

Argentina

Universidad de Buenos Aires Departamento de Ciencias de la Atmsfera

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Fax: (+54 1) 782 6528; **E-mail:** barros@at.fcen.uba.ar.

Director/Head: Vicente Ricardo Barros.

Scientific Fields of Interest: Meteorology, Climatology, Climate Change.

Main Lines of Research and Training Activities: Regional climate variability climate modelling. Mesoscale convection, weather prediction.

Major Scientific Results or Products: Structure of climate variability in South America, connection with ENSO and precipitation change causes.

Main Research Facilities Available: Work stations, data bank.

Future Development Plans: Develop regional centre for climate predication in association with CPTC and University of São Paulo.

International Cooperation Arrangements: Two projects with European Community, European Partners; East Anglia U.K. and LMD, France.

Bangladesh

Space Research and Remote Sensing Organization (SPARRSO)

Address: Agargaon, Sher-e-Bangla Nagar, G.P.O. Box 529, Dhaka 1207, Bangladesh. **Phone:** (+880 2) 313329; **Telex:** 642215 SRS BJ; **Fax:** (+880 2) 813080.

Director/Head: A.A.Z. Ahmad.

Number of Research Scientists: 34; **Number of Staff:** 105.

Scientific Fields of Interest: Agriculture; Forestry; Water Resources; Geological/Earth Sciences; Environment; Marine Sciences; Mathematics; Physics/Astronomy; Space Sciences; Remote Sensing; GIS; GPS.

Main Lines of Research and Training Activities: Multi-sectoral research and development organization with major research activities related to applications of modern remote sensing and space-oriented technologies in fields of agriculture, water resources, forestry, fisheries, meteorology, oceanography, environment, floods. From its inception in 1980, SPARRSO has hosted several national and international training courses, seminars, workshops and conferences on applications of remote sensing in collaboration with user agencies and international agencies/organizations such as International Centre for Theoretical Physics (ICTP), UN Economic and Social Commission for Asia and Pacific (ESCAP), UN Development Programme (UNDP), Food and Agriculture Organization (FAO), UN Educational, Scientific and Cultural Organization (UNESCO), US Agency for International Development (USAID), US National Aeronautics and Space Administration (NASA).

Major Scientific Results or Products: Carried out number of remote sensing and space-oriented application projects that generated ample data base useful for planning, management and decision-making in many areas of national development; information and knowledge gathered through satellite data in form of maps, reports, articles, papers, with recommendations supplied to user agencies and ministries within country; about 60 research and operational projects completed.

Main Research Facilities Available: Advanced meteorological ground station, photographic and cartographic equipment; remote sensing and conventional photographic, cartographic and field survey equipment; computer: VAX-11/750 minicomputer, Microvax 3400 system, I-S Digital image processing; optronics scanner, TRS-80 microcomputer, solar 16/65. PC-based image processing system, ERDAS and GIS ARC/INFO; library: rich collection containing books, journals, periodicals in space and remote sensing technology.

Future Development Plans: Development of multi-sectoral remote sensing capability; modernization of agroclimatic and environmental monitoring system; establishment of environment, disaster and resources

monitoring system; modernization of photographic laboratory. SPARRSO; through use of remote sensing techniques, following studies will be completed: environment, floods in Bangladesh, impact of shrimp farming on rice and other agricultural land coastal zone, mangrove forest biomass inventory, digital study on agriculture, weather and changes of natural environment.

Cooperation Arrangements with Developing Countries: Member of International Astronautical Federation: work closely with UN Economic and Social Commission for Asia and the Pacific (ESCAP)/UN Development Programme (UNDP) Regional Remote Sensing Programme (RRSP) and participate in RRSP activities; founder-member of Karachi-based Inter-Islamic Network on Space Science and Technology under auspices of OIC and founder-member of Asian Association of Remote Sensing; maintain liaison with Asian Institute of Technology (AIT), Thailand; member of International Astronautical Federation (IAF); member of Asia-Pacific Multilateral Cooperation in Space Technology and Application (AP-MCSTA) and Asia-Pacific Regional Space Agency Forum (APRSAF).

Other International Cooperation Arrangements: Cooperation sought through programme of technology transfer, exchange of data and training of manpower; assistance from UN Development Programme (UNDP), Food and Agriculture Organization (FAO), UN Economic and Social Commission for Asia and the Pacific (ESCAP), US National Aeronautics and Space Administration (NASA)/GSFC, US Agency for International Development (USAID), International Centre for Theoretical Physics (ICTP), and under France-Bangladesh Protocol.

Brazil

Universidade de Brasilia (IG-UNB) Instituto de Geociencias

Address: Campus Universitário Darcy Ribeiro, Caixa Postal 04465, 70910-900 Brasília, DF, Brazil.

Phone: (+55 61) 273 4735; **Fax:** (+55 61) 347 4062; **E-mail:** psgeo@guarany.unb.br.

Director/Head: Reinhardt A. Fuck.

Number of Research Scientists: 18; **Number of Staff:** 32.

Scientific Fields of Interest: Earth Sciences; Environment.

Main Lines of Research and Training Activities: Metallogeny; Geochemistry of rocks, soils, and water; Mineralogy and petrology; Seismology; Regional geology; Remote sensing.

Major Scientific Results or Products: Definition of magmatic volcanic arch of Goiás and the volcanic-sedimentary sequences of Brasileiro age; large evolution on knowledge of metallogeny of gold, diamond, nickel, tin, lead/zinc and phosphate Brazilian deposits.

Main Research Facilities Available: Electron microprobe (CAMECA SX50 with four WDS and one EDS); laboratory of geochemistry (including atomic absorption and ICP equipment); laboratory of geochronology with mass spectrometer; laboratory of stable isotopes (with mass spectrometer); laboratory of remote sensing (with workstations and microcomputers); laboratory of geophysics.

Future Development Plans: With LAM-ICP-MS, intend to develop our researches on heavy metal pollution; analyse such trace elements on minerals as Au in sulfides and Ni in garnets for diamond exploration; with electron microscope, intend to use image processing mainly for ore studies.

International Cooperation Arrangements: ORSTOM, France on hydrogeology of Amazon River, paleoclimatology and remote sensing; DAAD, hydrogeology of central Brazil (planned).

Universidade de So Paulo Instituto de Geociencias

Address: Caixa Postal 11.348, Cep. 05422.970, São Paulo, SP, Brazil. **Phone:** (+55 11) 211 2847; **Fax:** (+55 11) 212 2412; **E-mail:** acarvalho@usp.br.

Number of Research Scientists: 57; **Number of Staff:** 136.

Scientific Fields of Interest: Earth Sciences; Environment.

Major Scientific Results or Products: 15 books; 57 papers in regional journals; 88 papers in international journals; 294 full papers in scientific symposia.

Main Lines of Research and Training Activities: Exploration and mineral deposits geology; hydrogeology and environmental geology; applied structural geology; crustal evolution of cratons and

mobile belts; origin and evolution of sedimentary basins; glacial sedimentation; igneous and metamorphic petrology; experimental and applied mineralogy; geotectonic evolution of the South American continent.

Main Research Facilities Available: Mass spectrometers (solid and gas sources); clean labs for Pb, Sr and Nd; induced coupled plasma; electron microprobe (JEOL); X-ray diffraction analyser; x-ray fluorescent; scanning electron microscope; UNIX workstation (sun and silicon graphics); PC computers based on Intel 486 and Pentium (133,166 Mhz); library: 12,490 books, 1,825 journals, 3,840 maps; 900 project reports.

Future Development Plans: Implementation of new radiometric techniques (An-An, Re-Os, Pb-Pb).

International Cooperation Arrangements: Stable and radiogenic isotope geology, US Geological Survey, Menlo Park (California); isotope geology, Institute of Precambrian Geology and Geochronology, St. Petersburg; scientific and technological cooperation with following universities: Avero (Portugal), Aix-Marseille III Trieste and Modena (Italy); Dynamics of lateritic process (DYLAT), Orstom (France).

