeal to policy-makers and businesspeople.

Valuation of Ecosystem Services – Bhim Adhikari

106. Dr Bhim Adhikari presented on valuation of ecosystem services. He distinguished between use values and non-use values and discussed different methods for determining value – revealed preference methods, cost-based methods, and stated preference methods. The gap between willingness to pay and willingness to accept was described under a contingent valuation scheme, and certain less common valuation methods were also briefly discussed, including hedonic pricing, conjoint analysis, and choice experiments.
107. Ecosystem valuation only provides tools with which to make better and more informed decisions, and is not a stand-alone exercise. Case studies underestimate ecosystem values at larger scales because it is difficult to replace large scale ecosystem services and the systems are too complex to understand impacts of alternatives. Even with information on total benefit flows, we cannot provide guidance on specific conservation changes that make incremental changes in these flows. In the end, some ecosystems will never be measurable or quantifiable because the necessary data do not exist, and ecosystem valuation can be dangerous when it focuses only on financial or cash benefits. Finally, it is important to remember that there is no guarantee that economic valuation will support wise use and management of ecosystems, but this valuation can be useful for identifying ways of capturing these values through markets, such as with PES.

Carbon Markets and Drylands – Gregory Thaler

108. Mr Gregory Thaler shared information on carbon market opportunities for drylands. He discussed the state of compliance and voluntary carbon markets, potential carbon credit generation modalities for dryland regions, and carbon stocks in dryland regions. Many SUMAMAD projects have already carried out activities that sequester carbon and so could generate carbon credits. Examples include improved rangeland management and tree plantations. Carbon markets are complex and carbon offsetting projects must be managed by technicians, but carbon financing can contribute to the scaling up of a successful dryland management modality.
109. SUMAMAD partners were also informed of the current One UN coordination process on dryland issues through the Environmental Management Group and the World Conservation Monitoring Centre. Participants were welcomed to involve themselves in the process. The formation of the new Gulf Network for Arid Land Environments (GNALE) was also discussed, and opportunities for future links with SUMAMAD considered.

Closing

110. Dr Richard Thomas summed up the results of the workshop. He reminded participants of the decisions taken and still to be made regarding the next workshop in Alexandria, Egypt and the contiguous training session. Specific study visits, exchanges, or training needs should be communicated to the management team. He thanked CAZRI and UNESCO-New Delhi for their excellent work in organizing the workshop, and invited the participants to take part in the field trip to CAZRI work sites in the afternoon. He declared the Workshop session closed.

Field Visit

111. Workshop participants visited CAZRI work sites near Jodhpur at the villages of Bujawar and Rohila Kalan. In addition to seeing CAZRI projects firsthand, they were able to interact with local communities involved in the projects. Participants agreed that CAZRI's work represents an exciting new dimension for the SUMAMAD project.

ANNEX I. Workshop Agenda:

Saturday, 21 November 2009:

Arrival of participants

Sunday, 22 November 2009:

Venue: Hotel Mapple Abhay, Paota Circle, Jodhpur - 342 003, Rajasthan, India

9:00-9:30 hrs: Registration

9:30-10:30 hrs: Inaugural Session

- Lighting of the Lamp
- Presentation of bouquets
- Welcome address: Dr N.V. Patil, Director, Central Arid Zone Research Institute (CAZRI)
- About the workshop: Dr Ram Boojh, Programme Specialist, UNESCO-New Delhi Office
- About SUMAMAD Project : Dr Richard Thomas, UNU-INWEH;
- Inaugural address: Prof. Donald Gabriels, Ghent University, on behalf of the Flemish Government of Belgium
- Vote of Thanks: Dr N.L.Joshi, CAZRI
- National Anthem

10:30- 11:00 hrs Inaugural High Tea

11:00 – 13:00 hrs: Session 1: Presentation of project activities by national team leaders

Chair: Dr Richard Thomas, UNU-INWEH

Rapporteur: Dr R.S.Mertia, CAZRI

- Mr Jorge Cusicanqui (Bolivia): Bolivian highlands;
- Dr Jiang Gaoming (China): Hunshandake Sand area;
- Dr Boshra B. Salem (Egypt): Omayed Biosphere Reserve;
- Dr N.L. Joshi (India): Arid western plain zone, Thar Desert.

