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REPORT ON ADVISORY SERVICES MISSION TO ANGOLA

2 - 16 JUNE 1990

LUANDA, ANGOLA

by

REGIONAL ADVISOR ON DROUGHT AND DESERTIFICATION CONTROL

June 1990

ADVISORY SERVICES MISSION TO ANGOLA.

Mission objective.

- (i) To assist the Government of Angola in formulating long-term strategies in combating desertification and the impacts of drought;
- (ii) To assist the Drought Commission in the preparation for the National Forum on Drought and Desertification Control to be held in October 1990.

This report consists of two parts; part I pertains to the discussions in Luanda with the Drought Commission as well as the relevant UN agencies. It also summarizes the discussions held during the extensive field tour of the Namibe, Huila and Benguela Provinces. Part II consists of the recommendations to the Government of Angola.

INTRODUCTION

1. Seven provinces in the southern part of Angola, namely Huila, Cunene, Namibe, Kuando Kubanga, Benguela, Huambo and Kwanza have been experiencing episodes of drought since 1986. However, the drought situation in these provinces became acute in December 1989 and inflicted death to man and his livestock. It is estimated that about 2 million inhabitants have been affected by drought in Benguela, Huila, Namibe and Cunene. Another 100,000 persons are thought to be at risk in Kuando Kubango, Huambo and Kwanza provinces. In addition, drought has markedly affected the agricultural sector resulting in widespread malnutrition and famine. It is further estimated that about 225,000 heads of cattle have died in Cunene province alone. Due to the severity of the drought, the existing sources of water (chimpacas, boreholes, rivers) have completely dried up.

The Government has established the Drought Commission to organise the National Forum on Drought to discuss the causes and consequences of drought and desertification and how to deal with them.

PART I

A SUMMARY OF THE DISCUSSIONS HELD IN LUANDA AND IN THE PROVINCES

2. In order to acquaint myself fully with the on-going and planned programmes and activities on the management of the current drought, I held discussions with the members of the Drought Commission as well as the UNDP, FAO and UNICEF representatives in Luanda before undertaking a mission to the three provinces, namely Namibe, Huila and Benguela. Two members of the Commission, namely Mr. Felix Neto, Co-ordinator of the Commission and Mr. Abel Fonseca accompanied me on the visits to the provinces. In the provinces, I held discussions with Provincial Commissioners and their Deputies, Directors of Agriculture, Forestry, Planning, Youth as well as field technical staff. We reviewed the current drought situation in the provinces as well as the long term strategies on drought and desertification control.

VISIT TO THE UNDP OFFICE

Courtesy call on Mr. A. Essien UNDP Res Rep.

3. I paid a courtesy call on Mr. Essien, the Res Rep. and thanked him for the assistance I had received from his office. In turn, Mr. Essien welcomed me to Angola and wished me a fruitful and pleasant stay in the country. We exchanged views on environmental matters particularly drought and desertification, which had gripped the southern part of Angola since November 1989. As a result of the UNDP intervention, the UN Secretary General had now launched a world-wide appeal for assistance to Angola. The Res Rep. hoped that I would have time to visit some of the affected areas and make an appraisal of the situation. He also suggested that I should make a brief report on the situation including my recommendations and leave the report behind for use by the Government and his office, pending the completion of the final report. Mr. Essien further pointed out that there was need to plan ahead on strategies for cooperation within the subregion, and particularly amongst the countries which are seriously affected by the Kalahari and the Namibe deserts.

Briefing by Mr. M. Ganda, Deputy Res Rep.

4. Mr. Ganda briefed me on the drought situation in Angola. He pointed out that as a result of severe drought in the southern part of the country, the Govt., on her own initiative, had launched the Drought Commission whose objective would, inter alia, be to formulate long term strategies on combating the scourge of drought and desertification. The UNDP considered the work of the

Commission to be of paramount importance. Drought was an acute environmental problem in 1989 which necessitated emergency operations on the part of UNDP and other international organisations. As a result of the severe drought, other health and social problems such as cholera and the sustainance of the displaced persons became more pronounced. He added that the extent of the drought and the impacts it has had on the social and economic programmes of the affected communities is not known. UNDRO was in the process of setting up a data collection system which would alleviate this situation. He also assured me that the Government was quite open and willing to take in advice.

5. One of the most serious problems facing the Government of Angola is the fact that the level and capability of the staff in many sectors is not quite adequate. Many members of staff have not had the exposure to techniques and experience which have been acquired by similarly affected African countries. One of the reasons for this deficiency is attributed to the language barrier.

6. A Drought Commission had been established by the Govt. and mandated to carry out actions on drought and desertification control. Mr. Ganda hoped that I would include in my report the need to recruit a consultant to assist the Commission in establishing the necessary infrastructures as well as future programmes of the Commission. He also suggested that I should assess and advise on the development of man-power capability on desertification control.

7. In response, I agreed with Mr. Ganda's suggestions and added that we must also find ways of training personnel at the village level on the ways of combating desertification. Arousing public participation is critical because the Govt. alone cannot halt and reverse desertification. Extension workers will have to be trained in desertification control techniques and, in turn, they should assist in training women and youth at the village level. This would be one way of diffusing the knowledge and information which members of the Commission may possess.

8. We also agreed that at the end of my mission to Angola, I should prepare a brief report to be left behind for use by the Govt. and UNDP. Such a report should consist of:

- (a) An outline of the final report;
- (b) A summary of the final recommendations.

ROUND TABLE DISCUSSIONS WITH THE MEMBERS OF THE DROUGHT COMMISSION.

9. We met under the Chairmanship of Mr. Felix Neto, Chief of N.R.S.E. to discuss the work of the Commission and its future plans. Also present were Messrs. Abel Fonseca - Hydrometeorologist/Journalist, Jose' Carlos Bettercourt -

Agronomist and Mr. Bintou Beye - Chemical Engineer. We also reviewed briefly my programme of work including field visits to the affected provinces.

10. The Commission consists of representatives from several departments including Agriculture, Energy (renewable sources of energy), Trade and Provincial representatives. The Department of Energy coordinates the programmes and activities of the Commission.

11. Mr. Neto pointed out that as a result of the severe drought last year, the Government became seriously concerned about the deaths inflicted on the people and their livestock by drought. This resulted in an emergency operation. At the same time a seminar on Agriculture was held which resolved that drought should not be dealt with on an emergency basis but rather on a long-term basis. In addition to the seminar, a brain storming meeting on drought was held by the members of the Drought Commission. The Committee was informed about the availability of advisory services at ECA on drought and desertification control and it was for this reason that I was invited to the country.