Chile

Universidad de Chile Departamento de Geologia

Address: Casilla 2777, Santiago, Chile. **Phone:** (+52 2) 696 3050; **Fax:** (+52 2) 696 3050; **E-mail:** maparada@tamarugo.cec.uchile.cl.

Director/Head: Miguel A. Parada.

Number of Research Scientists: 14; **Number of Staff:** 15.

Scientific Fields of Interest: Earth Sciences.

Main Lines of Research and Training Activities: Metallogenesis; petrogenesis/volcanology/geochemistry; tectonic; environmental geology.

Major Scientific Results or Products: About 800 scientific articles (international/national journals, proceedings of symposia) during past 10 years; grants in main research lines: US\$800,000 during past 3 years.

Main Research Facilities Available: ICP-AES; electron microprobe CAMECA; complete computer unit; digitalizer table; complete paleomag. laboratory; petrographic microscopes; equipment for fluid inclusion studies; mineral separation devices.

Cooperation Arrangements with Developing Countries: Cooperation with ORSTOM (France) through long-term agreement.

China

Chinese Academy of Sciences (CAS) Institute of Atmospheric Physics (IAP)

Address: Beijing 100 029, China. **Phone:** (+86 1) 2028604; **Fax:** (+86 1) 2028604.

Director/Head: Hong Zhongxiang.

Number of Research Scientists: 350; **Number of Staff:** 200.

Scientific Fields of Interest: Agriculture; Energy; Chemistry; Geological/Earth Sciences; Environment; Marine; Mathematics; Physics/Astronomy.

Main Lines of Research and Training Activities: *Main Research:* atmospheric and oceanic circulations, climate change and its prediction; large-scale dynamics and numerical weather prediction; meso- and small-scale dynamics and forecasting of severe weather system; geophysical fluid dynamics; global change; atmospheric environment problem and acid rain; atmospheric physics; middle atmosphere; boundary layer physics; atmospheric chemistry, satellite meteorology, atmospheric detection and remote sensing. *Training Activities:* a summer school every two years; MSc, PhD and postdoctoral training; training of foreign students from the Third World.

Major Scientific Results or Products: More than 200 theses in Chinese; publications in international journals and international conferences each year; several monographs each year.

Main Research Facilities Available: Mini-supercomputers, 325 m meteorological tower, radio acoustic sounding system (RASS), stratospheric balloon observation system, meteorological lidar, sodar, cloud and rain detection radar, dual-wavelength radar and microwave radiometer system, supersonic anemometer-thermometer, ultra-low-speed wind tunnel, satellite reception system, Dobson ozone spectrum photometer and systems for monitoring, collecting analysing and processing of atmospheric compositions; library and data centre.

Future Development Plans: Participate in national scientific programmes; strengthen international cooperation and large research programmes (WCRP, LGBP, WOCE, GAME, COSTEO); Introduction to advanced research.

Cooperation Arrangements with Developing Countries: Thailand, Nigeria, Senegal, Mongolia, North Korea, Pakistan.

Other International Cooperation Arrangements: USA, Japan, Australia, France, Russia, Italy and World Laboratory.

Chinese Academy of Sciences (CAS) Institute of Desert Research (IDR)

Address: 174 Donggang West Road, Lanzhou 730 000, China. **Phone:** (+86 931) 884-7805; **Telex:** 72149 ICERD CN; **Fax:** (+86 931) 888-9950; **E-mail:** cibidr@ns.lzb.ac.cn.

Director/Head: Liu Xinmin.

Number of Research Scientists: 200; **Number of Staff:** 106.

Scientific Fields of Interest: Agriculture; Biology; Geological/Earth Sciences; Environment.

Main Lines of Research and Training Activities: Desertification processes and wind-sand movement; physical and ecological principle of shifting sand and sand dune stabilization; prediction and prevention of desertification; rational development of agricultural resources in desert regions.

Major Scientific Results or Products: Sand dune stabilization in China; general characteristics and rehabilitation of desertified land; status and trend of desertification in China; desert transformation in China; establishment of protective system along railway line in Tengger desert.

Main Research Facilities Available: *Main field stations:* Shapotou experiment station of desert research; Linze experiment station of oasis ecology; Naiman experiment station of desertification. *Main equipment:* Sand-wind tunnel system; 4991 s3 graphic workstation system; automatic weather station system; electronic probe analyser; LIDAR system for air-sol monitoring.

Future Development Plans: Develop academic exchanges; attract foreign scientists to come to Institute and field stations for collaborative research; send young scientists from Institute abroad for study; undertake international training courses and workshops on desertification and its control.

Cooperation Arrangements with Developing Countries: Develop academic training and send scientists abroad to undertake projects on desertification control.

Other International Cooperation Arrangements: Japan, Sweden, World Laboratory.

Chinese Academy of Sciences (CAS) Institute of Geochemistry

Address: Guanshui Road 73#, Guiyang, Guizhou Province 550002, China. **Phone:** (+86 851) 582-4385; **Fax:** (+86 851) 582-2982.

Director/Head: Xie Hongsen.

Number of Research Scientists: 150; **Number of Staff:** 290.

Scientific Fields of Interest: Materials; Earth Sciences; Environment; Marine Sciences.

Main Lines of Research and Training Activities: Theoretical study on the exploration of super-large ore deposits; Low-temperature geochemistry; Metalliferous ore deposits; Environmental change recorded in tree circle, peat deposit and lake deposit; Trace element and rare earth element geochemistry; Physico-chemical properties of materials under ultra-high pressure and high temperature; Astrolithology and the evolution of the earth; Isotope study of greenhouse gases and global change; Resource exploitation and environmental protection in Karst region.

Major Scientific Results or Products: Geochemistry of strata-bound ore deposits in China (State Natural Science Prize, first-class); geochemistry of Baiyun Ebo Nb-REE-Fe ore deposit (State Natural Science Prize, second-class); study of cosmochemistry (Natural Science Prize of Chinese Academy of

Sciences, first-class); experimental study of high pressure and high temperature (Natural Science Prize of Guizhou Province, first-class); study of environment geochemistry (Natural Science Prize of Guizhou Province, first-class).

Main Research Facilities Available: Gas mass spectrometer; multichannel analysis system; atom absorption spectrometer; electron probe microanalysers; spectrometer; X-ray fluorescence spectrometer; X-ray diffractometer; high resolution electron microscope; super-microcomputer workstation; laboratory of experimental geochemistry.

Future Development Plans: Ore-deposit geochemistry and mineral resource in Southwest of Yangzi platform; ecological environment in Karst region; global environmental change (greenhouse gases and air dust); formation and evolution of terrestrial planets; study of mineral materials; study of nonmetal mineral resource.

Other International Cooperation Arrangements: Global database in sedimentary petrology (IGCP-269 project); development of methodology on database application in geosciences (IGCP-388); personnel training project in field of mineral resources, supported by International Development Office of Canada (\$0.5 million Canadian); demonstration study of remote sense in Guizhou Province, cooperate with University of Ghent, Belgium (0.2 million Eurodollar provided by government of Belgium); part of project to study and harness of acid rain in Guizhou Province supported by EEC; transportation and influence of regional pollutant in East Asia, cooperate with Institute of Environment, Japan.

Chinese Academy of Sciences (CAS) Institute of Geography

Address: Building 917, Datun Road, Anwai, P.O. Box 771, Beijing 100101, China. **Phone:** (+86 1) 491-4841; **Fax:** (+86 1) 491-1844; **E-mail:** zheng@bepc2.ihep.ac.cn.

Director/Head: Zheng Du.

Number of Research Scientists: 477; **Number of Staff:** 85.

Scientific Fields of Interest: Agriculture; Earth Sciences; Environment.

