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Joint ESCWA/FAO Agriculture Division

REFORESTATION AND REHABILITATION OF THE SWARATUKA RESORT WATERSHED PROJECT

90-0101

NOTE

Symbols of United Nations documents are composed of capital letters combined with figures. Mention of such a symbol indicates a reference to a United Nations document.

CONTENTS

CONTENTS

ANNEXES

LIST OF TABLES

UNITED NATIONS DEVELOPMENT PROGRAMME
PROJECT OF THE GOVERNMENT OF IRAQ

PROJECT DOCUMENT

NUMBER AND TITLE:	IRQ/ / Development of the Swaratuka watershed, Dohuk governorate.		
DURATION:	36 months		
PROJECT SITE:	Swaratuka	IPF	$2,163,455
ACC/UNDP SECTOR:		Other	
AND SUBSECTOR:	Forestry	Government or third party cost sharing	
GOVERNMENT SECTOR AND SUBSECTOR:	Agriculture	UNDP and cost sharing Total	$2,163,455
GOVERNMENT IMPLEMENTING AGENCY:	Ministry of Agriculture and Irrigation		
EXECUTING AGENCY:	The Food and Agriculture Organization of the United Nations (FAO), in association with the Economic and Social Commission for Western Asia (ESCWA)		
ESTIMATED STARTING DATE:	January 1991		
GOVERNMENT INPUTS:			
(IN KIND)	384,600 Iraqi dinars (ID)		
(IN CASH)	--		

Brief description

The project aims at protecting, improving and stabilizing an area of about 20,000 hectares (ha) of a forested watershed in Swaratuka, Dohuk governorate. It will include reforestation of degraded and denuded patches, establishment of feeder roads, construction of check dams and terraces, establishment of fire-breaks and lanes, supply of one fire look-out station with necessary detection and reporting facilities, rehabilitation of the area's recreational potential, provision of a basis for formulating a long-term management plan for the area and provision of an opportunity to train the forestry cadre on how to deal with current forestry and watershed problems.

ON BEHALF OF	SIGNATURE	DATE	NAME/TITLE
THE GOVERNMENT			
EXECUTIVE AGENCIES			
UNDP			

United Nations exchange rate at date of signing of project document:
$1.00 = 0.310 ID

I. CONTEXT

A. Description of the subsector

The major characteristics of the forestry sector in Iraq are set out herewith as a background for the consideration of the present project on reforestation, soil and water conservation and resort rehabilitation of the Swaratuka watershed area.

B. Institutional framework

The Ministry of Agriculture and Irrigation is officially entrusted with the management, development and utilization of forest resources. Long before agriculture was served by a separate ministry, a unit at the section level was created within the framework of the then Directorate-General of Agriculture. From the late 1930s, this section was in charge of forestry resources in the country. The main technical cadre was composed of recent graduates from the Agricultural High School at Abu-Ghraib. In 1945, forestry organization became a division, and in 1952 it was raised to the status of the Directorate-General within the newly created Ministry of Agriculture. Until then, very few Iraqi nationals had obtained college degrees in forestry. Most of the staff, however, had undergone a two-year training course at the Forest Rangers Schools in Cyprus or Pakistan. As an organization, the Forestry Directorate-General maintained its status until 1985, when it became a division of the Department of Natural Ranges, Desert Oases and Forestry. In 1989, forestry was incorporated into the newly created Department of Horticulture, Oases and Forestry.

C. Manpower

Until 1952, forestry organization was constrained by the lack of university-trained foresters. Subsequently, Iraqi university graduates in forestry from started to return from Turkish and American universities after completing their studies. In 1957, a two-year forestry curriculum was started at the newly-created Forestry Institute, attached to the College of Agriculture at Abu-Ghraib. The graduates of this instutute helped to staff the expanding Directorate-General of Forests and Plantations. In 1964, the Forestry Institute became the nucleus of the Forestry Department at the College of Agriculture and Forestry of the University of Mosul. For the past 25 years, this Department has provided a four-year forestry programme leading to a Bachelor of Science degree. During this period, hundreds of foresters from Iraq and from many other Arab countries have graduated, some with a master's degree.

D. Legislation and law enforcement

Forest lands are all government-owned. However, the private sector has been utilizing forest resources since time immemorial, primitively and excessively. Local tribes and communities have acquired the right to utilize nearby forest resources. Until the middle of this century, forestry organization was so ineffective that forest resources were at the mercy of

influential local individuals. The Ottoman Forest Law, enacted in the nineteenth century, was effective until 1955, but it was so weak that it hardly provided any protection for forest resources. The extant Forest Law No. 75, which dates from 1955, is much more ambitious and only requires the zeal and will to implement it more effectively.

In the 1950s and 1960s forest police and forest guards from the Forestry Organization patrolled forest areas and reported forest offences to the relevant authorities. At present, however, there are no police or guards.

E. Forest area

At one time forests in Iraq covered most mountainous areas, occupying an area of about 30,000 square kilometres (km^2). As a result of the excessive utilization of forest resources over the years, however, forest cover disappeared from the majority of localities below 1,400 metres (m) level, where most of the villages and transportation routes are located.

Forests in Iraq have never actually been surveyed. The only attempt made to estimate forest densities and degrees of exploitation was that made by G. W. Chapman in 1949. That estimate, based on personal judgement and aerial photos and topographical maps on the scale of 1:25,000, concluded that forests occupied an area of 1.531 million ha.

These forests, which are now in coppice form and severely exploited, are mainly composed of Juniperus, Pistacia, Grataegus, Acer, Prunus, Pyrus and other species.

However, there are two distinct areas, Zawita and Atrush in Dohuk governorate, which are covered by a coniferous species, Pinus brutia in more or less pure stands. Here and there, however, pine trees may be seen growing side by side with oak and other broad-leaf species. In some localities, pine trees may be found growing in admixture with another Gymnospermae, Juniperus oxycedrus. Altogether, pine forests cover some 10,000 ha in these locations.