12. A Committee of the Drought Commission visited the affected areas and produced reports. A meeting was subsequently held between the Committee members and representatives from UN and international organisations, notably UNDP, UNICEF, FAO and EEC. This meeting decided on the need to hold a donors conference sometime in October 1990 to seek for international support. In addition, the Government decided to hold a national Forum prior to the donors meeting to sensitize the public on problems of drought and desertification.

13. Before reviewing the topics to be discussed in the national Forum, I presented a seminar on desertification process in Africa, citing specific actions which have been adopted by other countries to halt and reverse the process. Committee members present at the seminar were as follows:

- (i) Hermenecillo Keane Dos Santos - Engineer/Agronomist.
- (ii) Luis Manuel - Forrester.
- (iii) Abel Fonseca - Hydrometeorologist/Journalist.
- (iv) Ana Gaspar - Téc Ciências Sociais/ Chefe De Geccao de Esfera de Desenv Social/ Zinaca.
- (v) Bintou Beye - Industrial Chemical Engineer.
- (vi) Felix Neto (Chairman) - Economist.
- (vii) Jose Carlos Bettercourt - Agronomist.
- (viii) George Manuel David - Hydrologist.

An outline of my presentation appears here below.

OUTLINE OF PRESENTATION

- (i) Definitions
 - Desertification vs Drought.
 - UNCOD and PACD 1977, Nairobi, Kenya.
- (ii) Magnitude of drought and desertification in Africa - trace problems of Drought from 1968 - 1985.
- (iii) Establishment of E.W.S.
- (iv) Combating desertification (multisectoral approach).
 - (a) Afforestation:
 - agroforestry - multipurpose trees: Albizia, Luecaena, Casuarina, Sesbania, Cassia, Prosopis;
 - promotion of afforestation by individuals;
 - urban fuel wood crisis and establishment of shelter belts;
 - alternative sources of energy - solar, hydropower, wind - (Deforestation causes siltation of dams and rivers). Man is responsible for deforestation - indiscriminate cutting and burning of bushes.
 - seedlings production - ministry of Agriculture or Forestry Department.
 - school children (primary and secondary school children).
 - (b) Soil conservation
 - mechanism of desertification process
 - desert sand morphology and sand movement .
 - sand dune stabilization (biological and mechanical stabilization - selection of species for use).
 - drought tolerant crop plants and trees.
 - tissue culture techniques.
 - (c) Creation of public awareness on desertification control.
 - role of political leaders including church leaders.
 - role of women and youth.
 - role of public media.
 - (d) Monitoring environmental changes.
 - use of remote sensing techniques
 - use of ground and aerial photography.
 - (e) Transboundary strategies.
 - information exchange and adoption of some subregional agreements (Angola, Botswana and Namibia which are threatened with Kalahari and Namibe deserts).
 - (f) Education and Training.
 - primary and secondary
 - university.

14. At the end of my presentation several issues were raised by the members of the Commission and discussed. Some of the issues raised included (i) relationship between drought and climate change (ii) specific tree species adapted to arid environments (iii) whether drought in Angola was the result of negligence on the part of the Government in not promoting wise utilization of the resources.

VISIT TO THE FAO AND UNICEF OFFICES

15. I visited the FAO Office in Luanda in the company of Mr. Felix Neto and we spoke to Mr. Aurel Belanger, Officer in-charge and Mr. Raymond Tarku. (The FAO country representative was away on mission).

16. We discussed the seriousness of drought and desertification in the southern part of Angola. We were informed that the FAO had undertaken a mission in the area in February 1990 to review the seriousness and the magnitude of the problem. A report detailing their findings had already been submitted to the Government, Ministry of Agriculture.

17. On the question of pilot projects in the affected areas, we were informed that a number of projects were underway in affected provinces and they included the following.

(i) Early warning system

The work involves preparation and establishment of the early warning system through collection, collation and analyses of data on agrostatistics, agroeconomics and agro-meteorology.

(ii) Sand dune fixation in Tombwe.

The project commenced in December 1986 and is expected to be completed in December 1990. It will, on completion, have cost US \$1,086,110. It involves the rehabilitation of vegetation cover in biological fixation of sand dunes. A fence (10km. long) has been constructed to stop migration of sand dunes and 5m. of the length will be used for production of fuelwood (3000 ha.). This action will assure the protection and production of fuelwood for the Tombwe village.

18. I spoke to Mr. Ibrahima D. Fall, UNESCO Rep. for Angola & S.Tome and Principe. He briefed me on the current projects underway in drought affected areas (see discussion on water development, paragraph 53).

FIELD VISITS TO PROVINCES

NAMIBE PROVINCE

19. We flew to Namibe town, the capital of Namibe Province on 7/6/90. (The flight takes about 2 hours). Namibe town has a population of about 200,000 people. Their primary occupation is fishing. My team was welcomed to the Provincial capital by CDA Domingos Jose, the Commissioner of the Province (Governor). The Commissioner pointed out that the main environmental problem in the province is how to halt the spread of sand dunes. Lack of materials for sand dune fixation as well as water had been a stumbling block. He added that they have seedlings in the nurseries but because of lack of water, they cannot be transplanted. A portion of the road from the airport to town had been planted with rows of trees on both sides. The ministry of Agriculture had attempted to ferry water using trucks. However, this proved to be too expensive. He suggested that I should visit Tombwe District to see the FAD field project on sand dune stabilisation.

20. We drove to Tombwe District, a distance of about 90 Km. This is the main fishing town in the Province. The road between Namibe and Tombwe is tarmacked but was, in some places, covered with drifting sands. There are no bushes, shrubs or any form of vegetation along the road between Namibe and Tombwe; it is a true desert. The dominant plant species is the famous flowering plant, Wilweltchia mirabilis. Most of the sand dunes along the route appeared inactive.

21. We visited the FAO nursery. There were some Leucaena and Casuarina seedlings. Some of the seedlings were overgrown. We then moved to the site where sand dunes were being fixed. I was informed by CDA Jose Verdetete, a technician for the project, that there are 120 workers; 60 permanent and the remainder casuals. All the workers are paid a salary with food supplementation by WFP. The temporary workers are given food corresponding to 11 days of work, while the permanent ones are provided with food corresponding to 25 days of work. They have two nurseries; a borehole was being sunk at one of them which is to be expanded. The technician further stated that the area receives about 50 mm rainfall per annum. The wind speed is high (20-25 Km/hr) and changes direction, which makes it difficult to position the fences for stopping the dunes. In fact, the main work at the site is the fixation of dunes. He pointed out that the planting of seedlings would be carried out after the dunes had been stabilized.

