

WORLD METEOROLOGICAL ORGANIZATION

IPM/2011/Doc. 4

INFORMAL PLANNING MEETING OF THE
VOLUNTARY COOPERATION PROGRAMME

ITEM: 3.3

GENEVA, SWITZERLAND
11-12 APRIL 2011

Original: ENGLISH

Priorities Proposed by WMO Technical Programmes for 2011 and beyond

(Submitted by the Secretary-General)

Summary and Purpose of Document

This document provides information on capacity building priorities for 2011 and beyond as identified by the WMO Technical Programmes and Regional Offices.

ACTION PROPOSED

The meeting is invited to consider the information on capacity building priorities for 2011 and beyond as identified by the WMO Technical Programmes and Regional Offices as a guide to donor members in planning their support to VCP during 2011 and their technical assistance programmes more broadly.

1. Introduction

This document outlines the issues and priorities for capacity building of the developing country Members for 2011 and beyond as offered by various WMO Technical Programmes: Observing and Information Systems (OBS), Weather and Disaster Risk Reduction Services (WDS), Global Climate Observing System (GCOS), Climate Database Management Systems (CDMSs) and Education and Training.

In view of the recent trends of WMO programme priorities and of requests for technical assistance from NMHSs, special attention should be given in 2011 to what as stated by Congress; the focus of the VCP shall comply with the WMO Strategic Plan 2008-2011 and contribute to all of the expected results areas, with particular focus on Expected Result 9 "Enhanced capabilities of NMHSs in developing countries, particularly LDCs, to fulfil their mandates" on weather, climate and water.

2. Observing and Information Systems (OBS)

2.1 Observing Systems Division (OSD)

CBS-Ext.(2010) agreed that more effort is needed to support developing countries, LDCs and SIDS, especially by providing technical guidelines and organizing training and capacity building events in the respective Regions.

CBS-Ext.(2010) agreed on the following guidelines for the allocation of priorities for technical cooperation activities for the integrated observing systems:

- (a) Highest priority should be given to the projects aiming at improving and restoring the existing, and building the new upper-air observational capabilities, of the RBSN/RBCN with emphasis to the activation of silent upper-air stations and the improvement of coverage over data-sparse areas (in particular as regards the purchase of equipment and consumables, telecommunications and the training of staff);
- (b) Highest priority should be given to extend AMDAR coverage to developing countries, LDCs and SIDS to supplement scarce upper-air observations or to provide a cost-effective alternative to countries that cannot afford costly upper-air sounding systems.
- (c) High priority should be given to the projects related to the improvement of data quality, regularity and coverage of surface observations of the RBSN/RBCN with emphasis to the activation of silent stations and the improvement of coverage over data-sparse areas;
- (d) High priority should be given to projects related to the introduction and/or use of new observing equipment and systems including, where cost-effective, surface-based AWSs, AMDAR, ASAP and drifting buoys;
- (e) Medium priority should be given to the projects related to the improvement/upgrading of stations not included in RBSN/RBCN list of stations.

As far as the Instrument and Methods of Observation Programme is concerned, the following priorities should be observed:

- (a) Highest priority should be given to projects aiming at improving and restoring the existing and building the new regional calibration laboratories, such as Regional Instrument Centers and Regional Radiation Centers;

- (b) Highest priority should also be given to the projects aiming at improving and restoring the existing and building the new national calibration laboratories.
- (c) High priority should be given to projects aiming at improving the traceability of instruments, such as the use of traveling standards, the calibration of instruments and support to trainees from national calibration laboratories to visit RICs for extended period of time to be trained in calibration procedures and practices.

2.2 Weather Information System/Global Telecommunication System (WIS/GTS)

Sixteenth Congress will urge Members and regional associations to sustain their commitment in continued improvement of the regional component of the GTS and to take effective actions to modernize their national and regional data-collection systems, especially to get as many as possible NMCs connected to GTS. Therefore top priority should be given to ensure full implementation of the GTS as targeted on the Manual on the GTS, to ensure that all NMHSs have the capability to inject data into the GTS and retrieve required data and products. In some cases, this may include national data collection system and satellite-based receiving systems.