In addition to the mountain forest which are dominated by the Quercus species, there is another type of natural forest. These forests, which are scattered all over the country, along river banks and on alluvial islands occupy an area totalling 20,000 ha. These "riverain" forests, known locally as "abrash", are composed of Platanus orientalis, Fraxinus syriaca, Populus nigr, Juglans regia, etc., on the river banks and along water courses in the mountainous north, while Tamarix articulata, Salix acmophylla and Populus euphratica are dominant species in the abrash forest types in the central and southern parts of the country.

F. Irrigated plantations

The planting of forest trees on plains on a fairly large scale started in the early 1950s. The planted areas consisted mainly of plots scattered over the plains, according to the availability of irrigable lands. These lands were either allocated to the Forestry Department through irrigation projects, or acquired from abrash lands or river-bank areas.

The total planted area in all governorates and for all purposes until 1988 was about 42,000 ha. Most of the plantations in Mosul, Dohuk, Arbil and Sulaimaniya governorates were established with the aim of improving the natural tree cover of mountain forest areas. Other plantations in the same governorates were established for recreation and amenity purposes. Only a few plantations in the northern governorates were established for the commercial production of timber.

Forest plantations in the central and southern part of the country were primarily established for the production of industrial wood. Some plots, especially those within city limits, were set aside for recreation and resort purposes. Roadside plantings to form narrow strips of planted forest trees amounted to about 4,000 ha, while plantations in and around archeological, religious and tourist sites totalled another 2,500 ha.

The tree species planted in these irrigated plantations differ from one zone to another. Pinus brutia; Thuja orientalis; Cupressus sempervirens (pyramidal's and horizontalis); Populus and Euramericana; Melia azaderach; Dalbergia sissoo; Gleditsia triacanthos; Morus spp.; Platanus orientalis; Casuarina equisetifolia; Eucalyptus spp. (camaldulensis, sideroxylon, and microtheca), Tamarix articulata, etc.

G. Country's wood requirements

With the exception of fuelwood and ungraded construction timber, Iraq imports all its timber and wood products needs in hard currency. As this is beyond the financial reach of the common people, the consumption of wood and other forest products, per caput, is extremely low.

Domestic production of major forest products in 1972, expressed in thousands of cubic metres (m^3), were: fuelwood, 25; industrial round wood, 30; sawn wood and sleepers, 4; and wood-based panels, 2. The total value of the above products was estimated at $US 2.0 million.

Imports of forest products in the same year, on the other hand, which cost about $US 28.5 million, were as follows:

Product	Percentage (by value)
Pulp and paper	64
Sawn wood and sleepers	21
Veneer and wood-based panels	13
Charcoal	2
	100

Project import estimates of wood for Iraq (in terms of round-wood) over the years, were as follows:

Year	Imports (1,000 m^3)
1970	523
1975	621
1980	719
1985	818
1990	916

Since this implies a high import bill, it would be advisable for Iraq to expand and improve forestry in order to attain as high a degree of self-sufficiency in forest products as is economically feasible.

H. Current forest growing stock

Natural forests in Iraq are located on lands usually characterized by their mountainous topography, with deep gorges, steep slopes and shallow soils. The prevailing tree cover is the oak forest, stunted and poor in quality, which mainly yields small timber. The wood is only suitable for burning simple rural housing and the manufacture of crude agricultural implements.

For thousands of years, natural forests in Iraq have been subject to misuse, especially uncontrolled cutting, excessive grazing, repeated forest fires and shifting cultivation. Forests were so badly treated in Iraq that they are now limited in extent and confined to remote and inaccessible areas. The remains of these forests are now mostly decayed and over-mature or degraded and useless coppice stands. However, a few reasonably good stands of commercial quality, scattered here and there, still remain. If they were maintained and put under proper management, they could yield good quality timber.

No attempt has been made to estimate the amount of standing timber. Unless forests are surveyed and mapped, no reasonable forest inventory can be drawn up. However, some effort has been made to estimate the amount of standing timber in some of the irrigated forest plantations on the plains, and volume tables for a few locations have been constructed.

I. Role of forests in the national economy

Since Iraqi natural forests are chiefly composed of stunted, poorly formed and small-size oak trees which have little industrial or commercial use, their tangible contribution to the national economy is minimal.

However, as these oak forests occupy steep-sloping, mountainous terrain with shallow soil, they play an important site-protective role. This role is manifested by the stabilization of watersheds, the reduction of runoff, soil erosion, siltation and food hazards, the recharging of ground water, regulation of stream flow, improvement of ranges and grazing conditions and the enhancement of the habitat of flora and fauna, the micro-climate and scenic value of these areas.

Until recently, the utilization of forest trees was confined to the mountain forests of the north. The uncontrolled cutting of trees for local fuel consumption and charcoal manufacture were the most common uses. Charcoal was produced by traditional, primitive methods. Good quality charcoal, however, could be produced rapidly and economically if this activity was well organized, a sound management plan was followed and modern metallic kilns were used. With proper management, the mountain oak forest alone could provide the country with all its charcoal needs, currently estimated at about 10,000 tons. Natural forests also yield small timber and fuel for rural uses, as well as for the commercial production of timber for joinery and furniture.

For some time, some of the irrigated eucalyptus plantations on the plains have been utilized to supply wood to chipboard factories and for the production of charcoal using metallic kilns. Other older plantations in different locations are long overdue for utilization.

With poor indigenous raw wood resources, only a few forest industries have been established in the country. However, despite the dependence on imported raw materials and semi-finished products, noticeable efforts have been made to setup a number of wood-based industries. Domestic plantation output can be expected to be absorbed locally. On the whole, it would be in the interest of national economy and self-sufficiency to produce as many wood materials as is economically feasible within the country.

J. Iraqi forestry development strategy

Forestry development activities have always formed an integral part of overall agricultural development plans. Furthermore, forestry development has recently been given greater attention owing to the ever increasing demand for wood and other forest products which are now being imported at a high cost.

