UNITED NATIONS DEVELOPMENT PROGRAMME
PROJECT OF THE GOVERNMENT OF LIBYAN ARAB JAMAHIRIYA

PROJECT LIB/2000/003/01/16

Title:	Modernizing and Upgrading the Meteorological Services of the Great Socialist People's Libyan Arab Jamahiriya.
Short Title:	Modernizing the Libyan Meteorological Services
Estimated Starting Date:	01/07/2000
Estimated End Date:	30/06/2003
Executing Agent:	WMO - World Meteorological Organization
Implementing Agent:	WMO - World Meteorological Organization
Project Site:	Tripoli, Great Socialist People's Libyan Arab Jamahiriya
Beneficiary Countries:	
ACC Sector/Subsector:	SOCIAL WELFARE AND SERVICES AND SOCIAL SECURITY - SOCIAL DEVELOPMENT
OCAS Sector/Subsector:	Social development - Social legislation and administration (includes social security, occupational health and safety, leg
Primary areas of focus/sub-focus:	Other UNDP Development Priorities - Other UNDP Development Priorities
Sec. areas of focus/sub-focus:	Promoting Environmental and Natural Resources Sustainability - Application - science and technology for environmental sust
Primary Type of Intervention:	Capacity-Building - Institution-building
Primary Target Beneficiaries:	Target Organizations - Government - Local governmental organizations

Summary of UNDP and Cost-Sharing Inputs in US$ as per attached budget(s)

INPUTS	
UNDP:	0
01-UNDP IPF/TRAC	0
Cost Sharing:	0
Government:	6,363,636
TOTAL INPUTS	6,363,636
ADMINISTRATIVE AND OPERATIONAL SERVICES (AOS)	
Cost Sharing:	0
Government:	636,364
AOS TOTAL	636,364
TOTAL	7,000,000
LPAC approval date:	/ /
BPAC approval date:	/ /
Programme Officer:	

Designated Government Institution: LMD-Libyan Meteorological Department

Brief Description:

This project aimes to create a capability within the Libyan Meteorological Department(LMD) that will enable it to contribute effectively to the socio-economic development activities of the Great Socialist People's Libyan Arab Jamahiriya. This will be achieved through upgrading and modernizing the Department's technical facilities which include the observing station networks, the national and international telecommunications networks and the data processing systems as well as through the training of LMD staff in the operations and maintenance of these facilities and the development of applications for the users. The improved facilities will enable the Department to respond to and fulfill its international commitments to the United Nations Conventions on Climate Change, Biological Diversity and Desertification Control.

Approved by:	Signature:	Date:	Name/Title:
Government:		30.5.2000	Eng. Eiz El-Deen Al-Hanshiri Secretary General Authority for Transport and Communication
Executing Agent:			Prof. G.O.P. Obasi General Secretary
UNDP		30.5.2000	Awni Al-Ani Resident Representative

UNITED NATIONS DEVELOPMENT PROGRAMME TRIPOLI, LIBYA (GSPLAJ)

PD

برنامج الأمم المتحدة الإنمائي
مشروع الجماهيرية العربية الليبية الشعبية الاشتراكية العظمى
وثيقة مشروع

رقم المشروع :LIB/2000/003

عنوان المشروع: تحديث ورفع خدمات الارصاد الجوية للجماهيرية العربية الليبية الشعبية الاشتراكية العظمى

تاريخ بدء المشروع: يونيو 2000
تاريخ انتهاء المشروع: يونيو2003
الوكالة الدولية المنفذة:المنظمة العالمية للارصاد الجوية (WMO)
موقع المشروع:طرابلس. الجماهيرية العربية الليبية
قطاع ACC/UNDP والقطاع الفرعي
القطاع الحكومي والقطاع الفرعي
الجهة الحكومية المكلفة :ادارة الارصاد الجوية (LMD)

برنامج الامم المتحدة الانمائي والمشاركة فى التكلفة

التمويل

برنامج الامم المتحدة الانمائي:
الطريقة (IPF) (2،1) 0 دولار
طرق أخرى: 0 دولار
الحكومة، أو طرف ثالث
المشاركة فى التكلف (حدد) : 6,363,636 دولار

الخدمات الادارية والتشغيلية

الرقم التخطيطي الاشاري للبرنامج الانمائي:-
المشاركة الحكومية فى التكلفة: 636,364 دولار
الاجمالي: 7,000,000 دولار

وصف مختصر:

يهدف هذا المشروع الى خلق القدرة والكفاءة داخل مصلحة الارصاد الجوية ، والتى سوف تمكنها من المساهمة بفعالية فى أنشطة التنمية الاجتماعية الاقتصادية للجماهيرية العربية الليبية الشعبية الاشتراكية العظمى . وسوف يتم تحقيق ذلك من خلال رفع مستوى وتحديث وسائل الارصاد الجوية بالمصلحة ، والتى تتضمن شبكات محطات الرصد، شبكات الاتصالات المحلية والدولية وأنظمة معالجة البيانات، وكذلك من خلال تدريب كادر مصلحة الارصاد الجوية الليبية فى مجال العمليات والصيانة لهذه الوسائل وتطوير تطبيقاتها للمستخدمين . وسوف تمكن هذه الوسائل المطورة بالمصلحة من الاستجابة والايفاء بالتزاماتها نحو اتفاقيات الامم المتحدة المتعلقة بتغير المناخ والتنوع البيولوجي ومكافحة التصحر.