There are several Members in RA I and RA II which are not connected to GTS, for example, Zambia, Iraq, Afghanistan, and Bhutan. It would be appreciated if VCP could help those Members to establish/restore their connections to GTS.

2.3 WMO Integrated Global Observation System (WIGOS)

Cg-XVI will urge Members and RAs to put significant attention to specialized education and training activities to be reflected in the regional, sub-regional and national WIGOS implementation plans, especially for NMHSs of LDCs, LLDCs and SIDS. Hence, capacity building is not to be limited to scientific and technological concerns, but also to strategic and management consideration including human resources development, resource mobilization and communications and outreach activities.

3. Global Climate Observing System (GCOS)

For GCOS, 2010 was a year of some successes but also some failures. Several station renovations were completed and some stations received supplies of radiosondes. Following our failure to establish a Technical Support Project (TSP) in Africa for the second time, a person in Africa was hired on a WMO SSA. He is providing some of the services we wanted to implement with the TSP. This is not a good long term solution but it helps to have someone "on the ground" in Africa.

The Technical Support Project (TSP) for the Americas has ended so that only the TSP in the Pacific continues to function. This TSP is part of a bi lateral agreement between New Zealand and the US.

The next coordination meeting/workshop of the 9 CBS Lead Centers for GCOS is scheduled for October 2011 in Hamburg, Germany. These Lead Centers are supposed to interact directly with member countries to improve the quality and quantity of the essential reports, the CLIMAT, SYNOP, and TEMP. Unfortunately not all of the Lead Centers contribute as much as others. This year only 3 of the 9 prepared an annual report of their activities, down from 5/9 last year. One of the topics we will cover at the next meeting will be some form of performance measures or process in which the Lead Centers restate their interest and willingness to be a Lead Center on a periodic basis.

Regarding station maintenance / upgrades:

- (a) Radiosondes are being provided to the GUAN stations at Dar es Salaam, Tanzania; Vacoas, Mauritius, and Khartoum, Sudan. These were funded by Switzerland.
- (b) Support was provided to several GUAN stations that experienced equipment failures. Replacement parts and actual repair missions were provided to Vacoas, Mauritius and to Gan, Maldives.
- (c) The upgrade of the 8 GSN stations in Angola was delayed somewhat after the Director was changed. The new Director could not agree to provide the Stephenson screens that the previous Director had agreed to furnish. The requisition of these units at the WMO has taken 6 months so far. This was funded by the Netherlands.
- (d) The instruments were replaced at the high mountain GSN station at Aragats, Armenia. Subsequently a local contract was awarded to repair and renovate the observatory building itself. Work started last year but was then delayed when winter weather arrived.
- (e) In cooperation with the WMO Development and Regional Activities Department, a replacement hydrogen generator was procured along with a new upper air system, radiosondes and balloons for Conakry, Guinea. Possibly this station will be added to the GUAN at some point in the future.
- (f) A project to renovate 11 GSN stations in Madagascar has begun. The UKMO is managing the project and the funding is from the Netherlands.

Issues

- (a) Continuing support for important GUAN stations is still a major issue. Almost all of the GUAN stations are capable of operating but several are silent because they lack consumables (balloons and radiosondes) It costs \$50K-\$60K USD per year to support the operation of an upper air station. Some of the most important stations such as those in Yerevan, Costa Rica, and PNG are silent because they simply lack supplies and cannot purchase for themselves. Usually we can obtain good consistent prices at the WMO, in fact often better than the country itself can obtain. But we need to find a way to address this continuing need in a systematic way.
- (b) The GCOS donor board has determined that GUAN stations that are not likely to become self sufficient within a few years of receiving assistance should not receive additional support. Some of the stations that have received our support for several years will be informed that this support will not continue.
- (c) Hydrogen generators are still a major problem as the first generation of units are now 30 years old and failing. There are few current suppliers and their units have had a poor performance record and they are technically difficult to support. In Africa, many of the support staff are apprehensive even after several bouts of training. Replacement parts are expensive also.
- (d) As funds are less than in previous years GCOS is addressing surface station renovations more than upper air as they are much cheaper but do require much more effort on the part of GCOS to define more detailed specifications and to evaluate more bids. Assistance from members in this regard by managing projects for us is therefore invaluable. Currently UKMO and NZ provide support in