The long-term strategy for managing, improving, developing and utilizing forest resources in Iraq is summarized below:

1. Surveying and mapping natural mountain forests using fresh aerial coverage and ground control techniques;

2. Drawing up an inventory of standing forests, including classification, stratification and demarcation and the establishment and declaration of "reserved" and "protected" forests, so that provisions of the Forest Law No. 75 can appropriately be applied. It should be noted here that the above-mentioned law is only applied to forest areas termed "reserved forests" and "protected forests";

3. Formulating forest management plans for mountain oak forests, abrash and irrigated plantations. These plans are aimed at sustaining the multiple use of forest resources;

4. Pursuing a well-defined long-term watershed management and site protection policy through a sound forest management scheme;

5. Improving pasture conditions in the alpine and subalpine areas of mountain peaks and other high elevation areas;

6. Providing appropriate measures to prevent and suppress forest fires in order to eliminate or minimize the great damage caused to forests, ranges, production and the habitat;

7. Establishing large afforestation tracts in rainfed and foothill areas and in well selected areas along river banks on the plains, using good quality, fast growing forest tree species for the production of quality timber;

8. Establishing large irrigated plantations with carefully selected forest tree species in all areas of the country where adequate irrigation can be provided. These plantations will provide the wood material needed for the wood-based industries in the country;

9. Expanding the capacity of existing forest nurseries in all provinces to supply enough seedlings and transplants of forest trees and other species, especially near plantation sites;

10. Continuing and expanding forestry extension plantations such as village or community woodlots, green belts, wind-breaks, shelter belts, parks, roadside and amenity plantations, etc.;

11. Providing forest training at the vocational level, as the Iraqi forestry organization is clearly weak in sub-professional or intermediate-level rangers and forest guards.

II. PROJECT JUSTIFICATION

Swaratuka watershed lies at about 36.5° north and 45° east. It is bordered on the north by Gaora mountain at Ispindara village, on the south by Qantara gorge, just north of Zawita pine forest, on the east by the Sarki-Ghalbouki-Barash village limits, and on the west by the mountain range running parallel with and west of the Dohuk-Amadiya road. The project area is divided into two almost equal parts by the well-paved Dohuk-Sarsing road running in the direction south to north.

The shape of this watershed is almost rectangular, about 20 kilometres long from north to south and 10 kilometres wide east to west. The total area is therefore about 200 km^2, or 20,000 ha. The terrain is typically mountainous with a gradient varying from very steep to more or less level. About 60 per cent of the total area is steep to very steep; about 25 per cent is gently sloping while the remaining 15 per cent is plain or rolling. The elevation varies from about 1,000 m above sea level at the southern limit to about 2,000 m at Gaora mountain.

A continental-type climate prevails, with hot summers and cold winters, separated by the two shorter transitional seasons, spring and autumn, with moderate temperatures. July, the hottest month, has an average daily maxima of about 40° C and an average daily minima of about 20° C. The coldest winter month is January, with an average daily temperature of about 0° C Early and late frosts are not uncommon.

The mean annual precipitation is about 700 millimetres (mm), mainly in the form of rain, but occasionally as snow. It occurs mainly during winter, with some precipitation in autumn and spring. Winter precipitation is steady and of a long duration, while that of spring, being of the convection type, is intense and stormy, but of far shorter duration. The latter type of precipitation, however, often results in severe runoff, erosion, the silting of stream beds and flood hazards.

The three oak species, Quercus (Q.) aegilops, Q. infectoria, and Q. libani dominate the forest in this watershed. In some localities, these trees are mixed with Juniperus oxycedrus, Pistacia spp. and Crataegus azarolus. Natural regeneration is often disturbed by frequent fires and uncontrolled grazing. Annual grasses are overgrazed and the land is often left bare. The soil profile is getting progressively thinner owing to erosion and the great reduction in the infiltration rate of the rainwater.

Practically all the land in this watershed is owned by the Government. Some of the land in the lower reaches of watershed, however, amounting to about 250 ha, is privately owned. This land is mainly in the form of small fruit-tree orchards and rainfed vineyards. Sizeable forested areas on the slopes, moreover, have been utilized at one time or another for what is termed "shifting cultivation". As they are not very productive in terms of agricultural crops, these areas are soon abandoned once they are stripped of their protective tree cover.

At present, there are two main communities in this watershed. One has a population of around 600 persons (Swaratuka village), while the other has a population of about 1,500 (Lower Bagair complex). About 100 cattle and 50 goats graze in the area.

Natural resources in this watershed have been heavily exploited and badly misused through excessive cutting, overgrazing, shifting cultivation and repeated forest fires. This has resulted in the degenetration of the area of "high forest" into low-grade shrub-type coppice, depletion of the grazing capacity, elimination of wildlife, disturbance of the ecosystem in general and destruction of the scenic and resort potential of the area.

In view of the current advanced state of the site deterioration, depletion of natural resources, degradation of the watershed and drastic lowering of the resort value, it is imperative that urgent steps be taken to halt this destructive trend and reverse it in order to attain the maximum sustainable, multiple-use production of the available natural resources in the area.

Consequently, the project will aim at stabilizing and improving the watershed. This will include reforestation, soil and water conservation, revegetation of denuded lands and resort rehabilitation. The training of the intermediate foresty cadre will be an integral part of this project.

III. FOREIGN AID PREVIOUSLY GRANTED TO FORESTRY

In 1969, technical assistance was extended to the Forestry Research Centre at Arbil through the UNDP/FAO project entitled "Forestry research, demonstration and training". Phase I of this project culminated in the submission of the forest improvement programme report which emphasized the development of multiple-use forestry in northern forest areas, the establishment of large-scale irrigated forest tree plantations and the training of intermediate technical staff. The project included the preparation of an improved land and water-use plan in the Hijran pilot watershed in Arbil governorate, where soil erosion control and range improvement were demonstrated.