	الاسم /اللقب الوظيفي	التاريخ
بالاصالة عن :	عزالدين محمد الهنشيري	
الجماهيرية :	أمين الهيئة العامة للمواصلات والاتصالات	2000/05/ 30
الوكالة المنفذة:	ج . أو . بي . أوباسي	
المنظمة العالمية للارصاد الجوية	الأمين العام	
برنامج الأمم :	عوني شاكر العاني	
المتحدة الانمائي	الممثل المقيم لبرنامج الامم المتحدة الانمائي	

UNITED NATIONS DEVELOPMENT PROGRAMME
TRIPOLI, LIBYA (GSPLAJ)
2000/05/30
2000/05/30

A. CONTEXT

1. It has been determined that:

(i) The agricultural productivity of the Great Socialist People's Libyan Arab Jamahiriya is dependent upon accurate and timely forecasts of the onset, cessation, quantitative estimate and distribution in time and space of the intensity of the seasonal rainfall;

(ii) Present water resources are scarce and are, therefore, not adequate for the projected growth in the Great Socialist People's Libyan Arab Jamahiriya;

(iii) Alternative sources of energy (solar, wind, etc.) need to be developed to avoid heavy reliance on oil which is not a renewable source of energy;

(iv) Increased use of aviation and shipping for tourism and business requires improved weather services for safety and efficiency of operations;

(v) Lives and property are lost due to inadequate warnings of weather-related hazards;

(vi) There are preventable economic and social losses throughout the Great Socialist People's Libyan Arab Jamahiriya due to weather phenomena.

Further, over the past two decades, the growth of the Great Socialist People's Libyan Arab Jamahiriya in industry, agriculture, housing, transport and oil sectors was not supported by a proper environmental management and preservation policy, leading to environmental degradation that is affecting both human and natural resources. Due to world-wide industrialization, a lot of chemicals are being injected into the global atmosphere and are known to deplete the protective ozone layer and cause change in climate. This calls for the participation of the Meteorological Department in the management and the preservation of the environment by monitoring atmospheric pollution levels and changes in ozone concentrations in the atmosphere. Unfortunately, the present Meteorological Service cannot meet fully the growing needs of the Great Socialist People's Libyan Arab Jamahiriya.

2. Host country strategy

It is the responsibility of the government of the Great Socialist People's Libyan Arab Jamahiriya to provide the meteorological services necessary to ensure the safety of life and property of its citizens, increase agricultural productivity, improve the efficiency of reforestation, permit the efficient operations of the nation's commerce, conserve the nation's water resources, increase energy productivity and permit the safe and efficient operations of the aviation and shipping industries.

To achieve these responsibilities, the government of the Great Socialist People's Libyan Arab Jamahiriya is designing a strategy of developing and enhancing its meteorological services to satisfy the following specific needs:

(i) provide accurate and timely weather observations and forecasts for the public, agriculture, forestry, water resources development and management, aviation, surface transportation, ships at sea and coastal marine activities;

(ii) provide severe and hazardous weather warnings to the public, aviation, maritime industry and commerce;

(iii) provide accurate and timely weather information to be used in the formulation of flood/drought forecasts and warnings for the public and commerce; and

(iv) ensure that climatological records are maintained, among others, to help monitor changes in climate and enhance applications.

To this end, a Memorandum of Understanding (MOU) between the government of the Great Socialist People's Libyan Arab Jamahiriya, the World Meteorological Organization (WMO) as the executing agency and the United Nations Development Programme (UNDP) was signed on Thursday, 10 February 2000, thereby confirming a commitment to this project.

B. PROJECT JUSTIFICATION

1. The present situation

For the Meteorological Department to be able to serve the socio-economic sectors effectively and efficiently, it requires funds to place its services on a high standard. The Department should establish, maintain and operate a network of meteorological observation stations. It should also establish, maintain and operate communication networks both nationally and internationally so that observed data can be moved from the observation sites to the National Meteorological Centre (NMC) and enable the NMC to receive data and products from other centres. The Meteorological Department should also develop a capability to process the data and information and prepare the necessary forecasts and warnings. To maintain this basic infrastructure, the Department must have qualified and well trained staff.

At present, the Meteorological Department has established a reasonable number of varied stations to form its observation station network. It has established 24 surface synoptic stations, 18 climatological stations, 4 agricultural meteorological (Agromet) stations, 5 marine meteorological stations and 8 upper-air radiosonde stations. Many of these stations do not function according to internationally accepted standards or do not function at all due to lack of proper instrumentation. In fact, after the termination of the OMEGA navigation system, the Department was able to rehabilitate only 3 of the 8 upper-air stations to the Global Positioning System (GPS). Those three are functioning well today. All the marine meteorological

stations are not functional as the equipment/instruments are obsolete. The Department also installed 3 analogue weather radars, as part of a cloud seeding exercise. Their technology is now outdated.

For the national collection of observed data, the Department has deployed Radio Telephones (RTs), which work in High Frequency (HF) mode and are backed up by ordinary telephones. This communication mode is inefficient and unreliable due to severe atmospheric interference. The RTs cannot be easily maintained due to lack of spare parts.

According to the Global Telecommunication System (GTS) of WMO, the National Meteorological Centre (NMC) Tripoli is to have regional links with Cairo and Algiers. The existing links are a 75 bauds link to Cairo, which is serviceable and a 50 bauds link to Algiers, which is presently not operating. There is a bilateral link between Rome and Tripoli, which is used for receiving data and products only. Links with low speeds do not fit in the present day telecommunication technology and are, therefore, not very useful to a meteorological service. Unfortunately, links, with medium to high speeds, cannot be established because NMC Tripoli is all manual. Data collection, plotting and analysis, and dissemination of products are done manually. However, the NMC is equipped with a Meteorological Data Distribution (MDD) System through which it receives some data and products from other centres. It is also equipped with a Secondary Data User Station (SDUS) through which it receives some satellite imagery.

For the important exercise of cloud seeding, the Meteorological Department has three (3) weather radars with a 20 year analogue technology which is now outdated. These radars cannot provide the necessary precipitation data over most of the Great Socialist People's Libyan Arab Jamahiriya.