- (e) The WMO procurement function has become even more problematic. It is very difficult to buy some items competitively, such as radiosondes for specific systems, support for name brand units, and equipment that is standard in a particular country. Our attempts to justifying sole source in such cases have generally failed.

Priorities

- (a) The priorities for the coming year include the renovation of the upper air station at Luanda, Angola if funds can be found. This is the highest single priority assigned by the GCOS advisory board.
- (b) Additional training/workshops including training on hydrogen safety and balloon handling is needed as is training on the preparation of the CLIMAT reports. These topics have apparently never been taught. Considering that there have been a few fatal accidents, instruction in the area of hydrogen safety this is an important area where WMO can help its Members and CIMO agrees.

4. Climate Data Management Systems (CDMSs)

4.1 Climate Data Management Systems

There has been an increased engagement of Members in implementing various aspects of climate data management and the increased assistance provided through WMO-VCP or bilateral collaboration to developing and least developed countries in acquiring and operating modern Climate Data Management Systems (CDMSs). However these activities still need further efforts by the Members to accelerate the modernization of Data Archiving systems and methods.

The Commission for climatology identified the future work on Climate Data Management Systems (CDMS) including the following main components:

- (a) Provide guidance on Model of Description for CDMSs describing the main functions of the CDMSs based on existing database management standards and protocols to help the providers of these systems to adequately describe them to and the potential users to make an informed choice of the CDMSs;
- (b) Produce a minimum set of functions that CDMSs should offer based on a new evaluation of the existing and future CDMSs;
- (c) To conduct a comprehensive survey on the degree of operational use of the already installed CDMSs in the developing and Least Developed Countries (LDCs) which benefited from the various capacity building mechanisms e.g. training workshops, bilateral collaboration and the WMO Voluntary Cooperation Programme (VCP). The result of the survey should lead to revisit the ongoing capacity building strategy to ensure that the CDMS implementation should have a positive impact on producing CLIMAT reports and their exchange in addition to the improved historical data digitization in the countries.

VCP would help in hiring a consultant to carry out Survey Analysis and develop Guidance material for the NMHS on the new CDMS model description. The result of this survey will guide WMO to better plan for modernizing Climate Data Management Systems in the

countries. Also VCP would help in assisting least developed countries in the installation and use of modern climate data management systems. The most urgent VCP needs would help in updating the existing CDMSs like Climsoft and Clidata as well as the migration from the obsolete systems such as CLICOM.

Expenditure	Cost
Consultancy	30 K CHF
Support LDC in the migration from old systems to new CDMSs	120 K CHF
Total 150 K CHF	

4.2 Climate Data Rescue

Congress, EC and the Commission for climatology considered that data rescue and digitization of old climate records is still a challenging topic for many NMHSs in developing and least developed countries and needs further attention by the Members. They requested Members to increase their support to safeguard the old climate records and make them available for research and applications in the digitized electronic format. They urged Members and the Secretariat to continue the support given to the developing and least developed countries to implement DARE.