Main Lines of Research and Training Activities: The Institute of Geography mainly studies the structure, formation, and evolution of the geographical environment and its transformation/utilization with emphasis on the exploration of migration, accumulation and transformation process of energy and substance as well as man-environment interaction. At present, the key researching subjects are environmental changes and natural hazards, geographical system and processes, natural conditions and sustainable development for agriculture, regional planning and development, and mapping and geographic information system.

Major Scientific Results or Products: 16 research departments and stations, two opening laboratory and stations, including national key laboratory, and technical development system; has undertaken many research projects set by state, CAS, and local governments; documents published include more than 3,500 papers, 260 monographs, more than 40 sets of atlases and 400 map sheets; 184 prizes awarded by state, CAS, ministries or local governments; awarded TWNSO Executive Board in Agriculture in 1993.

Main Research Facilities Available: WAX-II/785 CPU, 12 workstations, 100 PC 486/386/286, two field stations, one library.

Future Development Plans: More participation in national projects, systematically cooperate with international organizations, promote further use of new technology to research.

Cooperation Arrangements with Developing Countries: Botswana, India, Nepal, Pakistan, Thailand.

Other International Cooperation Arrangements: USA, Italy, Germany, UK, France, The Netherlands, Belgium, Russia, Canada, Australia, Japan, Singapore, Korea, Spain, UNDP, UNESCO, UNEP, FAO, USEP, IPCC, IGU, ICIMOD, World Laboratory.

Chinese Academy of Sciences (CAS) Institute of Geology

Address: P.O. Box 9825, Beijing 100029, China. **Phone:** (+86 1) 6204-0570; **Fax:** (+86 1) 6491-9140;

E-mail: LiuJQ@mimi.cnc.ac.cn.

Director/Head: Liu Jiaqi.

Number of Research Scientists: 196; **Number of Staff:** 170.

Scientific Fields of Interest: Energy; Engineering/Technology; Earth Sciences; Environment; Marine Sciences.

Main Lines of Research and Training Activities: Study on the composition, structure, evolution and dynamics of the lithosphere as well as its relationship with atmosphere, hydrosphere and biosphere; lithosphere of the continents and continental margins; timing and space distribution and prediction of energy and mineral resources; rock mass stability in civil engineering; prevention and control of geohazards and disasters as well as analysis of geo-environmental system; quaternary global changes and protection of natural environments.

Major Scientific Results or Products: First paleogeographic map of China; plate tectonic map of China; tectonic map of China and neighbouring regions; first map of Chinese loess distribution; theory of imbibition of terrestrial weathering products and composite-process and poly-episodic of the genesis of sedimentary ore deposits; polystage model for plate collisions and generation in Tibetan plateau; feasibility evaluation and synthetic investigation of more than 180 large engineering projects, proposed theory on control effect of rock mass structure over rock mass stability; heat flow measurements in North China, North Tibet Southeast China; aspects of biomineralization: geology of main gold metallogenic belts in northern China; thrust and nappe tectonics in Qinling-Dabie orogenic belt in central China.

Main Research Facilities Available: More than 60 well-equipped laboratories such as tectonophysics and physics of earth's interior, paleomagnetism, geothermal analysis and measurement, isotope geology and dating, REE analysis, micro probe analysis, chemical and crystal texture analysis, organic geochemistry, mechanical measurement for civil engineering and processing system for geological information; library.

Cooperation Arrangements with Developing Countries: Cooperative research with scientists from Thailand, India, Korea, DPR.

Other International Cooperation Arrangements: Cooperative research with scientists from Germany and Greece; long-term agreements or cooperative projects with overseas institutions or universities in Australia, Japan, France, USA, UK, Canada, Italy, Russia, Slovenia.

Chinese Academy of Sciences (CAS) Institute of Oceanology (IOCAS)

Address: 7 Nanhai Road, Qingdao 266071, China. **Phone:** (+86 532) 2879062; **Telex:** 32222 ISS CN; **Fax:** (+86 532) 2870882; **E-mail:** iocas@ms.qdio.ac.cn.

Director/Head: Zhou Mingjiang.

Number of Research Scientists: 501; **Number of Staff:** 300.

Scientific Fields of Interest: Agriculture; Biology; Biochemistry/Biophysics; Materials; Chemistry; Engineering/Technology; Earth Sciences; Environment; Marine Sciences.

Main Lines of Research and Training Activities: Marine biology (includes marine botany, marine zoology, mariculture, biotechniques and experimental biology); Physical oceanography; Marine geology and geophysics; Marine chemistry; Marine environmental sciences and marine ecotoxicology; Marine technology and instrumentation.

Major Scientific Results or Products: Studies on marine fauna and flora of China seas; studies on environment quality of the Beijing, Tianjin and Bohai Sea region; study on technology of multiplication and culture of marine economic organisms, such as shrimps, fish and sea algae; structure and variation of Kuroshio and nearby currents; numerical model and distribution characteristics of tidal wave in the Bohai Sea, Yellow Sea and East China sea; investigation and assessment of marine oil-engineering geology in Beibu Gulf; marine biological active substances and marine drugs, such as β -carotene, sea alga iodine tablet.

Main Research Facilities Available: MRC-1000 laser scanning confocal microscope; automated capillary electrophoresis system; high resolution transmission electron microscope and scanning electron microscope; spectrometers; HPLC series and HP 5800A gas chromatography; X-ray excited fluorescence analyser; elemental analyser; digital seismic system; sde-scan sonar system and geochirp profiler; ADCP; CTD system; vessels; library; computers.

Future Development Plans: Concentrate on following fields: ocean circulation and marine dynamics; experimental marine biology and marine biotechniques; marine ecology and environmental sciences, sustainable use of living resources; sedimentation and its dynamics, paleo-oceanographic changes and its environmental effects.

Cooperation Arrangements with Developing Countries: Cooperation agreements with many developing countries, including Vietnam ("Biological Survey in Beibu Bay" programme in early 1950s), Indonesia (alga chemistry with Pt. Algalindo Perdana Company) and Thailand (sea alga culture with Thong Thai Dee Panich Company).

Other International Cooperation Arrangements: Cooperation agreements with international organizations, such as Scripps Institution of Oceanography, Woods Hole Oceanographic Institution, Pacific Oceanological Institute and Seismic Institute of Tokyo University.

Chinese Academy of Sciences (CAS) South China Sea Institute of Oceanology

Address: 164 West Xingang Road, Guangzhou 510301, China. **Phone:** (+86 20) 8445-1335; **Fax:** (+86 20) 8445-1672.

Director/Head: Pan Jinpei.

Number of Research Scientists: 315; **Number of Staff:** 255.

Scientific Fields of Interest: Biology; Biochemistry/Biophysics; Chemistry; Earth Sciences; Environment; Marine Sciences.

Main Lines of Research and Training Activities: Marine dynamics and environmental oceanography; experimental biology and marine biotechnology; marine ecology and sustained utilization of bio-resources; marine environmental geology and marine geotectonics. The Institute offers courses for master's and doctoral degrees.

Major Scientific Results or Products: Multidisciplinary oceanographic investigations on Nansha Islands and adjacent sea areas, northeastern South China Sea, and central waters of South China Sea; engineering and environmental studies in oil development area of South China Sea; selective breeding, cultivation and development of superior spirulina species; products: marine spirulina, marine health food, marine medicine.

Main Research Facilities Available: research vessels (2), field stations (4), CTD, ADCP, 1156 direction wave buoy, seismic survey system, electronic probe, inductively coupled plasma spectrometer, wavemeter.

Future Development Plans: Major scientific and technological problems concerned with tropical marine environment, resources and marine development, emphasizing basic studies on marine environment, ecological evolution, ecological system, sustained utilization of bio-resources in South China Sea and adjacent oceans.

Cooperation Arrangements with Developing Countries: Participant in field observations of the South China Sea Monsoon Experiment.