22. The Commissioner of Tombwe, CDA Jose G. Alberto was busy with other engagements and, therefore, requested CDA Jaime

Antonio, his Chief Secretary to take us round. Also present were Jose M. Costa, Director of Technical Cabinet of the Ministry of Fisheries.

23. I also held discussions with Messrs A. Baptisa, Director of Provincial Planning and Raul de Oliveira Gomes, former Director of Agriculture of Namibe Province. I was informed that desert expansion had accelerated during the past few years. Mr. Baptisa attributed the expansion to over-cutting of trees in the region. Assistance had been received from FAO for sand dune fixation in Tombwe District. However, no work on sand dune fixation was taking place in Namibe town. When I asked about the programmes and projects on which national and international efforts should be concentrated, Mr. Baptisa suggested the following:

(i) Rehabilitation of chimpacas for the sub-region (ie. Namibe, Kuando-Kubango, Kunene and Huila provinces). A previous project had as one of its objectives to construct 25 new chimpacas and to rehabilitate 76 old ones. There are probably more than 400 chimpacas in these provinces. In his view this project was totally inadequate for the four provinces. He added that chimpacas are crucial for the development of crop and animal husbandry.

(ii) Rehabilitation of boreholes

This project involved rehabilitation of boreholes including the installation of equipment for pumping water. At least 50 out of 100 boreholes had been rehabilitated in Namibe Province. Due to civil strife and unavailability of skilled man-power the other bore-holes had not been rehabilitated. There are many boreholes in the province which need to be rehabilitated.

(iii) Afforestation

This is a project which was to have extended from Namibe to Lubango towns.

24. After reviewing various issues we finally agreed on the following recommendations for review by the provincial administration from which a selection would be made for consideration by the Donors meeting:

- (i) Need to carry out meteorological monitoring, especially agrometeorology
- (ii) Afforestation
 - (a) establishment of greenbelts around urban centres
 - (b) biological fixation of sand dunes to protect the airport, roads and other essential infrastructures.
 - (c) fuelwood plantations for urban centres
- (iii) Development of water resources (boreholes, chimpacas and dam construction).

- (iv) Education and sensitization of the public on environmental degradation.
- (v) Decentralization of the functions of the Drought Commission.

After these discussions, we all moved to the Provincial Commissioner's office, in order for me to brief him on the outcome of our meetings. It was agreed that a selection from the above list would be made and forwarded to the Drought Commission for further consideration.

HUILA PROVINCE

25. A meeting was held in Lubango town (Huila Province) under the Chairmanship of the Deputy Provincial Commissioner, Mr. Joao Baptista Kusumwa. (The Provincial Commissioner was away in Luanda on official matters). In his introductory remarks the Deputy Provincial Commissioner underscored the importance of drought in the province, and added that this environmental hazard should be accorded the same importance as education and health because it hampers development in all sectors. For example, it reduces agricultural production resulting in malnutrition and thus, affecting the programmes of the ministry of health.

26. Also present in the meeting were the following:

Nginann Lutayawo, Engineer Agriculture
 Carlos Alberto Afonso, Eng Mec Agricola
 Daniel Chivango, Director INAMET
 Miguel Rafael, Director IDF
 Antonio do Santos
 Seeno Vulto, OAB Planner.
 Mr. Felex Neto, Chief, Dept NRSE
 Mr. Abel Fonseca, Meteorologist/Journalist

27. I then reviewed the subject matter on desertification control and the management of the impacts of drought (see paragraph 13). In my discussion, I also reminded them of the main objectives of the meeting, namely:

- (i) to review problems of drought and desertification in Huila Province with them.
- (ii) to identify specific needs of the province which would be translated into viable project proposals for presentation at the donors conference. Such projects must emphasize the long term strategies rather than the short term relief measures.

My presentation provoked a discussion on drought and desertification. Some of the issues raised included:

- (i) air movement between Namibe and Huila Provinces as a possible cause of drought in the Haila province;

- (ii) sand dune stabilization in Tombwe;
- (iii) harmonization of developmental programmes in agriculture etc, and deforestation.
- (iv) possible causative agents of desertification in Huila Province.

28. After the discussion, Mr. Neto highlighted the proposed programme including papers to be presented at the national forum. We then reviewed the possible project proposals for presentation to the Donors Conference. The proposals suggested included;

- (i) Afforestation - Approximately 80,000 ha of wooded habitats had been deforested in the province, hence need for reafforestation.
- (ii) Development of water resources. The amount of rainfall in the northern part of the province is about 1000 mm per annum, while the amount of rainfall in the southern part is about 500-700 mm/annum. There are over 1057 boreholes in the province that need rehabilitation.
- There are also many chimpacas which need rehabilitation. The rehabilitation of the boreholes and chimpacas as well as the construction of dams would provide the badly needed water for man and his livestock. At least 90% of the cattle found in Angola are located within this sub-region. In addition, it is hoped that the additional water would result in the establishment of small scale irrigation schemes.

BENGUELA PROVINCE

29. We were warmly received in Benguela province by the Deputy Commissioner, Mr. Manuel Fraueiseo. After a few introductory remarks we reviewed problems of drought and desertification in the province. We then discussed my programme for the next two days which include the review of a video film on the impacts of drought in the province and visits to Lobito and Bariafarta towns.

Video film on impacts of drought in Benguela province

30. The film depicts men, women and children caught up in a predicament of the extreme. The children are malnourished and are obviously suffering from kwashakor or marasmus. The men and women have turned into skeletons and will probably die before their children. We saw three orphans left behind awaiting for their turn. The parents had died of diseases associated with hunger and malnutrition. There was also a general lack of medicines and cooking utensils. We saw long que's of children waiting for rations at a camp. The Cuban volunteer doctors were on hand but were too few for the masses. We also saw the displaced persons

who were being cared for at another camp. They obviously looked more healthy than their counterparts experiencing the acute problems of drought.