VCP would help in buying DARE equipment and support expert field mission to 20 developing countries with an estimated cost of 3000 CHF per country and a total of **60K CHF** as follow:

Region	Country	Number of countries / cost
Africa	Burundi, Cameroon, Central African, Republic of Congo, Democratic Republic of Congo, Uganda, Rwanda, Burundi	8 / 24K CHF
Central Asia	Afghanistan, Kazakhstan, Kyrgyzstan, Turkmenistan, Uzbekistan	5/ 15K CHF
Caucasus	Georgia, Armenia, Azerbaijan	3 / 9K CHF
South East Asia	Laos, Myanmar, Cambodia, Thailand	4 / 12K CHF
Total 20 countries / 60 K CHF		

4.3 Hands-on training seminars Climate Extremes

The Joint CCI/WCRP-Clivar/JCOMM Expert Team on climate change detection and indices developed a useful technical document " Guidelines on the Analysis of extremes in a changing climate in support of informed decision for adaptation". The Experts highlighted the importance of the results of the extremes analyses as it will support climate-policy related research at the local and national scales. Local authorities and national decision makers will be able to utilize the extremes analyses for their country as input for climate change assessments and the formulation of adaptation and mitigation strategies. Countries can also directly use the results for their "national communications on climate change policies", which are a written requirement for the Conference of the Parties of UNFCCC and include national GCOS implementation activities.

EC-LXII supported ETCCDI ongoing plans for organizing hands-on-seminars for climate extreme analysis as framed in the guidelines. The Objectives of these seminars are:

- (a) Provide training on climate analysis using modern Climate Data Management Systems (CDMSs) and Statistical Analysis tool for climate extremes (RClimdex) which was developed by ETCCDI;
- (b) Address in the regions scientifically important issues related to climate data, such as homogeneity, data gaps, cross-border data comparison regional climate data sets for climate change assessment, regional data bases for climate extremes, etc.
- (c) To produce climate change indicators that enable NMHSs to make a scientifically sound contribution to the implementation of high value climate services as well as to contribute to upcoming IPCC AR5;
- (d) To raise awareness on the need for Climate Data Rescue, Climate Metadata and data exchange;
- (e) To enable participating climate experts, particularly from the developing world to producing peer-reviewed scientific publications with participation of international lead climate experts.

VCP would help in co-sponsoring with the African Centre for Meteorological Applications for Development (ACMAD) one ETCCDI seminars for West Africa and providing a full sponsoring for an ETCCDI seminar for Caucasus and Central Asia. The proposed ETCCDI seminars are one week period with the following participating countries:

Region	Recipient countries	Number of countries	Total estimated cost	VCP funds	Other funds
West Africa	Burkina Faso, Benin, Cape Verde, Cote d'Ivoire, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo	16	60 K CHF	20 K CHF	ACMAD (CLIMDEV project) (40 K CHF)
Caucasus and Central Asia	Georgia, Armenia, Azerbaijan, Afghanistan, Kazakhstan, Kyrgyzstan, Turkmenistan, Uzbekistan	8	30 K CHF	-	-
Total VCP funds required					90 K CHF

5. Weather and Disaster Risk Reduction Services (WDS)

5.1 Data-Processing and Forecasting System

According to CBS-Ext.(10), on support to building technical capacity to improve weather forecasts and warnings:

The Commission agreed on the following guidelines, in relation to Capacity Building, for the allocation of priorities for technical cooperation activities for the DPFS:

- (a) Highest priority for establishing access at NMHSs to NWP/EPS products from advanced centres, for viewing and post-processing, and use as guidance for forecasting applications, in particular severe weather forecasting;
- (b) Highest priority for automation of operational data-processing functions, including the processing of observations and post-processing of NWP outputs, for improvement of all weather forecasting applications, in particular for very short-range forecasting, including nowcasting;
- (c) High priority for training on use of NWP products, in particular use of EPS products, and probabilistic forecasting methods, particularly in support of the SWFDP;
- (d) High priority for training on operational data-processing, including on the implementation of post-processing of NWP products, running of a Limited Area Model, and NWP verification, where NMHS' capacity is insufficient.
- (e) High priority for training in the use of LRF products issued by the GPCs.