Other International Cooperation Arrangements: China-Germany Joint Geophysical Investigation in western South China Sea; plan to continue cooperation in marine studies and investigations with concerned countries.

University of Science and Technology (USTC) Department of Earth and Space Sciences

Address: Hefei, Anhui 230026, China. **Phone:** (+86 551) 3601384; **Telex:** 90028 USTC CN; **Fax:** (+86 551) 3601760; **E-mail:** yfzheng@ess.ustc.edu.cn.

Director/Head: Yong-fei Zheng.

Number of Research Scientists: 80; **Number of Staff:** 15.

Scientific Fields of Interest: Earth Sciences; Environment; Physics/Astronomy.

Main Lines of Research and Training Activities: Structure and composition of crust and mantle; Isotope geochemistry; seismology; seismic computerized tomography; geodynamics; oil and other mineral resources investigation; rock physics; petrology; mineralogy; global climatic changes; quaternary chronology; environment geochemistry and atmospheric environment; simulation of atmospheric circulation; Cloud physics and atmospheric chemistry; remote sensing of atmosphere; solar and interplanetary physics; MHD numerical simulation; astrophysics; cosmology.

Major Scientific Results or Products: More than 100 papers published in international and domestic journals each year; more than 50 projects supported by National Scientific Foundation, government and industries.

Main Research Facilities Available: workstations (5), personal computers (100), thermal ion mass spectrometer, gas mass spectrometer for isotope ratio measurements, high pressure vessel used in rock physics research, 3 cm meteorological radar, shock tube, international ultraviolet satellite base; library with more than 100 periodicals; equipment in Structure and Element Analysis Centre available for research.

Future Development Plans: Environmental geochemistry, pollution problem, chemical geodynamics, natural resource investigation and exploitation, disaster prevention, solar physics, astrophysics, observation data analysis, atmospheric electricity.

Cooperation Arrangements with Developing Countries: Visiting scholars from developing countries cooperate and work with departmental professors for several months each year; plans to exchange more visiting scholars with developing countries.

Other International Cooperation Arrangements: Scientific research cooperation with institutions in USA, Germany, France, Italy, Japan, Netherlands, UK and Russia.

Egypt

Egyptian Geological Survey and Mineral Authority (EGSMA)

Address: 3 Salah Salem Street, Abbassya, Cairo, Egypt. **Phone:** (+20 2) 4829935; **Telex:** 22695 GEOSU UN; **Fax:** (+20 2) 4820128.

Director/Head: Gaber M. Naim.

Number of Research Scientists: 462; **Number of Staff:** 2,650.

Scientific Fields of Interest: Geological/Earth Sciences; Materials; Energy; Environment.

Main Lines of Research and Training Activities: Geological mapping; mineral exploration (geological, geophysical, geochemical); groundwater investigation; geotechnical studies; environmental geology; laboratory studies (mineralogical, chemical, ores dressing.); mining projects.

Major Scientific Results or Products: In-country geological maps; discovery of ore deposits; study of sites for new cities; groundwater supplies for desert resorts; formation of coal mining company.

Main Research Facilities Available: Well-equipped field camps; geophysical instruments and computers; cartographic section; information centre and library (computerized); central laboratories (mineralogical, chemical, ore dressing).

Future Development Plans: More emphasis on geotechnical investigations, environmental geological research and production of land-use maps; encouragement of small-scale mining activities and promotion of investment in mining industry.

Cooperation Arrangements with Developing Countries: Current cooperation schemes with Syria and Libya; planned cooperation with geological surveys of Arab countries; part of Ministry of Industry and Mineral Resources.

Other International Cooperation Arrangements: Cooperation with British and US geological surveys; Germany, British and American universities.

National Authority for Remote Sensing and Space Sciences (NARSS)

Address: 101 Kasr El-Ainy Street, Cairo, Egypt. **Phone:** (+20 2) 3540173; **Telex:** 93069 ASRT UN; **Fax:** (+20 2) 3557110.

Director/Head: Mohamed Abdel Hady.

Number of Research Scientists: 27; **Number of Staff:** 70.

Scientific Fields of Interest: Agriculture; Biology; Materials; Engineering/Technology; Earth Sciences; Environment; Marine Sciences.

Main Lines of Research and Training Activities: Study of desertification and land degradation; assessment of natural resources; land evaluation; environmental impact and assessment; geology, mineral resources and ground water potentiality; land use mapping.

Major Scientific Results or Products: Atlas of Egypt (MSS images), preparation of atlas of Sinai (TM images); reports about desertification, soil survey, geological survey and environment.

Main Research Facilities Available: Mainframe and PC computers; equipment for air and terrain surveys; field station for photography and photogrammetry; library.

Future Development Plans: Establish data base network for natural resources in Egypt; monitoring and assessment of environmental parameters.

Cooperation Arrangements with Developing Countries: Study of desertification in cooperation with North African countries; study of Middle Eastern natural resources using remote sensing.

Other International Cooperation Arrangements: Study of soil degradation using GIS (Ghent University, Belgium); study of desertification in North Africa (E.C.).

National Institute of Oceanography and Fisheries (NIOF)

Address: 101 Kasr El-Ainy Street, Cairo, Egypt. **Phone:** (+20 2) 355-1381; **Fax:** (+20 2) 355-1381.

Director/Head: Hussein Kamel Badawi.

Number of Research Scientists: 362; **Number of Staff:** 152.

Scientific Fields of Interest: Biology; Biochemistry/Biophysics; Energy; Chemistry; Earth Sciences; Environment; Marine Sciences.

Main Lines of Research and Training Activities: Oceanography and marine environment; Aquaculture; Fisheries; Freshwater and lakes environment; Water reuse.

Major Scientific Results or Products: Proposed measures for protection of aquatic environment; aquatic resources management; mariculture and sea food technology; proposed legal conditions for protection of water bodies.

Main Research Facilities Available: Laboratories equipped with most advanced apparatus in different fields of science and technology.

Future Development Plans: Conduct research programmes to encourage better management of country's aquatic resources; follow global progress in fields of interest.

Cooperation Arrangements with Developing Countries: Scientific cooperation agreements with most developing countries, exchange of expertise; training courses for students.

Other International Cooperation Arrangements: Marine technology programme for Middle East, Texas University, USA; marine environment of Red Sea, Max Planck Institute, Germany; Research cruises in Red Sea and Gulf of Aqaba, Israel.

Soil and Water Research Institute Remote Sensing Unit

Address: Gama Street, Giza, Cairo, Egypt. **Phone:** (+20 2) 720608.

Director/Head: Hassan M. Hamdi.

Number of Research Scientists: 13; **Number of Staff:** 10.

Scientific Fields of Interest: Agriculture; Environment.

Main Lines of Research and Training Activities: Soil survey and land assessment evaluation; crop area estimation; cultivated area estimation; urbanization on agricultural land; land degradation; preparation of salt affected maps using remote sensing.

Major Scientific Results or Products: Estimation of crop areas of rice, cotton and wheat for 1989, 1990 and 1991; estimation of urbanization for number of cities and villages in Delta and Upper Egypt using remote sensing techniques; land degradation on upper part of Nile Delta.

Main Research Facilities Available: Digital image analysis system, PCs; library; Sunsparc workstation; CCT covering whole of Egypt, MSS, TM, SPOT, spectro-radiometer; field stations throughout country belonging to Ministry of Agriculture.

Future Development Plans: Desertification; urbanization on agriculture land on national scale; preparation of soil and land use maps for desert areas in Egypt.

International Cooperation Arrangements: Cooperation with Remote Sensing Center, Boston University, USA.

Ghana

Council for Scientific and Industrial Research (CSIR) Water Resources Research Institute

Address: P.O. Box M.32, Accra, Ghana. **Phone:** (+233 21) 775351 (2 lines); **Fax:** (+233 21) 777170.

Director/Head: Nii Boi Ayibotele.

Number of Research Scientists: 52; **Number of Staff:** 107.