13:00 – 14:00 hrs Lunch

14:00 – 15:40 hrs Session 1 (continued): Presentation of project activities by national team leaders

Chair: Dr Bhim Adhikari, UNU-INWEH

Rapporteur: Dr R.S.Mertia, CAZRI

- Dr Mansour Esfandiari (Iran): Undulating area SW of the Gareh Bygone Plain;
- Dr Mohamed Ouessar (Tunisia): Zeuss-Koutine Watershed;
- Dr Jean-Noel Poda (Burkina Faso): Mare aux hippopotames Biosphere Reserve;
- Presentation on behalf of Dr Zamir Ahmed Soomro (Pakistan): Lal Suhanra Biosphere Reserve and Cholistan Desert and Dr Ma'en Ahmad Al-Smadi (Jordan): Dana Biosphere Reserve.

15:40–16:00 hrs. Coffee/tea break

16:00 – 17:30 hrs: Session 2: Training needs / Study visits

Chair: Dr Ram Boojh, UNESCO-New Delhi Office

Rapporteur: Dr R.K Goyal, CAZRI

Open discussion on training needs and study visits among SUMAMAD Project sites.

Monday, 23 November 2009:

9:00 – 10:30 hrs: Session 3: Training on scenario building, adaptation to climate change and ecosystem valuation

Resource persons:

1. Professor KG Saxena, School of Environmental Sciences, Jawaharlal Nehru University, New Delhi
2. Dr Ram Boojh, UNESCO, New Delhi
3. Dr Richard Thomas, UNU-INWEH
4. Dr Bhim Adhikari, UNU-INWEH
5. Mr Gregory Thaler, UNESCO, Paris
6. Dr Boshra Salem, Egypt

10:30 – 10:45 hrs. Coffee/tea break

10:45–12:45 hrs: Session 3 (continued):

12:45 – 13:45 hrs: Lunch

13:45 hrs.: Departure for field trip to CAZRI's study areas.

Tuesday, 24 November 2009:

Option 1: Some SUMAMAD Project partners return on a group ticket to New Delhi (and then travel to their respective homes)

Option 2: Some SUMAMAD Project participants attend the CAZRI Conference (and then return via New Delhi to their respective homes)

ANNEX II. List of Participants

1) SUMAMAD Country Participants:

Belgium

Prof. Donald Gabriels
Ghent University
Dept. of Soil Management
Coupure Links 653
B-9000 Gent
Belgium
Tel: (+32-9) 264.60.50
Fax: (+32-9) 264.62.47
E-mail: Donald.Gabriels@rug.ac.be

Bolivia

Mr Jorge Alberto Cusicanqui Giles
Deputy Coordinator
Bolivian SUMAMAD project
B-3000 Leuven
Belgium
Phone: 32 16 32 9849
Cel. 32 – 489959047
E-mail: acusican@gmail.com

Burkina Faso

Dr Jean-Noel Poda
Director of Research
Assistant Director of IRSS/CNRST
Institut de Recherche en Science de la Santé (IRSS)
Centre Nationale pour la Recherche Scientifique et Technologique (CNRST)
IRSS / CNRST
03 B.P.7047
Ouagadougou 03
Burkina Faso
Tel: (+226) 50 36 32 15
Fax: (+226) 50 36 03 94
E-mail: podajnl@yahoo.fr

China

Dr Jiang Gaoming
Institute of Botany
The Chinese Academy of Sciences
Vice Secretary-General of China-MAB Committee
20 Nanxincun, Xiangshan,
Beijing 100093
People's Republic of China
Tel: (+86-10) 62591431 ext 6286, 6287

Fax: (+86-10) 62590843
E-mail: jianggm@126.com

Egypt

Dr Boshra B. Salem
Department of Environmental Sciences
Faculty of Science
University of Alexandria
Moharram Bey 21511
Alexandria
Egypt
Tel: (+2010)1449645
Fax: (+203) 3911794
E-mail: Boshra.Salem@dr.com or boshra.salem@yahoo.com

India

Dr N.L. Joshi
Central Arid Zone Research Institute (CAZRI)
Jodhpur 342 003
India
Tel: (+91-291) 2786584
Fax: (+91-291) 2788706
Email: nljoshi@cazri.res.in or nljoshi@yahoo.com