The Severe Weather Forecasting Demonstration Project (SWFDP) is a project which focuses on capacity building for forecasting severe weather and for provision of warning services, for up to a 5-day lead-time, and is consistent with (a), (b), (c), and parts of (d), above. With the increasing number of regional projects, and increasing numbers of participating countries, IPM/VCP is requested to give SWFDP related activities its highest priority of consideration in 2011. The SWFDP contributes to disaster risk reduction goals.

Improved severe weather forecasting and warning services in developing countries and LDCs

The ever-increasing precision, reliability and lead-time provided by Numerical Weather Prediction (NWP) systems have led to increasingly skilful weather forecasting over the recent decades and will become ever more relevant in the future. They generally give accurate indication of developing extreme weather events, thereby being a very relevant component of routine and severe weather forecasting and warning programmes at NMHSs. It's in this context that the Severe Weather Forecasting Demonstration Project (SWFDP) initiative is intended, to further explore and enhance the application of existing NWP and Ensemble Prediction System (EPS)-based products from major NWP centres of the WMO's Global Data-Processing and Forecasting System (GDPFS) and satellite-based products, in the improvement of severe weather forecasting and delivery of warning services in countries where sophisticated tools and products are not currently used, or poorly used. PWS aspects have been integrated in SWFDP, which aimed at the improvement of delivery of products and services to various socio-economic sectors, thereby contributing significantly to reducing the risk of disasters from weather-related hazards. SWFDP as a planning concept, initially focus on strong winds and heavy precipitation, thereby also addressing some flooding aspects as a major impact. Flooding due to wind-induced waves and storm surges in coastal inundation-prone regions where the SWFDP had been implemented, has been or will be addressed by the SWFDP regional subprojects, thereby contributing to the Storm Surge Watch Scheme (SSWS).

The SWFDP represents a systematic and practical approach for building capacity, and for transferring new knowledge and skills; and could well serve as a trialing environment for promising outputs from GIFS, and the implementation of new products from TIGGE. The

SWFDP has been implemented successfully and is now being expanded to include all sixteen countries of southern Africa and to span all seasons and a number of meteorological and related hazards (heavy rain, strong winds, large waves, cold temperatures, etc.). A second project is in implementation for four South Pacific Islands which addresses heavy rains, strong winds, and damaging waves. SWFDP subprojects in Southeast Asia and in Eastern Africa are in early stages of development, and others are also in consideration.

Based on the experience gained with the SWFDP, for example in southern Africa, a series of regional SWFDP subprojects, including training, especially focused on developing countries, LDCs and SIDSs, will be implemented in East/Central Africa, West Africa, Southeast Asia, South Asia-Bay of Bengal, Central Asia and the Caucasus, South-eastern and Southern South America, Central America and the Caribbean, South East Europe, and Southwest Pacific Islands, depending upon donor capacity and support.

Detailed information on the phased approach for the each SWFDP subproject is presented in the SWFDP overall project plan, available at: <http://www.wmo.int/pages/prog/www/CBS-Reports/DPFS-index.html>).

5.2 Aeronautical Meteorology Programme

Twinning Partnership in Implementation of Quality Management Systems for LDCs & SIDS

By 15th November 2012, the implementation of a properly organized quality management system for the provision of aviation meteorological services to international air navigation is going to become an ICAO Annex 3 Standard and therefore mandatory to NMHSs providing such services. A lack of resources needed for hiring a commercial consultancy company to guide implementation has been a major obstacle to compliance for many Members especially in the developing and least developed countries.

In order to overcome this problem, the idea of forming “twinning partnerships” with Members already operating a mature QMS has been seen to a viable solution to Members willing to do so, especially LDCs and SIDS.

To do this it is important to firstly identify suitable Members with mature QMSs prepared to enter into a twinning partnership by region. Once the wish to enter into such a partnership has been declared by a DC or LDC Member, and a suitable partner has been identified either by the requesting Member or the WMO, the extent of support available (manpower/expertise, travel cost,) needs to be checked against any VCP commitment the Donor Member is able and willing to enter.

Once this is done, a comprehensive protocol for the respective engagement of partners has to be developed and documented, and the extent of further support by the WMO Secretariat that would be needed in completing the twinning project has to be established and authorized.