Phase II of the project aimed at: (a) improved planning and programming procedures for project formulation, implementation and control; and (b) research, demonstration and training in forest range watershed management, the planning of suitable fast-growing tree species and wood utilization.

IV. EXPECTED SITUATION AFTER PROJECT COMPLETION

On the completion of the project, Iraq will have established an integrated approach towards improving, developing and managing natural resources, together with watershed rehabilitation. The project area, therefore, will serve as a model for the improvement and treatment of many other problem areas of natural forests, watersheds and potential tourist sites in the country's mountain region. Furthermore, forestry staff will be able to gain invaluable experience in different field operations.

V. TARGET BENEFICIARIES

The project will have an immediate positive impact, increasing the production potential of natural resources in the area and enhancing the scenic value of the landscape. The beneficiaries of the project and the advantages they will gain are as follows:

1. Villagers in the treated area

(a) Crop yields will increase as a result of a reduction in topsoil losses owing to water erosion;

(b) New job opportunities will be created for the local labour force;

(c) There with be a possibility of generating additional income with the establishment of a summer resort and recreation facilities in the area;

(d) The community will be stabilized by preventing further rural migration to urban centres.

2. Private investors

The opportunity to invest in recreation and resort commercial activities will be increased.

3. The country in general

(a) The development of this area and others elsewhere in the country will result in an increase in the potential of the country as a whole, which will benefit the entire nation;

(b) A project of this type will ensure resort rehabilitation, encourage local tourism and save hard currency which would otherwise be spent on travel abroad;

(c) The rural exodus to urban centres will be halted, a reverse trend may occur as a result of rural rehabilitation;

(d) The Iraqi forestry cadre will gain field experience in methods of improving the production potential of natural resources, solving related environmental problems and controlling desertification;

(e) The general public will have more recreation options within the country.

VI. STRATEGY OF THE PROJECT

The strategy of this project is based on complete site protection and the development of natural resources. Urgent preventive measures will also be taken to set the stage for watershed stabilization. Further improvement measures and a sound management policy will ensure the achievement of permanent multiple-use objectives of existing land resources. Within the strategy of the project, the following points have been taken into consideration:

1. To ensure that the public in general and the resources users in particular are made aware of the danger of misuse and over-exploitation of available resources;

2. To ensure that preventive and improvement measures implemented in the area are understood to be essential steps towards improving land resources productivity;

3. To ensure that the stabilization of the area and development of resources are maintained permanently with little outside help.

VII. REASON FOR ASSISTANCE FROM UNDP

The Government of Iraq has long been aware of the degradation of land resources and the hazards of desertification, caused by centuries of misuse and over-exploitation of these resources. Therefore, for many years, several government departments have been tackling problems created by salinity and

water-logging, soil erosion, sand-dune movement, natural plant cover deterioration and many other related issues.

UNDP, realizing the magnitude of the dilemma, has already provided assistance to similar projects such as forestry development and the revegetation of dune areas which threatens the major drainage canal in Nasiriya governorate. FAO has also participated in a number of similar projects, including the regional rangeland development project at Rutba. ESCWA and FAO are currently financing the formulation of the National Plan of Action to Combat Desertification (NPACD) in Iraq, together with the preparation of the project document.

It is hoped that, by assisting in this project, UNDP will stimulate initiative to tackle similar problems in other parts of the country.

VIII. PROJECT OBJECTIVES

This project seeks to help the Government in promoting and developing an integrated approach to the improvement of natural resources and their proper utilization, site protection, restoration of a balanced ecosystem, rehabilitation of deteriorated recreational sites and the control of specific forms of desertification.

A. Immediate objectives

The planned objectives can be realized through the implementation of preventive measures to stop further site deterioration and improvement activities aimed at resource development.

B. Outputs

The following outputs and corresponding activities are involved.

1. Output 1: preparation of maps on the scale 1:50,000 for current land-use in the project area

(a) Activity 1

Delineation survey and preparation of the base map. This will involve:

(i) Demarcation of boundries;

(ii) Field survey;

(iii) Preparation of a base map.

(b) Activity 2

Determination of current resource utilization and compilation of a detailed land-use map. This will require:

(i) Surveying the area and distinguishing different land uses;

(ii) Plotting the above uses on the map.

2. Output 2: planting of degraded patches of forests

(a) Activity 1

Survey and demarcation of localities requiring planting.

(b) Activity 2

Preparation of holes for planting on contour furrows, trenches or terraces, to be spaced according to the topography of the area.

(c) Activity 3

Transportation of seedlings and transplantation at the planting site.

(d) Activity 4

Planting with predetermined spacing, using suitable species.

(e) Activity 5

Watering the planted area in the first year during the hot and dry period, if needed, to ensure establishment.

(f) Activity 6

Fencing the treated areas to ensure proper protection.

3. Output 3: establishment of a nursery with an annual capacity of about 200,000 seedlings

(a) Activity 1

Selection of proper location (near Reflesen) for the nursery site.

(b) Activity 2

Fencing, digging of a well, establishment of seed-beds, irrigation system, sheds and wind-breaks.

(c) Activity 3

Preparing soil mix, providing containers, plastic, fertilizers, watering tubes and cans, etc.

4. Output 4: construction of check-dams in gullies, ravines and water courses on slopes for the purpose of stopping soil erosion

(a) Activity 1

Surveying and locating sites for the construction of check-dams, perpendicular to streams, valleys and ravines on steep and eroded slopes.

(b) Activity 2

Preparing construction materials from local sources.

(c) Activity 3

Determining length, width and height of dam across the channel and vertical distance between the dams.

(d) Activity 4

Constructing the dam from materials, as indicated in activity 2 above.

(e) Activity 5

Planting the inter-dam areas with suitable tree species.

(f) Activity 6

Inspecting the treated area and repairing the damaged dams, especially after torrential rains and thunder storms.

5. Output 5: stabilization of eroded slpes

(a) Activity 1

Surveying, locating and demarcating the eroded and threatened slopes.