Islamic Republic of Iran

Dr Mansour Esfandiari Baiat
Executive President
Research Society for Sustainable Rehabilitation of Drylands (REaSSURED)
P.O. Box 71365-458
Shiraz
I.R.Iran
Tel: (+98711) 7203010; 09171184741
Fax: (+98711) 7205107
E-mail: esfandiari@farsagres.ir

Jordan (*unable to attend*)

Mr. Ma'en Ahmad Al-Smadi
The Royal Society for the Conservation of Nature (RSCN)
P.O. Box 1215
Jubeiha, 11941
Jordan
Tel: (+962 6) 5337931 / 2
Fax: (+962 6) 5357618, 5347411
E-mail: ma22en@yahoo.com or reserves@rscn.org.jo or maen@rscn.org.jo

Pakistan (*unable to attend*)

Mr Zamir Ahmed Soomro
Pakistan Council of Research in Water Resources (PCRWR)
House No.3&5
St.No.17
Sector F-6/2
Islamabad
Pakistan
Tel: (+92-51) 9218984 and (+92-51) 9258959 (secretary)
Fax: (+2-51) 9258963 / 4
E-mail: chiefdesert@gmail.com

Syria (*unable to attend*)

Dr Awadis Arslan
Director of Natural Resources Research Administration (ANRR)
General Commission of Scientific Agricultural Research
Ministry of Agriculture and Agrarian Reform
Damascus
Syria
Tel: (+963-11) 5756012 ; +963-933443354 (mobile)
Fax: (+963-11) 57386400
E-mail: diwu@mail.sy ; abarslan@scs-net.org

Tunisia

Dr Mohamed Ouessar
Institut des Régions Arides (IRA)
4119 - Medenine
Tunisia
Tel: (+216-75) 633005
Fax: (+216-75) 633006
E-mail: Med.Ouessar@ira.agrinet.tn

Uzbekistan (*unable to attend*)

Dr Muhtor G. Nasyrov
Samarkand State University
University Boulevard,15
Samarkand 703004 Uzbekistan
Tel/fax: (+998662) 35 27-24 or 33 34 87
E-mails: muhtorn@yahoo.com; nmukhtar@samarkand.uz ; g_nosirov@samdu.uz

2) Core Management Group:

UNESCO-New Delhi Office

Dr Ram Boojh
Programme Specialist
UNESCO House
B-5/29, Safdarjung Enclave

New Delhi - 110 029
India
Tel: (91-11) 26713000
Fax: (91-11) 26713001, 26713002
E-mail: r.boojh@unesco.org

Dr Suprava Patnaik
UNESCO House
B-5/29, Safdarjung Enclave
New Delhi - 110 029
India
Tel: (91-11) 26713000
Fax: (91-11) 26713001, 26713002

Ms Aditi Bhatnagar
UNESCO House
B-5/29, Safdarjung Enclave
New Delhi - 110 029
India
Tel: (91-11) 26713000
Fax: (91-11) 26713001, 26713002

UNESCO-Headquarters, Paris

Mr Gregory Thaler
UNESCO
Division of Ecological and Earth Sciences
1, rue Miollis
75732 Paris, cedex 15
France
Tel: (+33-1) 45.68.43.63 or 45.68.40.65
Fax: (+33-1) 45.68.58.04
E-mail: g.thaler@unesco.org

UNU-INWEH, Canada

Dr Richard Thomas
United Nations University
International Institute for Water, Environment and Health (UNU-INWEH)
175 Longwood Road South, Suite 204
Hamilton Ontario L8P 0A1
CANADA
Phone: +1 (905) 667-5490
Fax: + 1 (905) 667-5510
E-mail: rthomas@inweh.unu.edu

Dr Bhim Adhikari
United Nations University
International Institute for Water, Environment and Health (UNU-INWEH)
175 Longwood Road South
Suite 204, Hamilton Ontario L8P 0A1

CANADA
Phone: +1 (905) 667-5495
Fax: + 1 (905) 667-5510
E-mail: adhika@inweh.unu.edu

3) Other participants

Central Arid Zone Research Institute (CAZRI)

Dr NV Patil, Director

Dr TK Bhati
Dr Raj Singh
Dr (Mrs.) Amtul Waris
Dr Priyabrata Santra
Dr RS Mertia
Dr RK Kaul
Dr RK Goyal
Dr AK Patel

Training Resource Person/Moderator

Professor KG Saxena
School of Environmental Sciences
Jawahrlal Nehru University
New Delhi, India