Another area where it is thought similar efforts could bear fruit is in the area of qualifications and training of meteorological personnel in aeronautical meteorology as stipulated in the WMO Technical regulation No. 49, Vol. 1. and WMO-No. 258 together with its Supplement No. 1 and respectively its successor publication which is nearing completion at this time.

The recently drafted Top-level competencies for operational aeronautical forecasters will be mandatory to all Member countries by 2016. A Competency Assessment Toolkit has been developed to facilitate the assessment of the competency of personnel, and the availability of external Experts (from donor Members) to carry out model assessments as a practical means of helping Developing Country Members to develop appropriate assessment methods.

Twinning arrangements with Members with the required competences and joint exercises using Competency Assessment Toolkits are expected to provide a significant support in capacity development in this field. The formal and practical arrangements would follow very closely the example given for the QMS implementation twinning exercise.

5.3 Disaster Risk Reduction Programme

Under the crosscutting framework of the WMO Disaster Risk Reduction (DRR) Programme, four cooperation initiatives are underway in Southeast Europe, Central America, the Caribbean and Southeast Asia for strengthening of meteorological, hydrological and climate services to support disaster risk reduction (DRR) with consideration for climate variability and change in these regions. These initiatives engage multiple national/regional/international stakeholders from various agencies and sectors to develop clear priorities based on gaps and needs identified by national and regional stakeholders, with national development components and strengthening regional cooperation. In these initiatives, in addition to WMO training and assessment workshops, the various regional meetings and platforms such as the tropical cyclone committees, Regional Association meetings, and DRR-related regional meetings and platforms (organized by other partners) are leveraged to bring together multi-stakeholders for identification, prioritization, development and sharing lessons learned from implementation of projects and activities. Regional Associations (and their various task teams), WMO Regional Specialized Centres (RSMC, RCC), other regional agencies and partners are engaged from early stages to leverage their contribution and engage them in a multi-stakeholder integrated approach for project implementation. A critical part of these initiatives are the identification and integration of various projects implemented through bi- and multi-lateral cooperation and by other agencies. The initiatives are developed within a long-term capacity development planning, implemented through phased projects.

These projects engage WMO technical programmes and commissions, operational components of GDPFS/WIS/WIGOS and external partners for development and implementation of proposals and project activities. Through these initiatives, a coordinated process engaging relevant national and regional stakeholders, technical programmes is being developed to leverage expertise, capacities and resources of WMO and partners in the implementation with a coordinated approach. Areas of focus include:

- (a) Consideration of the NMHSs' institutional role, responsibilities and budgets within the disaster risk management (DRM) policies, legislations, budgeting, planning and coordination mechanisms at the national to local levels;
- (b) Development of historical and real-time standardized hazard databases, metadata, statistical analysis and climate modelling of extreme events, and data exchange policies as critical input for risk assessment;
- (c) Strengthening of observations, forecasting, communication and dissemination of warnings and development of Standard Operating Procedures (SOPs) with DRM stakeholders in Multi-Hazard Early Warning Systems (MHEWS) for reduction of mortality risks;
- (d) Development of meteorological, hydrological and climate products and services to support:
 - (i) Risk reduction through medium- to long-term sectoral planning and investments in land zoning, infrastructure and urban development, agricultural management, health, etc;
 - (ii) Risk transfer through catastrophe and weather-indexed insurance and other financial tools.

To date contributions from VCP funds have been leveraged for initiatives in the Caribbean and Central America.

The meeting is invited to discuss opportunities for further leveraging of VCP funding to facilitate these coordinated DRR initiatives in these regions and expansion of the multi-stakeholder cooperation model to other sub-regions (e.g., Africa, Pacific).