In terms of human resources, the Meteorological Department has adequate staff strength of close to 770, about 100 of whom hold B.S. degrees in Meteorology from the Department of Meteorology, University of Tripoli. The Department trains WMO classes IV and III meteorologists at the Institute of Civil Aviation and Meteorology, Tripoli. Because of what the country has gone through, the staff have not kept up with the technological changes and advances.

2. Expected end of project situation

The implementation of the project will allow LMD to enhance its capabilities in various areas, as described below.

Automatic Remote Observation Network: The Meteorological Department will automate all the 24 surface synoptic stations and add 6 new fully automated stations to fill the gap in desert areas for a total of 30 surface synoptic stations. The Automated Remote Observation Network (ARON) will provide surface data of various types (wind, pressure, temperature, precipitation, radiation, humidity, etc.) to meet the real-time data requirements for the generation of forecast products. The station categories will be based on the synoptic/agrometeorological configuration.

Upper-air Sounding Systems: The Department will maintain a total of 2 upper-air stations. These systems will provide data on pressure, temperature, humidity, and wind direction and speed at different levels. The upper-air data has applications for not only meteorological forecasting but, also in models for transportation of airborne pollution and general wind flows over selected areas of GSPLAJ.

Weather Radars: On of the 3 existing weather radars will be replaced. The new weather radar network will be able to provide information on precipitation over most of the GSPLAJ for both meteorological and hydrological purposes. From these measurements, the Meteorological Department will be able to provide improved weather, flood and marine warnings and forecasts; agricultural weather forecasts; water resources will be better managed. The applications will serve the public, civil aviation, agriculture, marine operations, ground transportation and the construction industry. Each radar site will function independently and consist of a Doppler radar, radar signal processing, product generation and data communication terminal to provide products to a central forecast facility. A central facility will archive all weather radar products, generate timely mosaic products from all the national radar data and distribute the information through the national network.

Satellite Imaging Systems: The existing satellite ground receiving system which comprise of the Secondary Data User Station (SDUS) and the Meteorological Data Distribution (MDD) system that are based on METEOSAT will be replaced by a new system. The European Organization for the Utilization of Meteorological Satellites (EUMETSAT) that launches and operates METEOSAT Satellites which cover the whole of Africa, is soon to launch a new generation of METEOSAT Satellites, METEOSAT Second Generation (MSG), that will have on board instruments based on new technologies. The recommended system for the MSG will be a High Rate Information Transmission (HRIT) System referred to as a High Rate User Station (HRUS).

Integrated Airport Terminal Weather systems: To serve the aviation industry in the GSPLAJ better, 2 airports will be equipped with Integrated Terminal Weather Systems (ITWS). The ITWS is a complete integrated weather system incorporating weather radar, Runway Visual Range (RVR), Automated Surface Observing System (ASOS), Aeronautical Fixed Telecommunication Network (AFTN), forecasts from the Meteorological Department and graphical weather chart capabilities. It provides a single integrated display for aviation weather phenomena for each of the various users. The purpose is to reduce air traffic controller workload, improve aviation safety in both the terminal and enroute airspace and to improve pilot briefing procedures. Specifically, ITWS will provide:

(i) air Traffic Control with necessary meteorological data required for category II operations;

(ii) significant weather information for enroute planning and operations;

(iii) detailed weather data for use by the weather forecaster; and

(iv) a pilot briefing terminal and printer.

Communication System: For better communication both nationally and internationally and in keeping with technological advances in telecommunication, an Automatic Message Switching System (AMSS) will be installed at the National Meteorological Centre (NMC). This will allow for easy compilation into bulletins, of observed data from the automatic stations and enable the Department to link to other international centres at high speeds for efficient reception and transmission of data and products.

Data Processing System: Modern data processing systems will be installed to provide computation of meteorological and climatological data. The systems will also provide interactive graphics support to assist in meteorological analysis, forecasting and warning. Several separate processing systems will co-exist at the NMC facility. Each will be on a Local Area Network (LAN) and will share common data but, generate different forecast products. There will be:

(i) a Message Switching System (MSS) and LAN Server;

(ii) an interactive graphics meteorological weather processor with workstation;

(iii) a central weather radar processor with workstation;

(iv) a meteorological satellite image and data processor with workstation;

(v) a forecaster's workstation for public, aviation and marine weather services;

(vi) a forecaster's workstation for agriculture, forestry and climatology; and

(vii) a back-up workstation.

The NMC will be the primary processing facility and will generate hydrological analyses and forecasts, current weather and meteorological forecast products for the entire country, and marine meteorological weather and state of the sea forecasts for the adjoining Mediterranean Sea.

Weather through the Electronic and Print Media: The most publicly visible output of a weather service is the public weather service distributed to the general public at large through the mass media; i.e. the Radio,Television and Print. These are often supplemented by a variety of individual user access arrangements. Usually, the Public Weather Service consists of a set of current weather information (maximum and minimum temperatures, rainfall, humidity, cloud cover, etc. over the past 24 hours), a description of the current and forecast synoptic systems and a set of forecasts and warnings extending out to one to seven days into the future depending on skills achievable by the individual weather services. To achieve this, a television weather presentation studio will be installed and appropriate training provided to the staff.

Environment, Natural Resource Utilization and Management and Climate change: The discharge of effluent and emission of gases from industry, oil sectors, during agricultural activities, housing and transport, if not properly managed, can lead to severe environmental degradation and a drastic change in the composition of the atmosphere around us. This, as is well known now, can, in turn, lead to a depletion of the protective Ozone layer and a change in climate. The Meteorological Department is eager to participate in the management and preservation of the environment by monitoring pollution levels and Ozone concentrations in the atmosphere. This will be achieved by acquiring and installing systems for measuring atmospheric pollution, especially a Dobson spectrophotometer.