Scientific Fields of Interest: Geological/Earth Sciences; Environment; Marine.

Main Lines of Research and Training Activities: Surface water and groundwater resources assessment; water resources planning and management; water quality assessment; development of appropriate technologies for water conservation and utilization.

Major Scientific Results or Products: 368 publications (reports, surveys, papers for international conferences and specialized meetings) during past 25 years on all aspects of water resources issues.

Main Research Facilities Available: *Surface Water Division:* Hydrometeorological equipment, including water level; recorders, rainfall recorders, current meters; sediment laboratory for suspended bed load analysis; PC network and printers. *Groundwater Division:* Geophysical equipment such as electrical resistivity and seismograph; Drilling rig; power auger; neutron probe. *Water Quality Division:* Atomic absorption spectrophotometer (AAS); paqua laboratory for microbiological analysis; iron chromatograph; spectrophotometers; field laboratory for physio-chemical analyses. *Library and Documentation Division:* Research library with 6,563 titles; PC computer and printer.

Future Development Plans: Establish remote sensing and Geographic Information System (GIS); increase collaborative research with other water agencies/institutions from developed and developing world; explore more opportunities for developing human resources.

Cooperation Arrangements with Developing Countries: Collaborative research with Comité Inter-Africain d'Etudes Hydrauliques (CIEH) in Burkina Faso; affiliated with water-dependent and water-related institutions in Ghana, including Ghana Water and Sewerage Corporation, Irrigation Development Authority, Volta River Authority, the Architectural and Engineering Services Corporation (Hydro Division), and Meteorological Services Division.

Other International Cooperation Arrangements: Collaborative research with British Geological Survey (United Kingdom) and Desert Research Institute (USA). International Hydrological Programme/Operational Hydrological Programme (IHP-OHP), Germany; UNESCO's IHP; Hydrological, Operational Multipurpose Sub-Programme (HOMS); World Meteorological Organization (WMO); IAHS; GEMSWATER Global Environmental Monitoring Systems of UN Environment Programme (UNEP)/United Nations Educational, Scientific and Cultural Organization (UNESCO), World Health Organization (WHO)/World Meteorological Organization (WMO).

India

Council of Scientific and Industrial Research (CSIR) National Geophysical Research Institute (NGRI)

Address: Uppal Road, Hyderabad 500 007, Andhra Pradesh, India. **Phone:** (+91 40) 671124; **Telex:** 0425-7018 NGRI IN; **Fax:** (+91 40) 671564; **E-mail:** postmast@ngri.uunet.in.

Director/Head: Harsh K. Gupta.

Number of Research Scientists: 205; **Number of Staff:** 641.

Scientific Fields of Interest: Energy; Materials; Earth Sciences; Environment; Marine Sciences; Mathematics.

Main Lines of Research and Training Activities: Geophysical, exploration; lithosphere, structure and dynamics; natural hazard assessment; assessment and management of groundwater resources; geophysical instrumentation; training programmes on geophysical exploration, groundwater; seismicity

surveys for dams and nuclear power plants; winter and summer schools on seismology and earthquake processes.

Major Scientific Results or Products: Published more than 1,500 research articles, a dozen standard reference/textbooks in various areas of earth sciences printed by international publishing houses; gravity map series of India (scale 1:500000) and detailed gravity maps of Cuddapah and Godavari Basin (scale 1:250,000); technical reports based on in-house and sponsored research programmes; state-of-the-art instruments for geophysical exploration.

Main Research Facilities Available: ICP and mass spectrometry and geochronology lab, palaeomagnetic lab, seismological and magnetic observatories, mineral separation lab, hydrofracturing unit, mineral physics lab, tritium lab, cyber 180-850 main frame computer, Vax 3100/40, microvax and Apollo workstations, mobile seismic network stations, equatorial observatory at Ettaiyapuram; advanced library.

Future Development Plans: Efforts being made to apply research results to enhancing capabilities to examine mineral resources and oil in unexplored terrains; participate in seismic data acquisition in shield region for better assessment of stable continental earthquakes; closer interaction with oil and mineral industry; prepare transects numbering into several 100 km across geologically critical terrains in line with global geotranssect programmes.

Cooperation Arrangements with Developing Countries: Committee for Developing Countries (CDC) newsletter under IASPEI; participate in different programmes under umbrellas of SAARC and NAM; Trieste Institute, Italy) for training/visiting Fellowships; China in field of seismology particularly with SSB, China, Studies related to G-SHAP with neighbouring countries.

Other International Cooperation Arrangements: Germany: in-situ stress and pore pressure studies, and deformation studies through GPS/VLBI; USA: chemical and isotope studies of Deccan Plateau under Indo-US Sub-Commission on S&T; Russia: integrated long-Term programme of S&T cooperation; UK: on water management with University of Sheffield; France: collaborative research on continental lithosphere and subcontinental mantle; participation in exchange programmes under DAAD, CNRS, Commonwealth, Indo-US Exchange and with East European countries.

Council of Scientific and Industrial Research (CSIR) National Institute of Oceanography (NIO)

Address: Dona Paula, Goa 403 004, India. **Phone:** (+91 832) 221322 and 226253; **Fax:** (+91 832) 223340 and 229102; **E-mail:** ocean@darya.nio.org, ocean@csnio.ren.nic.in; **URL:** <http://www.nio.org/>.

Director/Head: Ehrlich Desa.

Number of Research Scientists: 217; **Number of Staff:** 421.

Scientific Fields of Interest: Marine Sciences.

Main Lines of Research and Training Activities: Survey of marine living resources; geological and geophysical surveys for exploration of minerals in the deep sea; identification and utilization of marine plants and animals for pharmaceutical purposes; air-sea interaction, heat budget parameters etc. in the Arabian Sea and the Bay of Bengal for improving monsoon prediction; studies on physical and engineering parameters for offshore and coastal engineering projects including coastal zone development; identification and monitoring of various pollutants and of suitable sites for the safe disposal of factory wastes and sewage.

Major Scientific Results or Products: Thorough study (physical, chemical and biological aspects) of the Northern Indian Ocean; location of ilmenite placers; preparation of geomorphological, sedimentological, geochemical and geophysical maps of the continental margin of India; survey of 4 million square km in Central Indian Ocean for polymetallic nodules, design and development of ocean research instruments; identification of several plants and animals which are sources of organic chemicals and drugs; method for extraction, testing and stabilization of TAL, an endotoxin tester; technical services to industries and agencies for coastal management, harbour, pollution control; technical assistance and training programmes to other countries.

Main Research Facilities Available: A well-equipped research vessel; sophisticated instruments/equipment for ocean research (all disciplines); computers and library facilities; image processing system.

Future Development Plans: Marine biotechnology; Mapping of the sea floor and development of technology for nodule mining.

Cooperation Arrangements with Developing Countries: Through bilateral arrangements technical assistance (training and resource survey) provided to Sri Lanka, Seychelles, Mauritius, Kenya. Through

international organizations like the Commonwealth Science Council (CSC), IOC, United Nations Educational, Scientific and Cultural Organization (UNESCO) to Caribbean countries and several other developing countries.

Other International Cooperation Arrangements: Bilateral: Germany, former USSR, USA.

Jawaharlal Nehru University School of Environmental Sciences

Address: New Delhi 110067, India. **Phone:** (+91 11) 6962438; **Telex:** 031 - 73167 JNU IN; **Fax:** (+91 11) 6865886; **E-mail:** psrama@jnuniv.ernet.in.

Director/Head: P.S. Ramakrishnan.

Number of Research Scientists: ~ 40; **Number of Staff:** ~ 25.

Scientific Fields of Interest: Agriculture; Biology; Environment.

Main Lines of Research and Training Activities: Environment and sustainable development; pollution; environmental biotechnology; earth and atmospheric sciences.

Major Scientific Results or Products: More than 50 scientific publications per year, train scientists.