31. The Commissioner of Kubao District in the Province, who provided the narrative for the film, also gave some information on mortality rates in the district. About 2600 people had died in the district between January and March 1990. However, the rate of mortality had declined after March. For example, in the month of May, only 200 people had died in the District. On the whole, the situation was much better, but this was due to the fact that food supplies had been received from international organisations. Approximately 600 tons had been received, of which 300 had already been distributed. He lamented that there were many orphans who had to be fed as their parents had died. He also appealed for more supplies from the international community.

32. A meeting to review current drought problems and strategies to adopt in dealing with it's impacts was held under the chairmanship of the Deputy Commissioner, CDA Manuel Fraueiseo. It was attended by representatives from various ministries as follows:

Joaquim Frederica d'Almeida - 1st secretary

Pedro Lucau - secretary for produtif sector

Mamwe Franciseo - Deputy Commissar for Economic and social sector

Vicira Lopes - representative of transport and communication

Alfredo Pita-Gros - representative of social affaires

Hamiltoas Adalbeito - representative of Agriculture

Albeito Piuto - Internal trade

Carlos Osorio - Cooperation

*Carlos Freitas - director of planning

I was informed that this was the local commission on drought and that they held meetings monthly.

33. The deputy commissioner informed us that the local Govt. had the will to work towards the halting of the expansion of desertification in the province. Their efforts were now being concentrated in Baiafarta municipality and suggested that we visit the municipality before leaving Benguela. In this municipality an effort was being made to grow trees. Because of lack of rain, the seedlings were being supplied with water transported from Benguela town.

34. We then discussed the priority needs of the province and agreed on the following:

- (a) Expansion of afforestation programme in Baiafarta municipality.
- (b) Water development in the province including the rehabilitation of boreholes and chimpacas as well as the construction of dams.

- (c) Afforestation: selection of appropriate tree species which can withstand the harsh drought conditions; seed collection and nursery management. Aims of afforestation to include the protection of the environment as well as the production of fuelwood for the urban populations.
- (d) Monitoring environmental changes - mainly agrometeorology.
- (e) Training in all sectors and at all levels.

VISITS TO LOBITO AND BAIAFARTA

While in Benguela town, we made visits to two neighbouring municipalities namely, Lobito and Baiafarta.

LOBITO

35. Lobito town is located north of Benguela, half an hours drive. The main activity of the people living between the two towns is agriculture, mainly irrigated agriculture. They grow sugar-cane which is milled in the sugar-cane factory at Katumbela, a town mid-way between Benguela and Lobito. The river Katumbela also empties it's waters in the Atlantic ocean at Katumbela town. The purpose of the visit to Lobito town was to assess the facilities for the National Forum. On arrival in Lobito town, we made a courtesy call on the Director of the Electricity Power Company. The primary goal of the company is to supply electricity not only to Benguela Province but also to the neighbouring provinces particularly the municipalities. The supply of electricity to rural communities requires the development of other infrastructures such as roads.

36. We also made a courtesy call on the Commissioner of Lobito municipality CDA Jose M. Moreno Mendew Fernandes and discussed matters relating to the national forum and the donors conference. After the discussion we were taken round to see the facilities. Some of the issues discussed related to the following:

- (i) Availability of Conference Hall as well as Committee Rooms. These are available. Simultaneous translation facilities are not available, although loud speakers are available.
- (ii) Accommodation - There are several hotels. We requested the Commissioner to form a local committee to look into the problem of accommodation for about 120 persons as well as other issues. The Commissioner indicated that the foreigners attending the donors conference would be housed at the palace.

- (iii) Transportation - not available and that the Drought Commission should arrange to move vehicles by boat from Luanda and Benguela to Lobito.
- (iv) Security - that the municipality would provide security in hotels and in the conference rooms. They would also look into secretarial support as well as the protocol and other logistics.
- (v) Social activities - The local committee to arrange for social activities including field visits. Committee to enlist the assistance of the industrial firms in Lobito and possibly Benguela.

BAIAFARTA

37. The municipality is a half an hours drive from Benguela. Our main objective in visiting the town was to view the afforestation project in the municipality. Approximately half an acre of land had been planted with seedlings (Leucaena and Casuarina). This plot is located just adjacent to a primary school. Water had to be transported from Benguela for the seedlings. This is a pilot project and the intention was to plant about 2000 trees and then move to Lobito town. Of the seedlings planted, 20-50% had died due to lack of water. The area receives 50-100 mm of rainfall per annum. The local people were looking after the seedlings so that they are not eaten-up by goats or other animals. The pupils at the school were also helping in looking after the seedlings. Seedlings which had been supplied to various households were doing much better than those in the municipality plot. Mr. Joao Correia, Provincial Director of Forestry Development Institute in Benguela took us round.

38. On return to Benguela I spoke briefly to Mr. Carlos Freitas, Director of Planning, Benguela Province. He informed me that environmental assessment in the province had been carried out. One farm of consultants had suggested that soil conservation including sand dune fixation must be given priority as they posed a great danger to the existence of these coastal towns.

RECOMMENDATIONS TO THE GOVT. OF ANGOLA

Strengthening of the Drought Commission

39. As a result of the severity of drought in seven southern provinces of Angola, the Govt. set up the drought commission to coordinate actions on drought. This commission was established by a resolution of the Council of Ministers with two immediate objectives, namely to:

- (i) organize the National Forum on Drought and desertification to discuss problems related to the causes and consequences of drought; and

- (ii) make concrete project proposals on socio-economic development of the affected areas for consideration by a 'Donors conference.

The commission consists of representatives from the Ministries of Energy and Petroleum, Agriculture, the National Union of Angolan Peasants, Institute for Forestry Development and UTA/Emergency.

40. The commission is young and will certainly have teething problems during its infancy. In order to hasten the flow of information and data between the affected Provinces and the Commissions Headquarters in Luanda, provincial, district and village committees should be established at an early date in the affected provinces. These committees should include party leaders, women, youth as well as professionals in various fields (agronomy, veterinary medicine, foresters, medical doctors, teachers, etc). The establishment of these committees will be critical in ensuring the effective participation of the people in projects related to anti-desertification. It is also hoped that the establishment of the local committees will improve data collection, analysis and dissemination. Currently policy formulation and planning suffer from inavailability and/or unreliable data. Additionally, recent and relevant research is wanting in many sectors.

41. It is worth pointing out here that during the early days, and probably before independence, there existed a Commission on Drought which was responsible for water resources management for the drought stricken areas. The existence of such a Commission gave credence and importance to the problem of water in the southern provinces. I was informed by the Namibe Provincial Planner that the creation of such a Commission had been proposed for the Namibe Province.