Human Resources: Through the project, the relevant staff of LMD will be trained in various areas, especially in the operation and maintenance of the new facilities, as well as in the areas of numerical weather prediction, climatology and agrometeorology.

3. Beneficiaries

It is not possible to exhaustively list the number of institutions and communities that will benefit from this project. However, the following will be the major beneficiaries of the project:

Agriculture: The agriculture sector will be a major beneficiary of improved weather services. Productivity will be improved significantly through accurate and timely forecasts of the onset of the seasonal rainfall. These forecasts will give an indication as to when to plant seeds and seedlings to increase their chances of survival. Forecasts of the expected amount of rainfall during a season will be used in deciding which crops to plant. There will also be savings on the cost of herbicides through short-term forecasts of rain which will allow delay of application until it is known that there will be no rain for a certain period.

Forestry: The forestry sector will benefit from improved weather forecasts in two areas. First, their reforestation effort will benefit because planting of seedlings will be based on forecasts of the onset of rain which is needed for the survival of the seedlings. The second benefit will be in forest fire prevention and control.

Water Resource Managproved hydrological analyses and forecasts will benefit the Great Socialist People's Libyan Arab Jamahiriya in the preservation of water resources. Over the next two decades, the needs for water are expected to triple in the Great Socialist People's Libyan Arab Jamahiriya. These needs can be met only through improved water resource management. Improved water resource management practices are based on knowledge of rainfall distribution in time and space and intensity, relative humidity, sunshine, temperature (maximum and minimum daily temperatures), wind speed and evaporation.

Aviation: Aviation is expected to benefit from improved weather analyses, warnings and forecasts. The Great Socialist People's Libyan Arab Jamahiriya airspace will be safer with the knowledge of the location and severity of severe weather. The air traffic control system will be able to more efficiently manage the national airspace with improved knowledge of the location of significant weather, upper-air winds and temperatures and airport conditions. Fuel costs will be reduced through improved knowledge of winds, the location of significant weather and better knowledge of weather conditions at destination airports.

Marine: Ships at sea, fishermen and recreational boaters will be able to operate with increased safety with timely and accurate marine forecasts and warnings.

Public and commerce: Both the public and commerce will benefit from improved weather forecasts. Flash flood warnings will save lives and property. Short-term forecasts of rain and severe storms will reduce highway accidents and improve commercial productivity.

Environment, natural resource utilization and climate change: By monitoring the chemical and gaseous composition of and the ozone concentration in the atmosphere, the Meteorological Department will contribute to a better understanding of the issue of climate change. The results of that monitoring will also help the society as a whole to better manage their natural resource utilization activities so that they do not lead to environmental degradation.

4. Project strategy

The main strategy is to put in place a functional basic infrastructure for the Meteorological Department that will efficiently and effectively serve the needs and requirements of the Department's customers for weather services. This strategy requires that the meteorological observation station network be upgraded, technologically, and be expanded to better cover the area of the Great Socialist People's Libyan Arab Jamahiriya. This will, in the long run, lead to a better understanding of the weather and climate of the country. Observations are useful only when they reach the NMC and much more valuable when, together with additional information, are analysed and processed. It is intended, therefore, that the national transmission of observed data be via the free communication channels of METEOSAT satellites and the international links be upgraded to at least 28.8 kbits/second. This is only possible if the NMC is automated.

To achieve the modernization process, a policy of staff development through short-term specialised training for specific purposes and long-term training to acquire scientific qualifications will be developed. New technologies aimed at new applications will also be developed.

At the beginning, there will be some level of dependence on international scientific expertise in a number of specializations. This will guarantee the success of the project and build confidence in the local personnel.

In addition, the following approaches will be taken to ensure the successful implementation of the project:

(i) All on site maintenance of the Meteorological Department equipment and systems will be performed by personnel from the Department with back-up support from manufacturers located in the GSPLAJ;

(ii) Depot repair of failed units will be performed by more experienced staff at the Department Headquarters;

(iii) Initial software support will be provided by staff trained in software program support within the Meteorological Department. A program support facility should be implemented at the Department Headquarters. This facility is to maintain configuration control of all software used in the Meteorological Department. Additional support, if needed, will be provided by local representatives of manufacturers;

(iv) Training for the operations and maintenance of Meteorological Department equipment and systems will be performed by a combination of the equipment manufacturers at the factories and on site, during installation. Professional training will be provided at universities abroad and in some developed and well-established national Meteorological Services. Professional training will include training in Numerical Weather Prediction (NWP), Data Processing, Advanced forecasting and Marine Meteorology. Management Staff will also have to undergo some training to enable them to appreciate change;

(v) A Technical Document Library with complete data on the Meteorological Department hardware and software will be established and maintained at the Department Headquarters; and

(vi) Supply support will be performed by representatives of manufacturers based in the GSPLAJ.

5. Reasons for UNDP support

In view of the development objective and the government strategy, this project relates directly to the aims set by the national development policies and stated in the country cooperation framework (CCF). By enhancing the human resources development and capacity building that will enable the meteorology department to contribute effectively to the socio-economic development of the country, the project is of high relevance to the mandate of UNDP in the field of sustainable human development.

The project will be fully funded by the government. UNDP will assist through the WMO in making available the required technical assistance and in helping to procure the technology and equipment needed to achieve the intended objectives of the project. UNDP will contribute to the success of the project also by monitoring and following-up activities of the project

6. Special considerations

As the weather knows no boundaries, the Meteorological Department of the Great Socialist People's Libyan Arab Jamahiriya is a part of a wider community with a global link. Any weak point in that link makes the whole link weak and, as it is now, the Meteorological Department of the Great Socialist People's Libyan Arab Jamahiriya is a weak point in the global meteorological community link. It is, therefore, necessary that the Meteorological Department of the Great Socialist People's Libyan Arab Jamahiriya is strengthened so that it can effectively play its international role.