(b) Activity 2

Treating with mulch and palisading with branches on the contour of the affected areas across the slope.

(c) Activity 3

Sowing the treated area with perennial grass seeds and planting with shrubs and trees, if appropriate.

(d) Activity 4

Fencing the area to provide proper protection.

6. Output 6: establishment of a network of fire-breaks and fire-lanes to check the advance of forest fire fronts and to serve as feeder roads in the area for different field activities

(a) Activity 1

Surveying and locating suitable routes.

(b) Activity 2

Determining the necessary length and width of the fire-breaks and lanes, smoothing the path and clearing trees and surface vegetation.

(c) Activity 3

Taking proper precautions to prevent soil erosion by reducing run-off along the path and constructing culverts wherever necessary.

(d) Activity 4

Clearing the breaks and lanes of vegetation and other combustible material before the fire-hazard season.

7. Output 7: preparation of camping and recreation sites

(a) Activity 1

Surveying, locating and delineating 4-5 potential camping and recreation sites, covering an area of about one hectare each.

(b) Activity 2

Clearing and fencing the area and establishing wind-breaks of all directions.

(c) Activity 3

Providing basic camping facilities (water supply, lavatories, waste disposal, etc.).

The above activities will be implemented in co-operation with a park management consultant.

8. Output 8: establishment of a meteorological station

(a) Activity 1

Selecting a suitable site, taking into account the type of information needed, and establishing the station.

(b) Activity 2

Training of two qualified technicians to collect and tabulate data.

9. Output 9: construction of fire look-out station for detection and reporting of forest fire incidents

(a) Activity 1

Selecting proper location (one of the prominent peaks) as a site for establishing a fire look-out tower and quarters for staff.

(b) Activity 2

Preparing the site, transporting the building material and constructing the tower and staff residence.

(c) Activity 3

Equipping the station with necessary detecting and reporting facilities and staffing with appropriate personnel so that prompt detection and reporting of forest fire incidents can be effected.

(d) Activity 4

Preparing and equipping a fire-fighting team (gang) to ensure effective fire suppression without delay.

(e) Activity 5

Preparing a manual and formulating a plan, in Arabic to be followed in the event of a forest fire.

The above activities will be prepared by the forest protection consultant.

10. Output 10: survey, demarcation, mapping and formulation of a simple management plan for better forest stands in the area

(a) Activity 1

Inspecting the area, delineating, surveying and mapping prospective forest stands.

(b) Activity 2

Formulating simple management plans, indicating type of cultural operations during the cutting cycle, methods of forest cutting, taking into account the sustainable multiple-use objective.

The above activities will be carried out in co-operation with the project co-ordinator.

11. Output 11: protection of areas threatened by encroachment

(a) Activity 1

Inspecting and demarcating areas subject to encroachment.

(b) Activity 2

Fencing the demarcated areas to ensure protection against unauthorized cutting, grazing and cultivation.

12. Output 12: promotion of education, awareness and participation of villagers and general public in natural resources protection and conservation, encourage afforestation and agro-forestry by training and distribution of seedlings and transplants

(a) Activity 1

Selecting and preparing audio-visual material covering activities and events related to planting, soil and water conservation, forest fire-fighting, timber cruising, thinning and cutting, camping, etc.

The materials mentioned in activity 1 above, which will be in the form of pamphlets (in Arabic), slides, placards, film strips, etc., will be prepared by the project staff with the assistance of the forestry extension consultant.

(b) Activity 2

The above-mentioned audio-visual material will be used during the implementation of the project and after to raise public consciousness of the proper utilization of natural resources, the hazards pertaining to the deterioration of the environment and the impact of desertification.

13. Output 13: Enhancing the professional level of forestry staff

(a) Activity 1

Training abroad of professional and technical staff. This will involve the following:

(i) Providing four fellowships for forestry engineers for a total of 96 months to pursue further theoretical and practical knowledge in reforestation, watershed stabilization and management, range development, resource management, desertification control, etc. The candidates will be selected from forestry graduates possessing a university degree;

(ii) Providing four fellowships for forestry or agricultural technicians for a total of 48 months for practical training in various forestry field operations, watershed, range, soil and water conservation activities, etc. The candidates should have a technical forestry or agricultural institute diploma;

(iii) Providing two fellowships for overseas training for a total of 12 months in operating forest fire look-out stations for the rapid detection and reporting of fire incidents. The candidates should be graduates of one of the vocational agriculture high schools.

14. Output 14: provision of in-service training for forestry employees

(a) Activity 1

Providing two in-service practical training sessions of two months each (during two consecutive summers) for 20-25 forestry employees, for training on the project site in nursery operations, forest, watershed, park and recreation improvement activities, reforestation, cutting and thinning of forest trees, forest fire-fighting, etc.

IX. INPUTS

A. Government inputs

The Government will:

1. Designate the Ministry of Agriculture and Irrigation as the co-operating agency in the implementation of the project.

2. Designate a full-time professional forestry officer with a background in forestry field operations as a national counterpart to the project co-ordinator.

3. Provide four full-time junior professional foresters to assist the national co-ordinator.

4. Provide four full-time intermediate level foresters to supervise field operations.

5. Provide 25 trainees for two summer training courses on field operations at the project site, for two months in each summer.

6. Provide 20 skilled workers to operate machines, vehicles, equipment and the nursery.

7. Provide ordinary unskilled labour for field operations, as required.

8. Construct a fire look-out station, including observation tower with appropriate living facilities, nearby on a selected site.

9. Provide office space for the project personnel, storage facilities for the equipment and supplies to be acquired for the project, as well as secretarial and logistic assistance for the project personnel and other services and utilities required for the proper implementation of the project.