42. Finally, it is pertinent to point out that when the Plan of Action to combat desertification was drawn up in 1977 by the United Nations Conference on Desertification held in Nairobi, it was recommended that each member State prone to desertification should establish a central authority to coordinate actions on desertification control. The Angolan Govt. must, therefore, be congratulated for taking this initiative. It is to be hoped that after the National Forum on desertification control and the management of the impacts of drought, a national plan of action on combating desertification will be drawn up, which will form the blue print for all aspects of anti-desertification programmes.

Afforestation in the Coastal Provinces

43. Agroforestry is the intercropping of trees with crop species. Also included in the concept of agroforestry is the planting of trees as windbreaks, for provision of shade or shelter and also for soil conservation. A fruit orchard can also be considered as an agroforestry practice. Agroforestry

practices are consistent with the traditional farming systems of many communities in Africa, including Angola. I am informed by entomologists that agroforestry reduces pest incidences.

44. Agroforestry is likely to succeed in the coastal provinces of Angola. Although fuelwood is most acute in these provinces, it must be recognised that the primary objective of agroforestry is not necessarily to produce fuelwood, rather fuelwood is a by-product of agroforestry practices. Moreover, the pre-colonial African farmer, being aware of the fragility of his soils, included agroforestry and land following in his agriculture. Care must, however, be taken to ensure that local leguminous species are used. It is strongly recommended that certain species of the multipurpose leguminous trees such as Prosopis, Albizia, Acacia, Leucaena, Casuarina, Sesbania and Cassia be tried in the various ecological habitats. Most of the species used in Africa have been imported from Australia or Central America.

45. Because of their ability to fix atmospheric nitrogen in the soil through the process of nitrogen fixation, their use tends to enrich the soil. Since the leaves of such trees are nutritious they are also used as a supplement for livestock feed.

Village woodlots and communal forestry

46. During the 1960's and 70's plantation of village woodlots as well as establishment of communal (or mass) forestry around the urban centres was the most prevalent activity. Today, the emphasis is now on agroforestry. Communal forestry means growing trees on public land. In Africa, communal forestry has been undertaken on a large scale in Ethiopia and Tanzania. The establishment of village woodlots in Tanzania failed miserably. In the Sahel countries, attempts to promote community forestry after the 1968-73 drought also failed. In some instances, the villagers are usually suspicious of any financial dealings undertaken on their behalf because some village members may abscond with the profits from the sales of the firewood and poles. In my opinion, the only way mass forestry or village woodlots can succeed is if they are owned by the local administration such as the locational, village or ward councils. Greater emphasis on the expansion of local forestry should,

by private citizens rather than mass forestry. Moreover, extensive fuelwood plantations would be difficult to manage due to the security problem in this country.

47. When peace and security return to Angola, it should be possible to establish forest plantations on the escarpments which are close to Benguela and Lobito towns. Indeed, there exists already Eucalyptus plantations on these escarpments which were established as raw materials for the Catumbela paper mill.

48. Rainfall in the coastal areas of Benguela and Namibe is very scanty (50-100 mm per annum). Consequently, the establishment of forests in these areas should be done cautiously using the most appropriate species. Although I have listed some of the common leguminous species to be tried, it is, however, essential to select the most appropriate indigenous species before making use of the imported ones. Appropriate University departments as well as scientists in the ministry of agriculture should embark on these basic studies as soon as possible. Seed collection and testing of their viability should also be carried out routinely.

Production and the nurturing of seedlings

49. Because of civil strife it is difficult to obtain an accurate figure of the number of tree nurseries in the country. In addition to the tree nurseries being managed by the ministry of Agriculture and the various NGO's, school children notably those in primary and secondary schools (the future citizens of Angola) should be assisted to establish their own nurseries. This activity could be sponsored both by both the ministries of agriculture and education. The seedlings produced would be used for establishment of shelter belts at their own respective schools as well as planting along the roads and highways. This should be quite possible in certain districts of Huila province where the rainfall is adequate.

50. When I visited an afforestation project in Baiafarta town located north of Benguela, I was particularly impressed with the growth of the tree seedlings which were being nurtured by school children around their homesteads. I met an 11 year old primary school pupil, (Bebiana Guilhermiana) who insisted on showing us her young trees at her home. Although her seedlings had been planted on the same day as those on the municipal project site, her seedlings were obviously healthier and taller. She had used sticks to fence round each seedling to avoid accidental trampling or destruction by goats. She also watered them regularly. I have confidence in the youth of Angola. Their energies must therefore, be harnessed in such worthwhile endeavors.

Water development

51. As pointed out earlier, rainfall is very scanty in the coastal provinces of Angola. Indeed, the major request of the peoples of the three provinces which I visited (Namibe, Benguela and Huila) revolved around the development and rehabilitation of boreholes and chimpacas as well as the installation of water pumps. Other communities requested for the construction of small scale dams for irrigation purposes.

52. A substantial amount of information is already available on the number of functional and faulty boreholes and chimpacas in each province. UNICEF, for example, is undertaking a reconstruction programme in the southern provinces (Cunene, Huila and Namibe). The programme involves the rehabilitation of boreholes as well as the installation of hand pumps and also the training of provincial and village personnel to maintain these facilities. UNICEF is also involved in the strengthening of community participation in the planning, implementation and continued maintenance and operation of the rehabilitated water points. The other envisaged projects to be undertaken by UNICEF pertain to the repair of dams which would allow the irrigation of small holdings. UNICEF is also looking into the possibility of standardizing handpumps to prevent proliferation of different types which would, in turn, pose problems of maintenance.

53. In every province we visited, we were informed of the number of salvageable boreholes/chimpacas and pumps. In Huila province alone, there are over 1000 boreholes which need rehabilitation. It is, therefore, recommended that greater emphasis be placed on the rehabilitation of existing boreholes/chimpacas and pumps instead of developing new ones. It is also important to promote the participation of the local community in planning, implementation, maintenance and financing of these community water projects.

54. Another request that was frequently made to us on our tour pertains to the construction of earth dams to provide water for irrigation purposes. The topography of the areas visited is quite ideal for dam siting. However, the siting of any dam must take into account the catchment area. In fact, the development of any dam must be carried out simultaneously with the conservation of the catchment area in order to avoid siltation.