Overview current and emerging major partnerships /regional development

Through coordinated DRR initiatives a network of partners (e.g., technical, development and donor) that contribute to implementation and funding of projects in these sub-regions have been identified and engaged. A number of primary partners are engaged in all initiatives, including United Nations Development Programme (UNDP), the World Bank, UN-International Strategy for Disaster Reduction (UN-ISDR), regional DRM agencies. Furthermore, all bi-lateral and multi-lateral activities are identified and engaged for enhance coordination. Other agencies such as UN and international partners such as UNESCO Intergovernmental Oceanographic Commission (UNESCO-IOC), FAO and WHO are engaged as relevant. Finally, donors and development agencies are engaged from early stage. Engagement of these partners and bilateral cooperation agencies in the coordinated initiatives in Southeast Europe, the Caribbean, Central America and Southeast Asia, has led to opportunities to identify existing projects and facilitating a forum for better integration across these initiatives as well as identification of gaps and priorities that need to be addressed through new proposals and projects. Furthermore, coordination with partners and stakeholders from beneficiary countries is facilitating achievement of regional agreed priorities for long-term cooperation and sustained capacity development in support of DRR, laying a clear roadmap for cooperation across various stakeholders.

5.4 Public Weather Services

Through the work of the Public Weather Services Programme (PWSP) over the years, much knowledge has been accumulated in various aspects of service delivery and spread to Members through conventional training methods such as workshops, conferences, and publication of guidelines. However, despite these efforts, some Members, particularly the developing countries and Least Developed Countries (LDCs), still face challenges in delivering services effectively due to lack of capacities and skills to establish efficient mechanisms for service delivery to users. To assist these Members in enhancing their PWS capabilities, the PWSP initiated a new thrust by embarking on Pilot Projects based on the “Learning Through Doing” (LTD) Project concept. The idea is that a pilot project is initiated to assist one or more National Meteorological and Hydrological Services (NMHSs) to improve their service delivery to specific social and economic sectors, through developing and delivering an improved range of products and services as required by the targeted user(s). The users include the health, transport, agriculture and fisheries sectors. LTD projects are currently under implementation in ten (10) countries. It is planned to spread them to other countries over the next four (4) years, hence the need for VCP funding. Below are examples of LTD projects under implementation:

Madagascar: The LTD pilot project is assisting the Madagascar Meteorological Service improve service delivery to the Ministry of Health (MoH). A joint Working Group formed to implement the project has completed several training activities and established a working mechanism between the two organizations, resulting in the delivery of improved products and services to the health sector in the fight against malaria, Rift Valley Fever and the plague. The impacts of the project include the following: The health sector is now experiencing improved access to weather and climate data and information from the NMHS; has acquired the capability to analyze and interpret data (epidemiological, meteorological and climatological); is able to properly articulate their needs for weather and climate information; and is using climate information for the prevention of malaria, Rift Valley Fever and plague epidemics. The project is being implemented in partnership with the World Health Organization (WHO), the International Research Institute for Climate and Society (IRI) and the Institut Pasteur de Madagascar.

Peru: The overall objective of the LTD project is to improve service delivery to the agricultural sector. The Project is introducing a range of meteorological products and services aimed at meeting the needs of the agricultural sector in the Ica Valley of Peru, specifically for grape and asparagus crops, for improving the monitoring of agrometeorological conditions of crops and also for the short- and medium-term planning of agricultural activities.

Chile: The LTD pilot projects have focused on enhanced agriculture, fisheries, health and transport sectors. The projects include Weather Forecasting System for the mountainous Complex Los Libertadores; information system for the agriculture of Region VIII of Chile; and the information system for the salmon industry. The projects have resulted in the introduction of 22 new products and meteorological services, determined by the real needs of the users. These projects are also being implemented in partnership with Spanish Meteorological Service AEMET.

Panama: The LTD pilot project which was initiated in 2008 focuses on enhanced service delivery to the health sector, in combating Dengue Fever. The project is implemented in partnership with (AEMET).