Main Research Facilities Available: All major analytical and computing facilities relevant to environmental sciences.

Future Development Plans: Initiate linkages between natural and social sciences (sustainable development programme) at Institutional level; Individual efforts already exists.

Cooperation Arrangements with Developing Countries: At present, only student exchange; institutional links in future.

Other International Cooperation Arrangements: UNESCO, SCOPE, IUBS, IGBP international programmes; funds from international agencies.

Jamaica, West Indies

University of the West Indies (UWI) Centre for Environmental and Nuclear Sciences (CENS)

Address: Mona Campus, Kingston 7, Jamaica. **Phone:** (+854) 9271777; **Telex:** 2123; **Fax:** (+854) 977-0768; **E-mail:** glalor@uwimona.edu.jm.

Director/Head: Gerald C. Lalor.

Scientific Fields of Interest: Agricultural Sciences; Chemistry; Geological/Earth Sciences; Environment; Medical Sciences.

Main Lines of Research and Training Activities: Analytical chemistry, including neutron activation analyses and X-ray fluorescence; geochemical mapping; applications of geochemistry to agriculture, the environment, natural resource management and health.

Major Scientific Results or Products: Numerous publications, including geochemical atlas of Jamaica; identification, definition and first steps in amelioration of lead hazards.

Main Research Facilities Available: SLOWPOKE 2 research reactor with maximum rated flux of 10^{12} n $\text{cm}^{-2}\text{s}^{-1}$; several gamma detector systems and multi-channel analysers; X-ray fluorescence spectrometers; liquid nitrogen generator of 10 litres per hour capacity; automated Dionex ion chromatography unit with conductometric and spectrophotometric detectors; PC's, servers, mini-computers and full access to Convex 3440 supercomputer.

Future Development Plans: Investigations on quantifying baseline levels in soils, air and water to be expanded and extended to other countries; programmes will include work of local, regional, and global concerns, including improvements of analytical methods, development of databases and GIS; environmental protection; radiation monitoring and protection correlation of environmental factors with health and well-being of human and livestock populations—for example, arsenic, cadmium, and lead in soils.

Cooperation Arrangements with Developing Countries: Cooperation arrangements now exists with Mexico and Argentina; plans being developed for cooperation with Brazil, Colombia, Costa Rica and Cuba.

Other International Cooperation Arrangements: Existing cooperative arrangements include British Geological Surveys, SLOWPOKE Centre at Dalhousie University and Institute for Earth and Oceans, University of New Hampshire.

Kenya

Regional Centre for Services in Surveying, Mapping and Remote Sensing

Address: P.O. Box 18118, Nairobi, Kenya. **Phone:** (+254 2) 803320-9; **Fax:** (+254 2) 802767; **E-mail:** rcssmrs@unep.org.

Director/Head: Simon L.P. Ndyetabula.

Number of Research Scientists: 10; **Number of Staff:** 15.

Scientific Fields of Interest: Engineering/Technology; Earth Sciences; Environment.

Main Lines of Research and Training Activities: Geodetic controls for resource mapping and environment monitoring; hydrographic charting; early warning systems for food security; global resource information databases; inventorying and analysis of geo-referenced digital databases for mapping; maintenance and service of scientific equipment; space-based techniques for resource mapping.

Major Scientific Results or Products: Techniques for crop yield assessment; land cover maps using space-based techniques; NDVI mapping for early warning systems; establishment of geodetic control points throughout Africa.

Main Research Facilities Available: Library, geodetic equipment, printing down frames; automatic colour processor; UNIX workstation/SPARC, PCs: Pentiums (75/100 MHz), 486 DX2/66 MHz; 386/20 MHz; laptop computer; dot-matrix and laser colour printers; digitizing tables; plotters; software includes Arc/Info, ArcView, Idrisi, ILWIS, Spans, PCI, Erdas; classrooms, laboratories and conference halls.

Future Development Plans: Redefine objectives and mandate to become partner in research development and instrument of sustainable development in eastern and southern regions of Africa.

Cooperation Arrangements with Developing Countries: Institute owned by 15 eastern and southern African countries; has mandate to serve 24 countries in region.

Other International Cooperation Arrangements: With UNEP, FAO, European Space Agency, UNIDO, France, Netherlands, Italy and UNESCO.

Mexico

Centro de Investigacin y de Estudios Avanzados (CINVESTAV), Merida Unit

Address: A.P. 73 Cordemex, Mérida, Yucatán 97310, México. **Phone:** (+52 99) 812973; 812910; 812960; **Fax:** (+52 99) 812923; **E-mail:** ggold@kin.ciemer.conacyt.mx.

Director/Head: Geraldo Gold Bouchot.

Number of Research Scientists: 21; **Number of Staff:** 29.

Scientific Fields of Interest: Biology; Chemistry; Environment; Marine Sciences.

Main Lines of Research and Training Activities: MSc Programme on Marine Biology. PhD Programme on Marine Sciences. Marine Ecology: GIS; Management of coral reefs; phytoplankton, zooplankton; energy budget in coral reefs; ichthyology; environmental impact in coastal ecosystems; nutrients in marine water; primary productivity in coastal lagoons; sustainable use of coastal and marine resources; benthos. Fisheries: biomodelling of tropical fisheries; multispecies tropical fisheries. Aquaculture: development of technology; nutrition, pathology and parasitology, ecophysiology, reproduction.

Major Scientific Results or Products: Sustainable use of coastal and marine resources; management of fisheries; technology for culture of aquatic animals and plants; basic scientific information.

Main Research Facilities Available: 18 laboratories for research with specialized equipment: microscopes, HPLC, gas chromatography, pH meters, oxymeters; tekator for analysis equipment, histokinette. Library with 2000 books on aquatic sciences, 65 periodical magazines, online access at two scientific bibliographic data base; satellite and optic fibre connection to Internet; about 60 computers, almost 60 connected to internet.

Future Development Plans: New building to fit 20 laboratories in Mérida; new teaching unit, including classrooms, labs, computers, facilities for students; new library.

Cooperation Arrangements with Developing Countries: Cooperation arrangements with universities in Guatemala, Brazil and Uruguay.

Other International Cooperation Arrangements: Louisiana State University; Universidad de Las Palmas de Gran Canaria; European Union.

Universidad Nacional Autónoma de México (UNAM) Centro de Ciencias de la Atmósfera (CCA)

Address: Circuito Investigación Científica, Ciudad Universitaria, 04510 Mexico, DF, Mexico. **Phone:** (52 5) 622 4059; **Telex:** 1774523 UNAMME; **Fax:** (52 5) 616 0789; **E-mail:** dire@mviica.atmosfcu.unam.mx.

Director/Head: Fernando García G.

Number of Research Scientists: 30; **Number of Staff:** 89.

Scientific Fields of Interest: Earth Sciences; Environment.

Main Lines of Research and Training Activities: *Basic research:* Physical climatology; Middle atmosphere physics; Cloud physics; Climate modelling; Radiation transfer. *Applied research:* Agrometeorology; Aerobiology; Bioclimatology; Global climate change; Synoptical meteorology; Environmental cytogenetics and mutagenesis; Urban climatology; Environmental pollution; Aquatic ecophysiology; Atmospheric electricity; Physicochemistry of the atmosphere; Numerical weather prediction; Atmospheric chemistry; Tropical meteorology. *Technological development:* Meteorological instrumentation.

Major Scientific Results or Products: World leader in climate research with development of climate thermodynamic model and in Mexico regarding air pollution and atmospheric chemistry research and numerical forecasting; 14 scientific papers published in international journals; 9 book chapters and 1 book in 1996; publish international scientific journal *Atmosfera* (quarterly) in English and Spanish.