The Great Socialist People's Libyan Arab Jamahiriya is a Member of the WMO Regional Association I (Africa) and, in that capacity, the Meteorological Department of the Great Socialist People's Libyan Arab Jamahiriya is to contribute to the development and strengthening of regional institutions such as the African Centre for Meteorological Applications to Development (ACMAD). Such institutions require good quality data to enable them provide the services expected of them. The Meteorological Department of the Great Socialist People's Libyan Arab Jamahiriya will also contribute to and promote the meteorological services within the framework of the Magreh Arab Union and the League of Arab States.

The project will offer opportunities to qualified females to join the technical ranks of the Department's staff and to contribute in meeting major challenges of the country in the related fields.

C. IMMEDIATE OBJECTIVES, OUTPUTS AND ACTIVITIES

1. Objective 1

To upgrade and expand the national meteorological surface and upper-air observation station network and, hence, enhance the efficiency of collection and volume of the data in order to serve better the socio-economic development sectors.

1.1 Output 1

Good quality data of various types will be provided on a timely basis to meet the real-time data requirements for the generation of forecast products.

1.1.1 Activity 1

Provision of a technical advisor for a period of two weeks to, in consultation with the staff of the Meteorological Department, design the station network and draw up station specifications based on the climatic conditions of the Great Socialist People's Libyan Arab Jamahiriya and the requirements of the socio-economic development sectors of the country.

1.1.2 Activitiy 2

Provision of factory training on maintenance and operation of stations for the staff of the Meteorological Department.

1.1.3 Activity 3

Provision of on-site training on installation, maintenance and operation of stations for the staff of the Meteorological Department.

2. Objective 2

To establish and implement networks of specialised observation stations (AGROMET, CLIMAT, Marine, Total Ozone, Vertical Sounding of Ozone, Chemical Composition of the Atmosphere, etc.) to cater for the specialized sectors of the socio-economic development.

2.1. Output 1

Good quality data will be available for research and other sector-oriented activities.

2.1.1 Activity 1

Provision of factory and on-site training on maintenance, installation and operation of station instruments/equipment for staff of the Meteorological Department.

2.1.2 Activity 2

Provision of long-term training in professional fields like agricultural meteorology, climatology, hydrological meteorology, etc. for staff of the Meteorological Department.

3. Objective 3

To take advantage of modern technologies and automate the data processing facilities of the Meteorological Department of the Great Socialist People's Libyan Arab Jamahiriya and, thereby, upgrade its telecommunications channels, both nationally and internationally, to more efficient modes and high speeds of communication.

3.1 Output 1

Efficiency and effectiveness of the NMC of the Great Socialist People's Libyan Arab Jamahiriya will be enhanced.

3.1.1 Activity 1

Provide an expert in Information Technology (IT) for a period of two to three weeks to, in consultation with the staff of the Meteorological Department,

design the data processing facility in relation to the telecommunication requirements of the Department and prepare specifications for the necessary hardware and software.

3.1.2 Activity 2

Provision of factory training on maintenance and operation of the data processing and telecommunication systems for the staff of the Meteorological Department.

3.1.3 Activity 3

Provision of on-site training on installation, maintenance, and operation of the systems for the staff of the Department.

3.2 Output 2

Meteorological observational data from the national networks of stations and from other countries and meteorological products and information from other meteorological centres will be available at the NMC of the Great Socialist People's Libyan Arab Jamahiriya for use in weather analysis and forecasts and for relay to other centres.

3.2.1 Activity 1

Provision, through attachments to advanced meteorological centres, of technical training in handling (reception and transmission) of data and products including WMO procedures and protocols of communication.

3.3 Output 3

Ability to compute meteorological and climatological data and provide interactive graphics support to assist in meteorological analysis, forecasting and warning.

3.3.1 Activity 1

Provision of long-term training in Dynamic Meteorology (Numerical Weather Prediction (NWP)) at universites abroad, leading to Master of Science degrees in meteorology.

3.3.2 Activity 2

Provision of short-term fellowships for training in data processing for staff of the Meteorological Department.

3.3.3 Activity 3

Provision of an expert in data processing for a period of six months.

3.3.4 Activity 4

Provision of an expert in telecommunications for a period of six months.

3.3.5 Activity 5

Provision of an expert in forecasting for a period of 12 months.

3.3.6 Activity 6

Provision of an expert in climatology for a period of six months.

4. Objective 4

To set up an electronic weather presentation studio to provide a visible output of the Meteorological Department of the Great Socialist People's Libyan Arab Jamahiriya.

4.1 Output 1

Ability to prepare weather services and distribute to the general public at large through the mass media i.e., radio, television and print.

4.1.1 Activity 1

Provide on-site training on installation, maintenance and operation of the studio for the staff of the Meteorological Department.

4.1.2 Activity 2

Provide training for presenters and producers at advanced weather presentation studios abroad. This kind of training should be offered to meteorologists and should take two to three months.

5. Objective 5

To procure and install a satellite ground receiving and imaging system for a new generation of METEOSAT satellites (Meteosat Second Generation (MSG)).

5.1 Output 1

The available imagery will provide for accurate tracking of storms, accurate forecasts of cloud movements, prediction of precipitation, calculation of sea surface temperatures, detection of forest fires and monitoring of vegetation patterns and overall conditions.

5.1.1 Activity 1

Provision of factory training on the maintenance and operation of the satellite imaging system to the staff of the Meteorological Department.

5.1.2 Activity 2

Provision of on-site training on installation, maintenance and operation of the system to the Department's staff.