Ethiopia: The project is based on the integration of weather and climate data with health data to forecast and respond to outbreaks of malaria. This is a joint project between WMO, WHO and the Climate and Health Working Group (CHWG) of Ethiopia of which the Ethiopia national meteorological service is a member. Funding for the project is provided by the Korean International Cooperation Agency (KOICA).

Burkina Faso, Mali, Mauritania, Niger and Nigeria: The project is focused on investigating the impact of weather and climate on malaria and meningitis under the auspices of the Conference of West African Directors (CDAO) and the Meningitis Environmental Risk Information Technologies (MERIT) Project Committee (CDAO-MERIT).

6. Education and Training

The goal of the Education and Training section is to support LDCs and developing countries to meet their needs in human resource development in NMHSs in a comprehensive manner through the VCP arrangement and other complementing schemes.

This long term goal could be translated to the following three immediate priority actions:

Priority Action 1: Encourage LDCs and developing countries to follow the Swaziland and Lesotho examples.

Priority Action 2: Explorer existing opportunities for placement of fellows as a way of complementing the current VCP arrangements.

Priority Action 3: Explore VCP resources in support of a potential WMO flagship activity, namely the GFCS

7. WMO Programme for the Least Developed Countries (LDCs)

The Least Developed Countries (LDCs), including those which are SIDS, are the most vulnerable countries to which the international community was prompted to extend special support measures beyond those available to other developing countries through successive ten-year Programmes of Action for LDCs. It is in support to the Brussels Programme of Action for the LDCs for the Decade 2001–2010 whose goals and targets are closely linked to the Millennium Development Goals (MDGs) that the WMO Programme for the Least

Developed Countries was established with the main objective of enhancing and strengthening the capacities of the National Meteorological and Hydrological Services concerned to contribute efficiently and in a timely manner to the sustainable development of these countries.

Considering the cross-cutting nature of the WMO Programme for the LDCs, its implementation was made as follows:

- (a) All the scientific and technical programmes gave higher priority to meeting LDCs needs and requirements in assistance provided to developing countries as evidenced under the relevant programme activities on strengthening the infrastructure and operational capabilities of NMHSs;
- b) Specific value-added and dedicated activities were undertaken to develop the institutional, human resource and advocacy capacity of a number of LDCs for:
 - (i) Integration of NMHSs activities and products into socio-economic development frameworks, strategies and priorities at national and regional level through the preparation of their development plans and the formulation and execution of demonstration/ pilot projects adapted to LDCs on socio-economic benefits valuation of weather, water and climate information and services in specific sectors, thereby raising their profile;
 - (ii) Enhancing the service delivery and the beneficial use of weather, water and climate information and services in support to LDCs productive capacity in key sectors, particularly agriculture, food security and rural development; health; disaster risk reduction; transport; energy; environment; water resources; tourism; and managing climate change.
 - (iii) Supporting LDCs participation in special meetings and training events;
 - (iv) Preparation of a brochure on the "Role of WMO and NMHSs in achieving the MDGs" to be used by NMHS Staff in their interaction with policy makers and development partners.

The Fourth United Nations Conference on the LDCs to be held in May 2011 in Istanbul, Turkey, will adopt a new ten-year Programme of Action for the LDCs. The WMO Programme for LDCs needs to contribute to the following strategic and specific areas of the Programme of Action for the LDCs for the Decade 2011-2020:

- (a) Building viable national productive capacity, particularly in climate sensitive sectors;
- (b) Halving the proportion of people living in poverty and suffering from hunger by 2015 as contained in the Millennium Declaration;
- (c) Promoting agriculture, rural development and national food security strategies that strengthen support for smallholder farmers and contribute to poverty eradication;
- (d) Investing in basic services for health, education, water and sanitation;
- (e) Enhancing national resilience of LDCs to economic, social and environmental vulnerabilities including climate change and natural hazards, building capacities for crises management, and climate change adaptation;
- (f) Promoting science and technology for peaceful and development purposes;
- (g) Strengthening global partnership for inclusive economic growth and sustainable development of LDCs and providing support to LDCs to attain the MDGs.