B. UNDP inputs

1. Personnel

	Duration in man/months (m/m)
One project co-ordinator/arid zone forestry expert (job description given in annex III).	36
One forestry seeding and planting expert (nursery management) (job description given in annex IV).	36
One forest protection-fire control consultant. The consultant will make an overall assessment of the forest-fire hazard, locate and mark the necessary fire-break routes in the project area, help to teach trainees in actual forest fire-fighting techniques and assist in putting the fire look-out station into operation.	4

	Duration in man/months (m/m)
One park management consultant. The consultant will evaluate the existing summer resort hotel, cafe and resort cabins. He will assess the resort and recreational potential of the area, help to locate camping and recreation sites, teach trainees in park management, maintenance and development techniques.	4
One forestry extension consultant to draw-up the strategy and a programme on forestry extension and participate in the preparation of audio-visual materials.	2

The detailed terms of references for the above-mentioned consultants will be prepared by the project co-ordinator, in co-operation with the national counterpart.

2. Administrative support

This includes the services of one administrative/finance officer, a secretary and a driver for the duration of the project.

3. Official travel

Expenditure for official travel of project personnel and counterparts is included in the budget.

4. Mission costs

Expenditure for evaluation/review missions is included in the budget.

5. Training

	Duration m/m
Four fellowships for professional training overseas, for 24 months each. Candidates should have a university degree in forestry.	96
Four fellowships for overseas practical training in forestry field operations, for 12 months each. Candidates should have technical forestry or agricultural institute diploma.	48
Two fellowships for overseas practical training on operation of forest fire look-out station. Candidates should have a technical forestry or agricultural institute diploma. Each fellowship will be for a duration of 6 months.	12
Two local training courses on the project site for 25 trainees, each course lasting 2 summer months, for forestry technicians and extension workers.	

The expenditure for the organization of these courses is included in the project budget.

6. Equipment

Annex II gives a detailed list of the equipment, together with the justification, specifications and estimated cost. This equipment is essential for the activities of the project such as transport, the field nursery, surveying, irrigation, fire detection and fire-fighting facilities.

7. Miscellaneous

Expenditure for operation and maintenance, reports and sundry items are included in the budget.

X. RISKS

An excessive delay in recruiting the counterparts of the project co-ordinator and nursery management expert will constitute a true risk to the project. Every effort should be made to speed up recruitment.

XI. PRIOR OBLIGATIONS AND PREREQUISITES

The Government should meet the following obligations and prerequisites:

1. Yield to the project any piece of land deemed necessary for the implementation of all the activities of the project and resolve any legal hindrance facing project implementation.

2. Nominate appropriate national personnel in a timely manner and assure their housing requireements are met.

3. Select, prepare and release national staff for professional, technical education and training under the project fellowships programme.

4. Provide adequate premises within the Swaratuka forestry facilities and storage space for the equipment to be acquired under the project.

5. Provide maps, documents, statistics and other information required for the project.

6. Facilitate and conduct ground reconnaissance and the survey of the project area, and provide any aerial photographs deemed necessary for the project activities.

7. Meet the charges for customs clearance, taxes and the local cost of transportation of all equipment imported by the project.

XII. PROJECT REVIEW, REPORT AND EVALUATION

1. The project will be subject to a tripartite review (joint review by representatives of the Government, executing agency and UNDP) at least once every twelve months; the first such meeting must be held within the first 12 months of the start of full implementation. The national project manager and/or senior project officer of the United Nations executing agency will prepare and submit to each tripartite review meeting a project professional evaluation report (PPER). Additional reports may be requested, if necessary, during the project.

2. A project terminal report will be prepared for consideration at the terminal tripartite review meeting. A draft copy will prepared in advance to allow review and technical clearance by the executing agency, at least four months prior to the terminal tripartite review.

3. The project will be subject to evaluation four months prior to its scheduled termination. The organization, terms of reference and timing of the project document will be decided after consultation among the parties and between any other associated United Nations agency.

Table 1. Project budget covering UNDP contribution

(US dollars)

Country : Iraq

Project : IRQ/ /

Project title : Reforestation and rehabilitation of the Swaratuka resort watershed

Project components	Total[a/]	1991[a/]	1992[a/]	1993[a/]
Project personnel				
Experts				
Project co-ordinator	463 000 (36)	144 000 (12)	154 000 (12)	165 000 (12)
Seeding and planting expert (nursery expert)	386 000 (36)	120 000 (12)	128 000 (12)	138 000 (12)
Forest protection consultant	50 000 (4)		25 000 (2)	25 000 (2)
Park management consultant	50 000 (4)		25 000 (2)	25 000 (2)
Forestry extension consultant	25 000 (2)			25 000 (2)
Subtotal	974 000	264 000	332 000	378 000
Administrative support personnel				
Administration and finance officer	97 000	31 500	32 000	33 500
Secretary	81 600	26 700	27 200	27 700
Driver	57 000	18 500	19 000	19 500
Subtotal	235 600	76 700	78 200	80 700
Official travel				
Duty travel	20 000	8 000	6 000	6 000
Subtotal	20 000	8 000	6 000	6 000
Mission costs	15 000	5 000	5 000	5 000
Component total A	1 244 600	353 700	412 200	469 700

Table 1 (continued)

Project components	Total[a/]	1991[a/]	1992[a/]	1993[a/]
Training				
Fellowships	187 200 (156)		86 400 (72)	100 800 (84)
Local training	20 000		10 000	10 000
Component total B	207 200		96 400	110 800
Equipment				
Expendable equipment	84 200	67 500	8 700	8 000
Non-expendable equipment	573 455	573 455	--	--
Component total C	657 655	640 955	8 700	8 000
Miscellaneous				
Operations and maintenance	30 000	7 500	15 000	7 500
Reporting costs	9 000	3 000	3 000	3 000
Sundries	15 000	5 000	5 000	5 000
Component total D	54 000	15 500	23 000	15 500
UNDP grand total (A + B + C + D)	2 163 455	1 010 155	549 300	604 000

a/ Figures in brackets refer to man-months.