55. The objective of an irrigation scheme is to produce food for the ever expanding populations through the use of the dam or river water. I was unable to obtain an accurate figure of the number of large and small scale dams in the drought prone provinces. However, the improper management of irrigation schemes

soils; Salinized soils are for all practical purposes desertified lands as they cannot sustain the growth of any vegetation. In practice, irrigation farmers tend to use more water than is necessary resulting in the accumulation of various types of salts in the soils. It is essential, therefore, to incorporate a drainage system during the initial preparation of an irrigation scheme. It is also important to use appropriate amount of water in irrigating various crops. Some crops such as maize require more water than say beans. Laying drainage pipes when visible signs of salinization have become apparent is always costly.

Sand dune stabilization

56. Sand dunes in Namibe province and other coastal provinces constitute an impediment to development in these areas. However, the towns located at the coast are important for various reasons, including fisheries and also as sea ports. Sand dunes have hidden powers in themselves; they nourish and derive their powers from the previously deposited ones, and no sooner thousands of acres of arable lands become engulfed. In the Namibe town, sand dunes are a threat to the airport runway, the major roads and other facilities including sewage systems. We drove from Namibe to Tombwe town through the Namibe desert. We visited the FAO project on sand dune stabilization in Tombwe. Currently, the emphasis is on mechanical sand dune stabilization. I was informed that biological fixation would be initiated soon using Casuarina seedlings. I suggest that there is need to investigate into the possibility of using Prosopis juliflora and Acacia cyanophylla in addition to the Casuarinas.

57. The techniques of sand dune stabilization are well known. They involve mechanical stabilization by erecting fences (barriers) perpendicular to the migrating dunes. In some cases, this may be followed by the construction of checkerboards using local materials (stones, clay from a river if available, straw or any plant refuse). In some cases this step is completely omitted so that mechanical stabilization is followed directly with planting of appropriate species which form micro-fences. In some parts of the world where human labour is in abundance (eg. China), levelling of the dunes precedes the planting of appropriate plant species. In other places no levelling is carried out. In other instances, it may be necessary to plant xerophytes to stabilize the sand dunes on the wind-ward side and the apex of the dunes before introducing tree species.

58. An important activity which must be undertaken immediately is to assess the magnitude of coastal and continental sand dunes in Angola and then formulate strategies on halting their further migration. Some of the salient questions to pose at the on-set are as follows:

- (a) How rapid are the sand dunes advancing towards, say, productive agricultural lands, water ways, transport systems and habitation sites?
- (b) What previous work, if any, has been done on the identification and selection of plant species, including members of the Gramineae family, to be used as microfences? Are techniques readily available for the rapid proliferation of the appropriate species for use in holding the sands?
- (c) What plant species (especially members of the Euphorbiaceae and or Cactaceae family) are available in the vicinity from which branches could be obtained for construction of fences, usually perpendicular to the direction of the wind (mechanical stabilization)?
- (d) Has any studies been carried out on the velocity of sand dunes as well as the morphology of sand particles? This information is essential before the construction of the fences.
- (e) Finally, we need to pose a question relating to the economic use of stabilized sand dunes for the generation of some income as both mechanical and biological sand dune stabilization are expensive.

Use of remote sensing techniques

59. One can obtain data on the status of crop growth as well as vegetation cover for Angola from the remote sensing technique. There exists the "Remote Sensing Component of the Early Warning System (EWS) of SADCC countries" which was established jointly by SADCC Food security Technical Administration Unit and FAO. It is located in the Dept. of Meteorological Services in Harare, Zimbabwe. Its main objective is to strengthen SADCC EWS for food security by establishing satellite remote sensing capabilities for monitoring precipitation and seasonal vegetation development in the region. A casual look at the satellite maps of this project for Angola vegetation index images from 1981 to 1989 shows clearly that drought commenced in the country in 1987. The area which is devoid of vegetation (Namibe desert) remains the same over the years. However, the area adjoining the Namibe desert enlarged markedly in 1988 in contrast to the 1986 satellite imagery. Finally, the "very green" areas on the north-east of the country covered a much larger area in 1986/87 than in 1988/89.

60. Sand dune stabilization is a laborious task; it requires the participation of many people. It is hoped that the local communities in Tombwe and elsewhere will be persuaded and encouraged to participate in this worthwhile endeavour.

Education Training and Public Awareness

Role of policy makers

61. The most worrying problem facing the Government of Angola is the civil strife. Naturally the meager resources of the country which would otherwise have gone into conservation and management of the country's resources are now being used to defend the integrity of the country. Furthermore, the war has instilled fear and a sense of insecurity in the people who, in turn, have had to move into the corridors of security such as the urban and trading centres. These centres were however not planned to cater for these large number of people. Needless to add that stable political leadership is mandatory for the implementation of the wide range of recommendations contained herein. Politicians and civil leaders are the policy makers; they have in addition, a platform which they can use, and ought to use, in informing the public about the root causes and the consequences of environmental degradation. It is not good enough for them to be invited to read written speeches at the opening and closing ceremonies of seminars and workshops on environmental degradation. They should be intimately involved in antidesertification activities of the regions they represent. They must mobilize human resources at their disposal to combat all forms of land degradation. The politicians are the field marshals against the war on environmental degradation; it is, therefore, their moral obligation to inspire those that they lead to do likewise.

Role of church leaders

62. The church leaders have a similar obligation. They, too have a platform, the pulpit. They should advise on a regular basis members of the congregation on the importance of rational utilization of their natural resources as well as the need to participate in communal activities. The church leaders must not be ashamed of "preaching" on the evils of soil erosion because soil loss would result in misery and destitution of the members of the congregation. I believe that no church leader would wish to see his flock suffer.

Role of women and the youth

63. The role of women and youth in communal activities such as afforestation, sand dune fixation, conservation of catchment areas as well as improved cooking stoves is critical for the success of such endeavours. It is the women and children who experience acute problems in the event of drought. Women and the youth will, therefore, respond readily when called upon to participate in communal activities. Women should, therefore, be involved in planning and implementation of all the rural

development projects. In addition, more women should be trained as junior and middle level forest officers in both sociology and silviculture to enable them educate, organize and collaborate with people in the establishment of communal forests.

Role of mass media

64. The public media should play a leading role in educating the masses on why they should participate in communal tasks. The mass media should not wait for trigger events such as drought. News from the provinces and districts should highlight environmental conservation programmes. The publication and distribution of pamphlets in the local languages must be promoted.