5.1.3 Activity 3

Provision of training on the interpretation of satellite imagery and information to staff of the Department.

6. Objective 6

To procure and install one weather radar.

6.1 Output 1

Ability to measure precipitation for both meteorological and hydrological purposed and provide improved weather, flood and marine warnings and forecasts, improved agricultural weather forecasts and water resources will be better managed.

6.1.1 Activity 1

Provision of factory training on the maintenance and operation of the weather radars to the engineers of the Meteorological Department.

6.1.2 Activity 2

Provision of on-site training on the installation, maintenance and operation of the weather radars to the staff of the Department.

6.1.3 Activity 3

Provision of training on the interpretation of weather radar data and information to the staff of the Department.

6.2 Output 2

Better understanding of the physics of clouds which will contribute to the cloud seeding activities of the Great Socialist People's Libyan Arab Jamahiriya.

6.2.1 Activity 1

Provision of an expert in precipitation enhancement for a period of six months.

6.2.2 Activity 2

Provision of long-term training in cloud physics.

7. Objective 7

To procure and install two (2) Integrated Airport Terminal Weather Systems at airports in Great Socialist People's Libyan Arab Jamahiriya to better serve the aviation industry.

7.1 Output 1

Reduce air traffic controller workload, improve aviation safety in both the terminal and en route airspace and improve pilot briefing procedures.

7.1.1 Activity 1

Provision of an expert for two weeks, in consultation with staff of the Meteorological Department, to design the systems, as they differ from one airport to another.

7.1.2 Activity 2

Provision of factory training on maintenance and operation of the systems to the staff of the Meteorological Department.

7.1.3 Activity 3

Provision of on-site training on installation, maintenance and operation of the systems to the staff of the Department.

D. INPUTS

1. **Government**

1.1 Cash Contribution **US$7,000,000**

1.2 In kind:

a) Office space, basic equipment and office support for the technical advisors and short-term experts;

b) National counterpart personnel at the required level;

c) Facilities for training activities;

d) Existing data, information, plans, maps, surveys, reports and any other relevant documentation for the project implementation;

e) Local transportation and support to the project teams;

f) Local consultants;

g) Qualified nominees for training; and

h) Infrastructure required for the installation of activities

In addition, WMO will make available, as required, technical and scientific backstopping for the project activities and assist LMD in participating in and benefiting from WMO related workshops, seminars and conferences of interest.

2. **WMO/UNDP**

International Consultants

- Consultant, Data Processing
- Consultant, Telecommunications
- Consultant, Forecasting
- Consultant, Climatology
- Consultant, Precipitation Enhancement
- Short-term consultancy

Training

Fellowships

-Numerical Weather Prediction (2)

-Agrometeorology (2)

-Data processing (1)

Other Training (Study tours, group training)

Equipment

-Automatic weather observation stations (30)

-Upper-air sounding stations (2)

-Satellite receiving system (1)

-Electronic weather presentation studio (1)

-Automatic message switching system (duplicated) (1)

-Data processing systems (combination of workstations) (2)

-Airport terminal weather systems (2)

-Weather radar (1)

-Miscellaneous equipment

-Training and support services

E. RISKS AND PRIOR OBLIATIONS

The delay in financing of the project is the risk that could arise and, therefore negatively affect the smooth implementation of the project. This risk is considered to be moderate in view of the strong commitment expressed by the Meorological Department to carry this project through.

To ensure the successful and timely implementation of the project, the government will undertake to meet with requirements given in section D paragraph 1.2.

F. MANAGEMENT

The project will be managed locally under the supervision of a project technical Committee which is chaired by the LMD Director of Climatology and

composed of the LMD Directors of technical cooperation, forecasting, administration and finance, maintenance and a professor of Meteorology at the Libya University. The Committee will work closely with the UNDP Office in Tripoli and with other national entities, as required. The WMO as the executing agency is to work through the local Committee for the implementation of project activities. WMO will be responsible for ensuring the timely delivery of activities under its responsibility. It will prepare and submit progress reports to UNDP and the government as well as regular financial statements. WMO will also prepare the final report on the project.

Coordination meetings could be convened, every six (6) months or at the request of the government, UNDP or WMO, to review the progress made and/or resolve any issues.

G. MONITORING AND EVALUATION

The project will be subject to tripartite review (joint annual review(s) by the Libyan Meteorology Department LMD, WMO, and UNDP). The first review meeting will take place 12 months after the commencement of the project activities. The review will update the project work plan according to the project performance evaluation report (PPER) to be prepared by the project technical committee.

Review visits by government backstopping personnel will be carried out as required and preferably at the deadlines set for major targets/benchmarks indicated in the work plan.

On completion of each project component, a report will be submitted for consideration to ensure that the level of implementation is effective and efficient towards achieving the intended results.

The project terminal report will be prepared for review at the tripartite meeting. It shall be prepared in accordance with UNDP rules of procedure. It shall be prepared in draft, sufficiently in advance to permit review and technical clearance by the Executing Agency at least two months prior to the terminal tripartite meeting.

H. LEGAL CONTEXT

This project document shall be considered as the Instrument of Reference, as stipulated in paragraph (1) of the Standard Basic Assistance Agreement (SBAA) between the government of Libya and the United Nations Development Program (UNDP) on 20 May 1976. The host country implementing agency shall, for the purpose of the Standard Basic Agreement, be referred to as the government Cooperating Agency described in the agreement.

The following types of revisions may be made to this project with the signature of the UNDP Resident Representative only, provided he or she is assured that the

other signatories of the project document have no objections to the proposed changes:

a) Revisions in, or addition of, any of the annexes of the project document;

b) Revisions which do not involve significant changes in the immediate objectives, outputs or activities of the project, but are caused by the re-arrangement of inputs agreed to or by cost increases due to inflation; and

d) Mandatory annual revisions which rephase the delivery of agreed project inputs or increased expert or other costs due to inflation or take into account agency expenditure flexibility.