Table 2. Project budget covering government contribution in kind

(Iraqi dinars (ID))

Country : Iraq

Project : IRQ/ /

Project title : Reforestation and rehabilitation of the Swaratuka resort watershed

Component	Total		1991		1992		1993	
	M/M	ID	M/M	ID	M/M	ID	M/M	ID
National counterpart project co-ordinator	36	24 200	12	7 200	12	8 000	12	9 000
Junior foresters (4)	144	43 200	48	14 400	48	14 400	48	14 400
Forestry technicians (4)	144	36 000	48	12 000	48	12 000	48	12 000
Local salaries for staff on foreign training	156	35 000		--	72	16 200	84	18 800
Salaries of local trainers	100	15 000			50	7 500	50	7 500
Skilled workers	720	108 000	240	36 000	240	36 000	240	26 000
Casual labourers	360	43 200	120	14 400	120	14 400	120	14 400
Subtotal								
Buildings		60 000		60 000		-		-
Supplies and materials		20 000		10 000		5 000		5 000
Government total		384 600		154 000		113 500		117 100
$US		1 240 645						

Annex I

LIST OF EQUIPMENT REQUIRED AND COST

Item No.	Specification of equipment and justification
1.	Typewriter (manual, Arabic) for the office.
2.	Typewriter (electric, English) for the office.
3.	Photocopying machine to photocopy documents, photocopy, enlarge and reduce maps.
4.	Desk calculators for general project accounting.
5.	Land cruiser (4 wheel drive) for project management.
6.	Toyota pick-up to transport project staff, labour, equipment, supplies and seedlings.
7.	Trucks to transport equipment, labour, seedlings and forest fire-fighting requirements.
8.	Water tankers to transport irrigation water and for fire suppression.
9.	Augers for deep planting pits.
10.	Shovels to be used by the labour for planting and forest fire-fighting and handles for replacement.
11.	Pick-axes for working hard soil, plus handles.
12.	Tree planting spades for opening furroway for planting.
13.	Bow saws and cross-cut saws for thinning and improvement cutting.
14.	Hammers for fixing and fencing posts.
15.	Weather station to measure temperature, humidity, precipitation and wind.
16.	Audio-visual equipment for use in training and extension activities.
17.	Engines and pumps for pumping irrigation water from wells.
18.	Electic generators to supply power to field office and nursery and fire look-out tower.
19.	Surveying and mapping equipment for surveying the project area, preparing maps and interpretation of aerial photos.
20.	Still camera for photographing items of interest in training, extension and research.

Item No.	Specification of equipment and justification

21. Nursery to supply planting material for reforestation and improvement planting.

22. Sprayers for pesticides and chemicals.

23. Pruning scissors for pruning roots of seedlings.

24. Office supplies: typing paper, photocopying paper, stencil paper, writing pads, pens, pencils and other stationery.

25. Road-roller to compact feeder roads and fire lanes in the project area.

26. Bulldozers for the preparation of feeder roads, fire lanes and for use in fire-fighting.

27. Grader for grading roads and levelling land.

28. Four wheel-drive (4 WD) tractor with all accessories for nursery services, planting and improvement operations in the project.

29. Twenty-seat passenger bus for the transport of trainees, fire fighters and labour.

30. Back-pack water pumps with spray nozzles for fire-fighting.

31. Forest fire look-out station equipment for detecting and reporting forest fires.

32. Refrigerators for nursery and fire look-out station.

33. Air conditioners for nursery and fire look-out station.

34. Torchlights for the field office and fire look-out station.

35. Shotguns for field teams and fire look-out station staff.

36. Camping tents with accessories for field gangs and fire fighting-teams.

37. Portable sleeping beds for field gangs and fire-fighting teams.

38. Sleeping bags for field gangs and fire-fighting teams.

39. Freshwater tanks for field office, nursery and fire look-out tower.

40. Kerosene lanterns for field office, nursery, field operations and fire look-out tower.

41. Camping knives for field, fire fighting and training camps.

42. Tube well, four inch (") capacity for nursery.

Item No.	Specification of equipment and justification
43.	First-aid kits for office, nursery and field teams.
44.	Plastic bags for seedlings.
45.	Seeds for seedling production.
46.	Pesticides and fertilizer for nursery.
47.	Office supplies and equipment for the project.
48.	Fuel, repair and maintenance of vehicles, machinery and equipment.
49.	Fencing of planted and treated areas (total circumference length of 25 kilometres, with barbed wire and 2" angle iron, 3 rows).

COST OF EQUIPMENT

(a) Non-expendable

Item No.	Quantity		$US
1.	1	Typewriter (manual) Arabic	800
2.	1	Typewriter (manual) English	800
3.	1	Photocopy machine "Mita" DC 213 RE	8 000
4.	2	Desk calculators	200
5.	1	Toyota Land Cruiser 4 WD, hard-top	15 000
6.	2	Toyota pick-ups 4 WD	25 000
7.	1	Truck 5 ton (dump truck)	30 000
8.	Water tankers:		
	2	Water tankers 8,000 l 4 WD locomotive and pumps	100 000
	1	Water tanker 12,000 l with high-power pump and long hose	60 000
9.	10	Augers	1 000
10.	50	Shovels, Nupla	1 500
	25	Replacement shovel handles	250
11.	10	Pick-axes	200
	5	Replacement handles for pick-axes	25
12.	20	Tree planting spades	600
	10	Replacement handles for spades	100

Item No.	Quantity		$US
13.		Wood cutting saws:	
	5	Bow saws	250
	3	Cross-cut saws	450
14.	5	Hammers, each weighing 3 kilograms (kg) + handles	200
	3	Replacement handles	30
15.	1	Small weather station + cost of fencing	2 000
16.		Audio-visual equipment:	
	1	D X C 3000 video camera + accessories	10 000
	1	PVM 2130 QM 27 inch (") video monitor	1 800
	1	Video cassete player/recorder SECAM-NTSC HIFI with manual sound regulater	1 000
	1	TMC 11 150 slide projector	300
17.	1	Kobota diesel engine + 1 pump, Capran 3" + 30 pipes	15 000
18.	2	Electric-generators, diesel, 25 kilovolt amperes (kVA) each	10 000
19.		Surveying and mapping equipment:	
	1	Theodolite, third-order + tripod	3 500
	1	Level instrument + tripod	1 500
	5	Plane tables with 5 telescopic alidades + 5 Ruler alidades + 5 plumb bobs + 5 hand levels + 5 tripods	6 000
	1	Mirror stereoscope + parallax bar and other accessories	1 200
	5	Hand compasses with leather case	150
	5	Clinometers	300
	5	Steel tapes, 50 metres (m) long	500
	5	Cloth tapes, 30 metres (m) long	100
	2	Drawing boards, mounted	2 000
	10	Range poles	100