Main Research Facilities Available: Library (with more than 6,000 volumes and 100 periodical journals); computing services (distributed network of PCs and workstations, connected to two Vax systems and Titan computer and to external networks), mechanical and electronic workshops, atmospheric chemistry and physicochemistry; environmental pollution; aerobiology; environmental cytogenetics and mutagenesis; cloud physics and atmospheric electricity laboratories; 3 mobile units and 3 weather stations.

Future Development Plans: Improve studies of global climate change; develop regional forecasting models; develop regional air pollution models.

Cooperation Arrangements with Developing Countries: Several projects with Latin American countries.

Other International Cooperation Arrangements: Cooperative projects with USA (universities, national laboratories, EPA); Belgium (Catholic University of Louvain); England (Rothamsted Station).

Universidad Nacional Autónoma de México (UNAM) Instituto de Geofísica (IGF)

Address: Circuito Exterior S/No. Ciudad Universitaria, 04510 Mexico, D.F. Mexico. **E-mail:** juf@tonatiuh.igeofcu.unam.mx.

Director/Head: Jaime Urrutia Fucugauchi.

Scientific Fields of Interest: Earth Sciences.

Main Lines of Research and Training Activities: Seismology; Volcanology; Geophysical exploration; Paleomagnetism; Geomagnetism; Natural resources; Geochemistry; Space physics; Solar radiation.

Major Scientific Results or Products: Some 50 research papers published in international journals each year.

Main Research Facilities Available: Library; computer centre; Sun workstations; each investigator has at least one 486 PC; national seismic network; isotopic geochemistry laboratory; solar radiation and geomagnetism observatories.

Cooperation Arrangements with Developing Countries: Memorandum of Understanding for research projects with several Latin universities.

Other International Cooperation Arrangements: Projects with US universities and National Science Foundation; projects with Commission of European Communities.

Morocco

Centre National de Coordination et Planification de la Recherche Scientifique et Technique Laboratoire de Goscience (LAG et LA

Address: B.P. 8027 R.P. Rabat, Morocco. **Phone:** (+212 7) 778674; **Telex:** CNR 36452 M; **Fax:** (+212 7) 771288/778678.

Number of Research Scientists: 15; **Number of Staff:** 20.

Scientific Fields of Interest: Engineering/Technology; Geological/Earth Sciences; Remote Sensing; Risk assessment; Environment.

Main Lines of Research and Training Activities: Installing national network for seismic monitoring and warning; seismic risk assessment and generation of a construction code; structure of crust and upper-mantle; gravity, magnetism and geodesy; marine biology (biogeography and ecology of marine fauna environmental impact monitoring of near coast water quality); marine and terrestrial geology; remote sensing; image processing; pattern recognition.

Major Scientific Results or Products: Regional historical seismicity studies; seismotectonics and active faults mapping; regional seismic risk assessment studies; seismic site investigations (nuclear plants, dams, bridges). Publication of monthly and half-yearly bulletins of seismological observations; magma and processes of magmatism; mineralogy; petrology; studies of pollution impact on marine organisms.

Main Research Facilities Available: VAX 750, 1 workstation DEC, 3 workstations SUN, 10 PC /AT, several printers including 2 laser jet printers, paintjets, plotters, digitizing tables, telemetered seismic network (32 stations), portable seismic network (19 stations), motion network (18 stations), one broad band seismic station, image processing PC scope camera CDD with hard PCSCOPE interface MATROX, tape drive station for seismic data acquisition and soft of image processing and signal processing.

Future Development Plans: Global Seismic Hazard Assessment Programme (GSHAP).

Cooperation Arrangements with Developing Countries: Seismic data exchange; training in seismology, geology and remote sensing.

Other International Cooperation Arrangements: Scientific visitors' exchange with France, Germany, Russia, Italy, Spain and USA.

Niger

African Center of Meteorological Applications for Development (ACMAD)

Address: B.P. 13.184, Niamey, Niger. **Phone:** (+227) 723160; **Telex:** 5407 NI; **Fax:** (+227) 723627.

Director/Head: Mohamed Sadeck Boulahya.

Number of Research Scientists: 10; **Number of Staff:** 8.

Scientific Fields of Interest: Environment; Meteorology; Climatology; Hydrology.

Main Lines of Research and Training Activities: Mitigate the effects of drought and other weather related disasters; Promote activities leading to an improved knowledge of weather and climate anomalies

in Africa as they affect the socioeconomic development process; Promote the use of renewable energy sources as well as water resources management; Conserve, by rational use and management, the natural resources of African countries.

Major Scientific Results or Products: Production of short- and medium-range weather forecasts; seasonal forecasts; on-job training in new techniques and technologies in field of meteorology; climate impact study in Africa within framework of AMCEN climatology network.

Main Research Facilities Available: Telecommunication equipment: MDD (meteorological distribution data by satellite METEOSAT); MESSIR, SYNERGIE, PDUS, E-mail, microcomputers with software like CLICOM, SYSTAT; library.

Future Development Plans: Monitoring of climate variability and extreme events like drought, heat waves, storms, floods, tropical cyclones at continental level; analysis, monitoring and forecasting met. systems for long range; carry out techniques and methods of met. and climatological applications and transfer these methodologies to regional, sub-regional and national institutions.

Cooperation Arrangements with Developing Countries: 53 African countries are ACMAD members, 24 have ratified Centre statutes and processes is underway in other countries.

Other International Cooperation Arrangements: WMO; UNDP; ECA; UNEP; FAO; ECMFW; Meteo-France; UK. Met. Office; AGRHYMET; HYDRONIGER.

Pakistan

Pakistan Council of Research in Water Resources (PCRWR)

Address: House No. 3 Street No. 17, F-6/2 Islamabad, Pakistan. **Phone:** (+92 51) 921-8984/90; **Fax:** (+92 51) 921-8939; **E-mail:** pcrwr%nadlin@sdrpk.undp.org.

Director/Head: Bashir A. Chandio.

Number of Research Scientists: 61; **Number of Staff:** 368.

Scientific Fields of Interest: Agriculture; Water Resources.

Main Lines of Research and Training Activities: Water harvesting in desert areas; Sand dune stabilization; Saline agriculture; Mountain hydrology; Drainage of agriculture land; Reclamation of saline, saline sodic and sodic soils; High efficiency irrigation techniques; training course for hydrology technicians; Holding of special tailor made courses on water resources; Crop water requirements with lysimeter; Artificial recharge of groundwater; Water quality monitoring; Computer modelling; etc.

Major Scientific Results or Products: Developed new concepts in irrigation and drainage for Pakistan; developed computer model for water management; developed skimming well technology; determined crop water requirements; research on salt and drought resistant varieties in desert areas; developed locally soil moisture instruments.

Main Research Facilities Available: HPLC; Fluorimeter; Flame photometer; computerized library; microfiche microfilm readers; range of 586 and 486 machines; plotters, printers and scanners; gravel hopper; resisting survey equipment; surveying equipment; back hoe machine; till laying machine.

Future Development Plans: Converting PCRWR to modern organization for research, consultancy and training.

Cooperation Arrangements with Developing Countries: Present: MOU with People's Republic of China for cooperation in sedimentation. Planned: cooperation arrangements with all developing countries in region for collaborative and training projects and exchange visits.

Other International Cooperation Arrangements: Planned cooperation with JICA, UNDP.

Peru

Instituto Geofísico del Perú (IGP)

Address: Apartado 3747, Lima 100, Peru. **Phone:** (+51 14) 370868; **Fax:** (+51 14) 370258; **E-mail:** machan@igpcam.pe.

Director/Head: Manuel Chang Ching.

Number of Research Scientists: 12; **Number of Staff:** 56.

Scientific Fields of Interest: Earth Sciences; Marine Sciences.

Main Lines of Research and Training Activities: Geomagnetism and equatorial aeronomy; Remote sensing of the upper atmosphere by radar techniques; Seismology and prevention of natural disasters; Solar activity; El Niño Southern Oscillation; Interaction ocean-atmosphere by satellite observations; Gravimetric variations; Neotectonic activity; Training facilities for university graduates and undergraduate students.