I. WORKPLAN

The tentative work plan of the project is given in Appendix B.

J. BUDGET

The project budget is given in Appendix C.

Main Source of Funds: 01 - UNDP IPF/TRAC
Executing Agency.....: WMO - World Meterological Organization

SBLN	Description	Implementing Agency		Total	2000	2001	2002	2003
010.	***PROJECT PERSONNEL***							
011.	***International Experts & Consultants***							
011.01	Data Processing Consultant	WMO	Net Amount	60,000	20,000	20,000	20,000	
			W/M	6.0	2.0	2.0	2.0	
			AOS	6,000	2,000	2,000	2,000	
			Total	66,000	22,000	22,000	22,000	
011.02	Telecommunications Consultant	WMO	Net Amount	60,000	20,000	20,000	20,000	
			W/M	6.0	2.0	2.0	2.0	
			AOS	6,000	2,000	2,000	2,000	
			Total	66,000	22,000	22,000	22,000	
011.03	Forcasting Consultant	WMO	Net Amount	120,000	20,000	50,000	50,000	
			W/M	12.0	2.0	5.0	5.0	
			AOS	12,000	2,000	5,000	5,000	
			Total	132,000	22,000	55,000	55,000	
011.04	Climatology Consultant	WMO	Net Amount	60,000	20,000	20,000	20,000	
			W/M	6.0	2.0	2.0	2.0	
			AOS	6,000	2,000	2,000	2,000	
			Total	66,000	22,000	22,000	22,000	
011.05	Participation Enhancement Cons.	WMO	Net Amount	60,000	40,000	20,000		
			W/M	6.0	4.0	2.0		
			AOS	6,000	4,000	2,000		
			Total	66,000	44,000	22,000		
011.97	Short Term Consultancies	WMO	Net Amount	20,000	20,000			
			W/M	2.0	2.0			
			AOS	2,000	2,000			
			Total	22,000	22,000			
011.99	***Line Total***		Net Amount	380,000	140,000	130,000	110,000	
			W/M	38.0	14.0	13.0	11.0	
			AOS	38,000	14,000	13,000	11,000	
			Total	418,000	154,000	143,000	121,000	
015.	***Duty Travel***							
015.01	Project Tripartite Review	WMO	Net Amount	9,000	3,000	3,000	3,000	
			AOS	900	300	300	300	
			Total	9,900	3,300	3,300	3,300	
015.02	Evaluation Mission	WMO	Net Amount	7,000			7,000	
			AOS				700	

Main Source of Funds: 01 - UNDP IPF/TRAC
Executing Agency.....: WMO - World Meterological Organization

SBLN	Description	Implementing Agency		Total	2000	2001	2002	2003
015.02	Evaluation Mission	WMO	Total	7,700			7,700	
015.99	***Line Total***		Net Amount	16,000	3,000	3,000	10,000	
			AOS	1,600	300	300	1,000	
			Total	17,600	3,300	3,300	11,000	
016.	***Mission Costs***							
016.01	Mission Costs	WMO	Net Amount	20,000	10,000	5,000	5,000	
			AOS	2,000	1,000	500	500	
			Total	22,000	11,000	5,500	5,500	
016.99	***Line Total***		Net Amount	20,000	10,000	5,000	5,000	
			AOS	2,000	1,000	500	500	
			Total	22,000	11,000	5,500	5,500	
017.	***National Professionals***							
017.97	National Consultancies	WMO	Net Amount	62,500	12,500	25,000	25,000	
			W/M	25.0	5.0	10.0	10.0	
			AOS	6,250	1,250	2,500	2,500	
			Total	68,750	13,750	27,500	27,500	
017.99	***Line Total***		Net Amount	62,500	12,500	25,000	25,000	
			W/M	25.0	5.0	10.0	10.0	
			AOS	6,250	1,250	2,500	2,500	
			Total	68,750	13,750	27,500	27,500	
019.	***PROJECT PERSONNEL TOTAL***		Net Amount	478,500	165,500	163,000	150,000	
			W/M	63.0	19.0	23.0	21.0	
			AOS	47,850	16,550	16,300	15,000	
			Total	526,350	182,050	179,300	165,000	
030.	***TRAINING***							
031.	***Fellowships***							
031.01	Numerical Weather Prediction	WMO	Net Amount	100,000	16,000	48,000	36,000	
			AOS	10,000	1,600	4,800	3,600	
			Total	110,000	17,600	52,800	39,600	
031.02	Agrometeorology	WMO	Net Amount	50,000	8,000	24,000	18,000	
			AOS	5,000	800	2,400	1,800	
			Total	55,000	8,800	26,400	19,800	
031.03	Data Processing	WMO	Net Amount	30,000	5,000	15,000	10,000	

Main Source of Funds: 01 - UNDP IPF/TRAC
Executing Agency.....: WMO - World Meterological Organization