Item No.	Quantity			$US
	5	Levelling rods, 4M, Extendable with level bubble and straps		1 250
	5	Pocket magnifier		50
	1	Stand magnifier		100
	10	Trace paper rolls		500
	2	Drawing sets		200
	2	Altimeter/barometer		400
20.	1	Camera, 35 millimetre (mm), wide-angle and telescopic lenses (1.5)		1 000
	5	Field binoculars, 7 x 30		1 000
21.	Nursery:			
		Total area, 50 m x 100 m = 5,000 m^2		
		Shed area 15 m x 25 m = 375 m^2		
		Fencing for the nursery area (300 m)	3 000	
		Shade construction coat 375 m^2 x $30	11 250	
		Store, office and electric installation	10 000	
		Nursery office furniture	1 000	
		Refrigerator for storing seed	1 000	
		Watering hoses, cans, rakes, spades, etc.	2 000	
				28 250
22.	10	Sprayers + accessories (15 e)		1 800
23.	5	Pruning scissors		150
24.		Office stationery: typing paper, paper pads pencils, etc.		1 000
25.	1	Road roller for compaction, engine driven		8 000
26.	1	Bulldozer		65 000
27.	1	Grader		50 000
28.	2	Tractor 4 WD, with all accessories		30 000
	1	Passenger bus (20 seat capacity)		20 000
29.	50	Back-pack, 20 l fire-fighting pumps		10 000
30.	Forest fire look-out station equipment:			
	2	Observation binoculars, high-powered, tripod mounted		40 000

Item No.	Quantity		$US
	2	Wireless sets (transmitters + receivers) with a range of 100 km	40 000
	10	Walkie-talkie wireless sets, with a minimum range of 30 km	5 000
	1	Refrigerator (14 cubic feet) + transformer	800
31.	2	Refrigerator for the office, capacity 16 cubic feet + transformer	3 000
32.	4	Air conditioners (6,000 BTU)	4 000
33.	10	Torchlights (battery), high powered	500
34.	5	Shotguns with ammunition	5 000
35.	5	Camping tents (300 pounds (lb)) + accessories	4 000
	20	Camping tents (180 pounds (lb)) + accessories	8 000
36.	50	Portable sleeping beds (collapsible)	5 000
37.	50	Sleeping bags	2 500
38.	3	Water tanks (capacity 5 m^3 each) + foundations	6 000
39.	40	Kerosene lanterns	800
40.	40	Camping knives	2 000
		Subtotal A	573 455
41.	1	Tube well	25 000
42.	3	First aid kits	1 200
43.	1	Million polyethene bags	3 000
44.		Seeds	6 000
45.		Pesticides and fertilizers	1 000
46.		Office supplies	8 000
47.		Fuel, repairs and maintenance	15 000
48.		Fencing	25 000
		Subtotal B	84 200
		Total (A + B)	657 655

Annex II

JOB DESCRIPTION OF PROJECT CO-ORDINATOR

Under the direct supervision of the Director of Operations Services, Forestry Department, FAO, and in co-operation and consultation with the national counterpart and with the Ministry of Agriculture and Irrigation, the project co-ordinator will be responsible for the control of UNDP inputs, including the supervision of FAO staff members and consultants, planning and implementing the project work programme and the timely submission of project reports and budgetary control.

In addition the project co-ordinator will:

1. Supervise and co-ordinate the work of the project experts and consultants;

2. Order and purchase equipment, administer and manage the UNDP component of the project;

3. Ensure the preparation of project work plans and the timely application of project inputs;

4. Serve as chief liaison person between the project and management, FAO, UNDP, consultants, visitors and related projects in the region and in the country;

5. Advise the Forestry Administration on matters related to forestry and watershed stabilization;

6. Participate in in-service training and the organization and conduct of training courses and the preparation of manuals;

7. Arrange fellowships for study abroad;

8. Co-ordinate and participate in the implementation of the project activities and perform any other duties related to it.

Duration	:	36 months
Duty station	:	Dohuk
Languages	:	Arabic and English
Qualifications	:	The forestry engineer should have at least 15 years experience in the field of reforestation, watershed stabilization and arid zone forestry in general. He should also have experience in co-ordinating a multi-disciplinary team.

Annex III

JOB DESCRIPTION OF NURSERY MANAGEMENT EXPERT

Under the direct supervision of the project co-ordinator and in close co-ordination with other members of the team and with the national counterparts, the nursery management officer will perform the following tasks:

1. Plan and supervise nursery site operations;

2. Propose and order seeds and all the materials and items needed for the production of planting stock;

3. Formulate a timetable for nursery operations;

4. Organize and supervize reforestation activities;

5. Participate in in-service training and in the preparation of audio-visual material and manuals;

6. Submit periodic reports on his work and a final report at the end of his assignment.

Duty Station	:	Dohuk
Duration	:	36 months
Languages	:	Arabic and English
Qualifications	:	The nursery management expert should be a forestry university graduate with at least 10 years experience in the field of nursery operations, seeding and planting and arid zone forestry.

Annex IV

TENTATIVE UNITED NATIONS STAFFING CHART

United Nations personnel	1991												1992												1993											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Project co-ordinator	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Nursery expert	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Forest protection consultant																			x	x											x	x				
Park management consultant																			x	x											x	x				
Forestry extension workers																															x	x				