Education, training and research

65. In addition to civil strife, the acute shortage of trained staff is another stumbling block to the development process of Angola. There is a need to restructure the primary and secondary school curricular with a view of incorporating environmental education. In this regard, the University's participation in the development of primary and secondary school curricula is essential. In addition, the preparation of teaching materials, including writing of text books for secondary schools should be undertaken seriously by university staff. Finally, the University must endeavour to train and produce more graduates capable of facing the challenges that exist in the country.

66. On the question of research in the general field of desertification control in Angola, I would like to suggest the following areas:

- desert sand morphology and sand movement;
- sand dune stabilization with emphasis on biological and mechanical stabilization;
- agroforestry research;
- drought tolerant crop plants;
- rangeland management and monitoring;
- tissue culture techniques for rapid multiplication of selected plant species for rehabilitation of semi-arid environments;
- development of alternative sources of energy to fuelwood (biogas, windpower, solar energy etc), including development of improved cooking stoves.

Short-term training programmes

67. The training programmes described above are for the long-term planning strategy. However, because of the dire need to commence immediately on some anti-desertification activities, it is prudent to propose two activities which should be carried out as soon as possible:

(a) Study tour

Provincial and district representatives of the Drought commission plus selected members of the Commission in Luanda should undertake a study tour to neighbouring African countries (e.g. Burkina Fasso, Botswana, Chad, Mali, etc.) which are experiencing problems of drought and desertification. The objectives of the study tour should be (i) to acquire skills and experiences in desertification control from a similarly affected African country (or countries). (ii) to enhance cooperation between Angola and her neighbours through the exchange of information on desertification control, a process that defies the existence of political boundaries

(b) Training at the district and village levels in anti-desertification techniques

Those who will have participated in the above study tour should be used to train others at the district and village levels on desertification control techniques. It is important that women and the youth should feature prominently amongst those to be trained under this category.

Convening of the National Forum on Desertification Control and the Management of Drought.

68. One of the mandates of the Drought Commission is to organize a National Forum on drought and desertification control. The Forum which is scheduled for October, 1990 is expected to discuss the causes and consequences of drought. I wish to propose the following as additional objectives of the forum:

- (i) to harmonize research and other activities currently under-way on drought and desertification in the seven provinces;
- (ii) to create public awareness amongst the local communities and policy makers on the impact of drought ;
- (iii) to serve as a launching platform for the take-off of the Drought Commission's work on the long-term management of drought and desertification.

The Programme for the Forum

69. I wish to propose two sessions: (i) plenary and (ii) sectional (or Committee) groups. I also wish to propose the following themes for the plenary session and the Committee groups respectively. I recommend that these themes be discussed fully by members of the Commission and may be modified as necessary.

A. Plenary Session

- (i) Distribution and general characteristics of the drought affected areas;
- (ii) The social and economic considerations of drought in Angola;
- (iii) Plan of action to combat desertification and the impacts of drought in Angola. This is a synthesis paper and should as far as possible include the following information:
 - (a) Background information;
 - geography
 - demography
 - administration
 - economy.
 - (b) The physical and biological environment of the programme area;
 - climate
 - geology
 - ground water resources
 - range and pasture resources
 - forestry resources
 - farming resources
 - wildlife resources.
 - (c) Causes and effects of drought and desertification;

- (d) Assessment of the current status of drought and desertification in South Angola;
- (e) Cultural desertification control measures and constraints;
- (f) Proposed plan of action to combat desertification and management of drought;
- (g) Programme of action;
- (h) National projects;
- (i) Professional and technical manpower resources;
- References.

B. Sectional Papers

- (iv) Water development in semi-arid and arid regions;
 - development of surface and ground water
 - harvesting water run-off
 - food production through irrigation
 - management of salinized soils
- (v) Rangeland management and conservation;
 - survey of rangeland resources
 - development and improvement of rangelands (e.g aerial seeding and grazing and rotation patterns).
 - forage and pasture developments in rangelands
 - protection of seasonal fires in rangelands
- (vi) Soil conservation in semi-arid and arid lands;
 - techniques of sand dune stabilization
 - selection of plant species for fixing sand dunes
 - shelter belt establishment
 - conservation of gully formation
- (vii) Agroforestry and forestry practices;
 - afforestation
 - establishment of woodfuel plantations
 - studies in agroforestry
 - production of seedlings for afforestation programmes
- (viii) Monitoring and mapping desert encroachment;
 - application of remote sensing techniques
 - ground and aerial photography
 - establishment of early warning systems on drought (EWS)
- (ix) Social and economic considerations of drought;
 - role of pastoralists - their migration patterns/sedentarisation
 - fuelwood production in arid lands
 - alternative forms of energy (solar, biogas, etc)
 - role of emergency supplies in combating drought and desertification
 - drought and public health

- (x) Education, training and public awareness;
- environmental education in schools at all levels including teacher training colleges
 - training of trainers at the village level including establishment and/or expansion of extension services
 - creation of public awareness - role of public leaders (policy of makers), role of women and youth, public media and NGO's
 - environmental legislation
- (xi) Recommendations.

70. The themes outlined above in numbers (iv)-(ix) can further be combined and reduced to four major categories, namely (i) Education, training and public awareness (ii) Desertification Control (iii) Water Development in Semi-arid Lands (iv) Monitoring and Mapping. I wish, therefore, to propose the establishment of four sub-committees of the technical committee to prepare and/or solicit for papers in these disciplines. Once the papers have been assembled and reviewed by the sub-committee, they should be forwarded to the technical committee for further scrutiny. The themes to be considered by each technical sub-committee are listed here as follows:

TECHNICAL SUB-COMMITTEES

- (a) Education, training and public awareness;
 - (i) social and economic considerations
 - (ii) training at all levels, including extension services
 - (iii) role of policy makers, women and youth in public awareness
 - (iv) human health
- (b) Desertification Control;
 - (i) soil conservation including sand dune stabilization
 - (ii) agriculture-food production in arid lands
 - (iii) rangeland management
 - (iv) forestry and agroforestry practices
 - (v) energy development in arid lands
- (c) Water development for arid and semi-arid lands;
 - (i) development of water resources - dams, boreholes, chimpacas, etc.
 - (ii) topography
 - (iii) geology
- (d) Monitoring and Mapping;
 - (i) climatology
 - (ii) agroclimatology
 - (iii) weather forecasting
 - (iv) EWS (Early Warning System)
 - (v) remote sensing
 - (vi) mapping

71. The organisational structure of the Forum may be depicted as in Fig. 1. The Chairmen of the various committees should meet at regular intervals as the Forum Steering Committee to receive reports from each committee.