SBLN	Description	Implementing Agency		Total	2000	2001	2002	2003
031.03	Data Processing	WMO	AOS	3,000	500	1,500	1,000	
			Total	33,000	5,500	16,500	11,000	
031.99	***Line Total***		Net Amount	180,000	29,000	87,000	64,000	
			AOS	18,000	2,900	8,700	6,400	
			Total	198,000	31,900	95,700	70,400	
032.	***Group Training***							
032.01	Study Tours	WMO	Net Amount	60,000	40,000	20,000		
			AOS	6,000	4,000	2,000		
			Total	66,000	44,000	22,000		
032.02	Group Training	WMO	Net Amount	24,000	12,000	12,000		
			AOS	2,400	1,200	1,200		
			Total	26,400	13,200	13,200		
032.03	Training on Equipment	WMO	Net Amount	601,136	401,136	200,000		
			AOS	60,114	40,114	20,000		
			Total	661,250	441,250	220,000		
032.99	***Line Total***		Net Amount	685,136	453,136	232,000		
			AOS	68,514	45,314	23,200		
			Total	753,650	498,450	255,200		
039.	***TRAINING TOTAL***		Net Amount	865,136	482,136	319,000	64,000	
			AOS	86,514	48,214	31,900	6,400	
			Total	951,650	530,350	350,900	70,400	
040.	***EQUIPMENT***							
045.	***Local Procurement of Equipment***							
045.01	AWOS	WMO	Net Amount	2,100,000	2,100,000			
			AOS	210,000	210,000			
			Total	2,310,000	2,310,000			
045.02	Upper-Air Sounding Station	WMO	Net Amount	300,000	300,000			
			AOS	30,000	30,000			
			Total	330,000	330,000			
045.03	Weather Radar	WMO	Net Amount	1,500,000		1,500,000		
			AOS	150,000		150,000		
			Total	1,650,000		1,650,000		
045.04	AMSS	WMO	Net Amount	250,000	250,000			
			AOS	25,000	25,000			

Main Source of Funds: 01 - UNDP IPF/TRAC
Executing Agency.....: WMO - World Meterological Organization

SBLN	Description	Implementing Agency		Total	2000	2001	2002	2003
045.04	AMSS	WMO	Total	275,000	275,000			
045.05	DPS	WMO	Net Amount	300,000	300,000			
			AOS	30,000	30,000			
			Total	330,000	330,000			
045.06	Weather Studio	WMO	Net Amount	70,000	70,000			
			AOS	7,000	7,000			
			Total	77,000	77,000			
045.07	Satellite Recieving system	WMO	Net Amount	100,000		100,000		
			AOS	10,000		10,000		
			Total	110,000		110,000		
045.08	ATWS	WMO	Net Amount	300,000	300,000			
			AOS	30,000	30,000			
			Total	330,000	330,000			
045.09	Miscellenous Equipment	WMO	Net Amount	50,000	50,000			
			AOS	5,000	5,000			
			Total	55,000	55,000			
045.99	***Line Total***		Net Amount	4,970,000	3,370,000	1,600,000		
			AOS	497,000	337,000	160,000		
			Total	5,467,000	3,707,000	1,760,000		
049.	***EQUIPMENT TOTAL***		Net Amount	4,970,000	3,370,000	1,600,000		
			AOS	497,000	337,000	160,000		
			Total	5,467,000	3,707,000	1,760,000		
050.	***MISCELLANEOUS***							
052.	***Reporting Costs***							
052.01	Reporting Costs	WMO	Net Amount	50,000	15,000	25,000	10,000	
			AOS	5,000	1,500	2,500	1,000	
			Total	55,000	16,500	27,500	11,000	
052.99	***Line Total***		Net Amount	50,000	15,000	25,000	10,000	
			AOS	5,000	1,500	2,500	1,000	
			Total	55,000	16,500	27,500	11,000	

Main Source of Funds: 01 - UNDP IPF/TRAC
Executing Agency.....: WMO - World Meterological Organization

SBLN	Description	Implementing Agency		Total	2000	2001	2002	2003
059.	***MISCELLANEOUS TOTAL***		Net Amount	50,000	15,000	25,000	10,000	
			AOS	5,000	1,500	2,500	1,000	
			Total	55,000	16,500	27,500	11,000	
099.	***BUDGET TOTAL***		Net Amount	[illegible],363,636	[illegible],[illegible]3,636	2,107,000	224,000	0
			W/M	63.0	19.0	23.0	21.0	0.0
			AOS	636,364	403,264	210,700	22,400	0
			Total	[illegible],000,000	4,435,900	2,317,700	246,400	0

Main Source of Funds: 01 - UNDP IPF/TRAC
Executing Agency.....: WMO - World Meterological Organization

SBLN	Donor	Funding Institution		Total	2000	2001	2002	2003
101.	***Government cost-sharing***							
101.01	LIB	MD	Net Contrib.	6,363,636	4,032,636	2,107,000	224,000	
			AOS	636,364	403,264	210,700	22,400	
			Total	7,000,000	4,435,900	2,317,700	246,400	
101.99	***Line Total***		Net Contrib.	6,363,636	4,032,636	2,107,000	224,000	
			AOS	636,364	403,264	210,700	22,400	
			Total	7,000,000	4,435,900	2,317,700	246,400	
109.	***COST SHARING TOTAL***		Net Contrib.	6,363,636	4,032,636	2,107,000	224,000	
			AOS	636,364	403,264	210,700	22,400	
			Total	7,000,000	4,435,900	2,317,700	246,400	
999.	***NET CONTRIBUTION***		Net Contrib.	0	0	0	0	0

United Nations Development Programme

C/S Schedule of Payments

Project	LIB/00/003//16	Modernizing the Libyan Metrological Services
Main Source of Funds		UNDP IPF/TRAC
AOS Source of Funds		03
Executing Agency		WMO - World Meterological Organization
Budget Currency		USD

Subline	Donor	Year	Date	Budgeted Amount	Scheduled Amount	Balance
101.01	LIB					
		2000				
			01/07/2000		4,435,900.00	
				4,435,900.00	4,435,900.00	0.00
		2001				
			01/03/2001		2,317,700.00	
				2,317,700.00	2,317,700.00	0.00
		2002				
			01/03/2002		246,400.00	
				246,400.00	246,400.00	0.00
		2003				
			01/01/2003		0.00	
				0.00	0.00	0.00
			Grand Total	7,000,000.00	7,000,000.00	0.00