Major Scientific Results or Products: Development of radar techniques for atmospheric research; understanding of magnetic equatorial ionospheric plasma properties; discovery of Forbush decrease effect and equatorial electrojet; monitoring of solar flares and cosmic rays during more than five decades; understanding of origin of seismic activity in Andean region; installation and operation of first MST Antarctic radar in King George Island.

Main Research Facilities Available: Observatorio de Ancón; Radio-Observatorio de Jicamarca; Observatorio de Huancayo; Seismological telemetric network and data processing laboratory.

Future Development Plans: Installation of VHF receiving station to observe interplanetary scintillations; development of international, regional centre for geomagnetic field research and training; Installation of national astronomical observatory.

Cooperation Arrangements with Developing Countries: With Andean countries to exchange information about earthquakes and publish earthquake catalogues; with Argentina to install MST radars in Antarctic.

Other International Cooperation Arrangements: Canadian International Development Agency to develop satellite remote sensing; NASA to cooperate in space research projects; Cornell University to operate Jicamarca incoherent scatter radar; University of Nagoya to study solar wind.

Syria

Arab Center for the Studies of Arid Zones and Dry Lands (ACSAD)

Address: P.O. Box 2440, Damascus, Syria. **Phone:** (+963 11) 5323039; 5323087; **Telex:** 412697 SY; **Fax:** (+963 11) 5323063.

Director/Head: Hassan Seoud.

Number of Research Scientists: 60; **Number of Staff:** 45.

Scientific Fields of Interest: Agriculture; Biology; Energy; Earth Sciences; Environment; Water Resources.

Main Lines of Research and Training Activities: Research on: production of wheat and barley varieties tolerant of drought and salinity and resistant to diseases; development of fruit trees suitable for arid conditions; development of rangelands and forests; development of farming systems in rainfed area; improvement of the productivity of the small ruminants; use of saline and slightly saline waters and soils in agriculture; use of waste and treated waste waters in agriculture; supplemental irrigation and rain water harvesting; water resources and water pollution (survey and evaluation). Providing training in the above fields.

Major Scientific Results or Products: Providing water resources for irrigation; identifying genetic resources suitable for arid regions to increase productivity of cereals, fruit trees, rangelands, small ruminants and camels; rehabilitating desert areas; identifying best farming systems in rainfed areas; drawing up principles and basics to prevent water pollution excessive use of water.

Main Research Facilities Available: Library, field research stations, data banks, cartographic section, remote sensing laboratory, laboratories (for analysing soils, water, plant and animal), training centres.

Future Development Plans: Research on production of cereal varieties tolerant of drought and salinity and resistant to diseases; research on identifying farming systems in rainfed areas and transfer of research results to farmers; research on developing small ruminants and camels; studies on development of water resources management systems; studies on use of waste and treated waste water in agriculture.

Cooperation Arrangements with Developing Countries: Providing national centres with genetic resources (cereals, fruit trees, range plants and small ruminants); providing expertise, consultations, materials and equipment; training national personnel; conducting studies and pilot projects pertaining to development of arid areas, desertification control and green belts.

Other International Cooperation Arrangements: Cooperation with regional and international organizations in exchange of data and experience and in conducting training and studies; some projects and studies carried out with support of Arab and international funds and technical cooperation agencies.

Thailand

Chulalongkorn University Environmental Research Institute

Address: Phayathai Road, Bangkok 10330, Thailand 10330.

Director/Head: Wasant Pongsapich.

Scientific Fields of Interest: Engineering/Technology; Environment.

Main Lines of Research and Training Activities: Waste management; risk assessment; water pollution; noise; air pollution; hazardous wastes management; policy and management; environmental impact assessment; global climate change; sustainable development/management; auditing; tourism and environment.

Main Research Facilities Available: Laboratories equipped with basic and sophisticated equipment for hazardous wastes such as atomic absorption, spectrophotometer, high performance liquid chromatography, total organic carbon analyser, carbon monoxide analyser, sulphur dioxide analyser, gas chromatography.

Future Development Plans: Proposed postgraduate programmes and industry/university cooperative research centre for environmental and hazardous waste management (IUCRC/EHWM); establish global change research centre to promote and support activities concerning research studies on physical, chemical and human dimensions changes in Thailand that would be link to SEA START RC.

International Cooperation Arrangements: Major support for establishment of postgraduate programmes and IUCR/EHWM will come from New Jersey Institute of Technology and its Global IUCRC Network; Université Louis Pasteur de Strasbourg has also agreed to join. In addition, the five local member universities of consortium engaged in personnel and institutional linkages with various universities; linkages cover academic exchanges and technology transfers.

National Research Council Thailand Remote Sensing Center

Address: 196 Phaholyothin Road, Chatuchak, Bangkok 10900, Thailand. **Phone:** (+66 2) 5790345;

Fax: (+66 2) 5795618.

Director/Head: Paibul Ruangsiri.

Number of Research Scientists: 14; **Number of Staff:** 60.

Scientific Fields of Interest: Agriculture; Engineering/Technology; Earth Sciences; Environment; Marine Sciences; Remote Sensing.

Main Lines of Research and Training Activities: Remote sensing application; GIS application.

Major Scientific Results or Products: Satellite imagery; maps and reports; database.

Main Research Facilities Available: Image processing system; GIS; Image-map projector; library.

Future Development Plans: Development of natural resources database related to satellite data; launching earth observation satellite.

International Cooperation Arrangements: EU/ESA (Europe); CCRS (Canada); NASDA (Japan); IGBP; STA (Japan); NASA/JPL (USA).

Uganda

Fisheries Research Institute (FIRI)

Address: P.O. Box 343, Jinja, Uganda. **Phone:** (+256 43) 22071; 21990; **Fax:** (+256 43) 21727; 22050;

E-mail: fredbugenyi@mukla.gn.apc.org.

Director/Head: F.W.B. Bugenyi.

Number of Research Scientists: 4 PhD, 11 MSc/MA, 8 BSc; **Number of Staff:** 35 technical and 56 supporting staff.

Scientific Fields of Interest: Agriculture; Biology; Chemistry; Earth Sciences; Environment; Marine Sciences.

Main Lines of Research and Training Activities: Stock assessment of fish in various water bodies; Fish introductions and their predator/prey relations; Fisheries biology and ecology in general; Food-webs and structures; Fish habitats; Primary and secondary productivity of the water bodies and how these relate to overall fishery productivity; Eutrophication of particularly Lake Victoria and other pollution threats; The spread of water hyacinth, its impacts to the biota and its control measures; Interaction of the community in the fishing and fishery industry; The potential of aquaculture to supplement wild fishery stocks. In these lines many people undergo training.

Major Scientific Results or Products: Devised three hypotheses to explain why Lake Victoria functions in awkward way; hypotheses must be tested; introduced species (in *The African Journal of Tropical Hydrobiology and Fisheries*); revived scientific journal that had been in limbo for more than 15 years,

Main Research Facilities Available: Library, conference room, computers, overhead projectors, slide projectors, lake-worthy ships, motor vehicles, outboard engines for use on boats and canoes, physico-chemical analytical equipment, microscopes, sampling equipment for water, plankton and fish, fishing gear, hostel for visiting scientists.

Future Development Plans: Recruit more scientists in fields of institutional interest; train more staff in special skills; expand scope of investigations to cover whole field of water resources management.

Cooperation Arrangements with Developing Countries: Cooperate with Kenya and Tanzania through research and management of shared lake, Lake Victoria, (cooperation includes such countries as Rwanda and Burundi that are in catchment; Nile Basin countries also cooperate).

Other International Cooperation Arrangements: Internationally, cooperates with Freshwater Institute in Canada, Universities of Michigan, Florida, Minnesota, Cornell, etc. in USA, Wageningen and IHE in Netherlands, Zürich in Switzerland, ORSTOM in France.