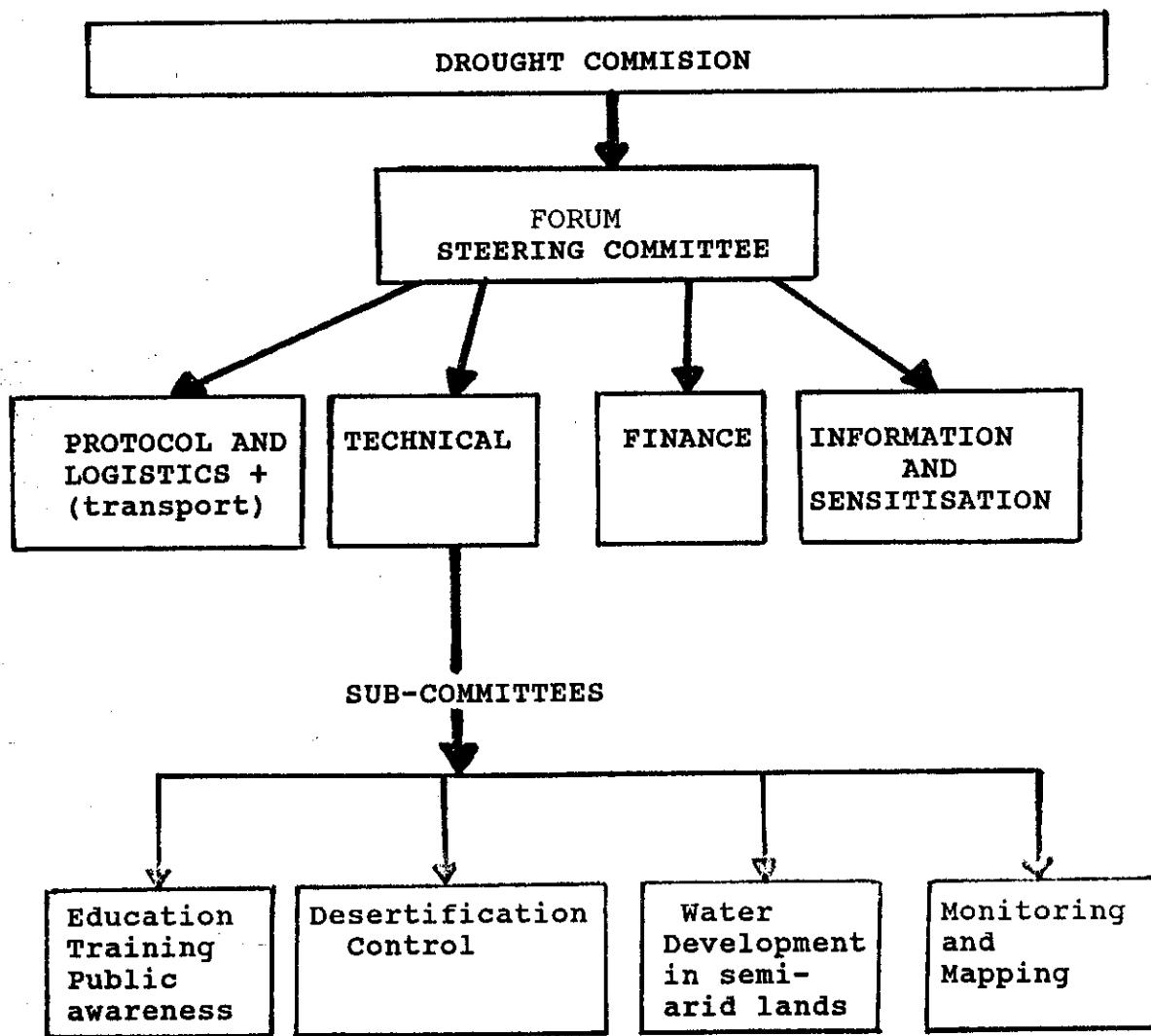


Fig. 1. Organisational structure of the Forum on Desertification Control and Management of Drought.

Format of the papers for presentation

72. Papers for presentation at the conference should be concise and informative (about 10 pages single spacing). They should follow the format shown below - where necessary:

- Summary (half a page);
- Introduction (brief);
- Methodology/materials or area surveyed - where necessary;
- Review of subject matter - under various sub-headings;
- Conclusions and/or recommendations;
- References (Literature citations).

73. Some important Dates for Preparation of Technical Materials

- (i) Conference date: October 1990 (Second half of October)
- (ii) Reproduction of all documents: September 15, 1990
- (iii) All papers to be with chairmen of the technical sub-committees: August 31, 1990
- (iv) Letters inviting individuals to prepare papers: June 22, 1990.

The services of a consultant

74. I propose that the Drought Commission should seek the services of a consultant for a period of three months. The terms of reference for the consultant would be;

- (a) to assist in writing and assembling documents for the National Forum
- (b) to assist in drawing up the programmes for the meetings as well as coordinating between the Drought Commission and the provincial committees
- (c) to review progress on preparations for the conferences in Lobito, including the facilities, accomodation, transport, etc.
- (d) to assist in the preparation of conference proceedings for publication.

LIST OF SELECTED PERSONS WITH WHOM REGIONAL ADVISER
HELD DISCUSSIONS

1. Mr. A. Essien, UNDP Res. Rep., Luanda, Angola
2. Mr. M. Ganda, Deputy Res. Rep., Luanda, Angola
3. Mr. Felix Neto, Chief, N.R.S.E. and Chairman of the Drought Commission
4. Ms. Bintou Beye, Industrial chemical Engineer, Member Drought Commission
5. Mr. Abel Fonseca, Hydrologist/Journalist, N.R.S.E.
6. Mr. George M. David, Hydrologist
7. CDA Domingos Jose, Provincial Commissioner, Namibe Province
8. Mr. Jose M. Costa, Director Technical Cabinet, Ministry of Fisheries
9. Mr. A. Baptista, Director of Provincial Planning, Namibe Province
10. CDA Joao Baptista Kusumwa, Deputy Provincial Commissioner, Haila Province, and his staff
11. CDA Manuel Fraueiseo, Deputy Provincial Commissioner, Benguela Province and members of the Local Drought Commission
12. CDA Jose M.M. Fernandes, Commissioner, Lobito Municipality
13. CDA Carlos Freitas, Director of Planning, Benguela Province