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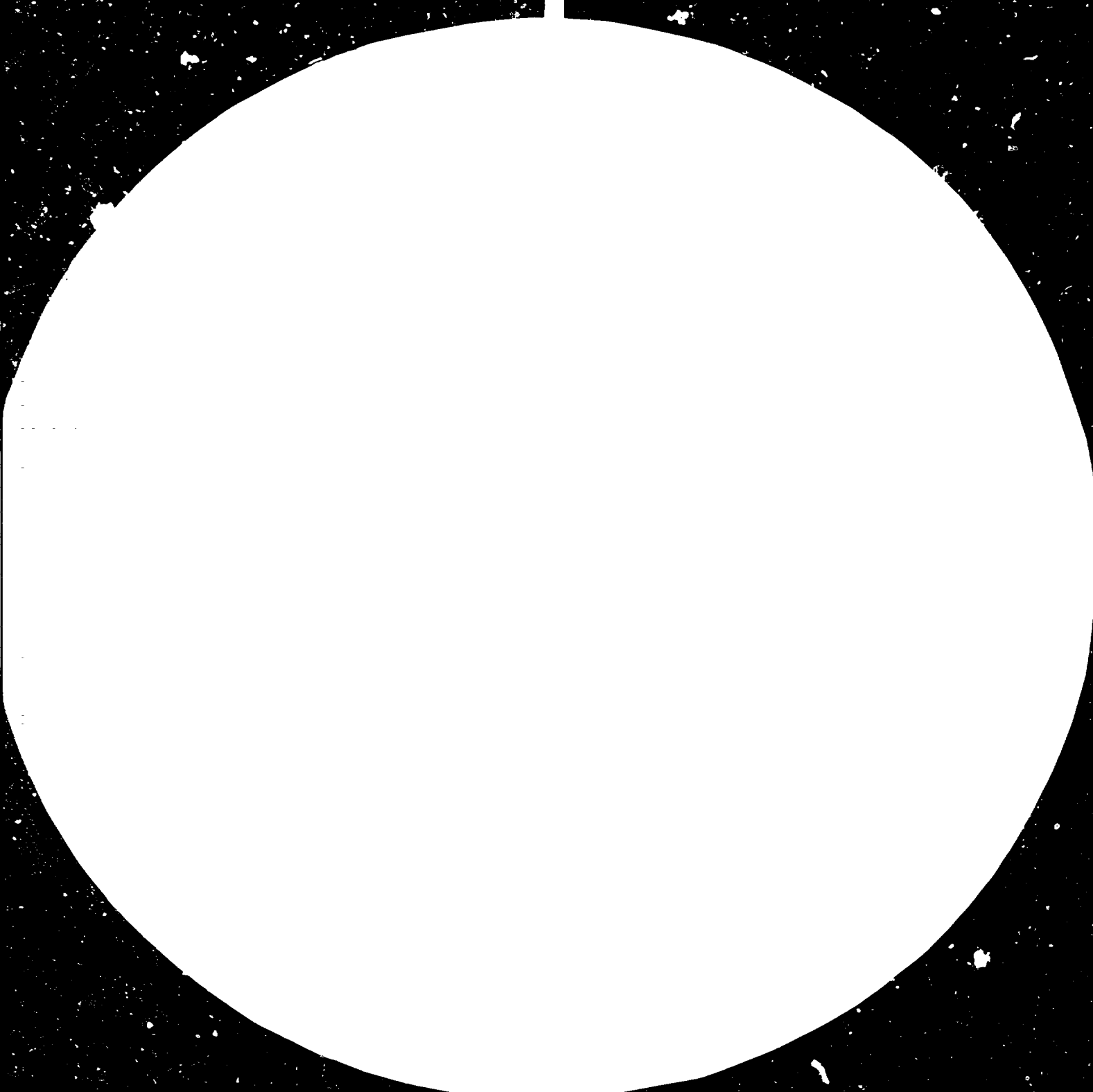
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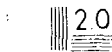
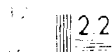
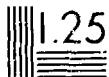
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SURVEY OF THE REQUIREMENTS AND CONSTRAINTS IN THE FIELDS
OF PACKAGING AND PACKING AND PROPOSALS FOR A NATIONAL POLICY
FOR THE CONSUMPTION AND PRODUCTION OF PACKAGING MATERIALS

SI/GBS/82/801

GUINEA-BISSAU

Technical Report: Preliminary survey of the most critical
and urgent needs of Guinea-Bissau in the fields of packaging
and packing, and of the national situation with regard to
the development of the packaging industry*

Prepared for the Government of Guinea-Bissau by
the United Nations Industrial Development Organization,
executing agency for the United Nations Development Programme

Based on the survey of (J. Belo), packaging expert
at UNIDO Headquarters

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United Nations Industrial Development Organization

Vienna

* This document has been translated from an unedited original.

S U M M A R Y

The purpose of project SI/GBS/82/801 is to set out a national policy for the consumption and production of packaging materials, to establish technical and economic criteria for choice of packaging materials appropriate for major national products, and to support the Government in taking decisions about local manufacture of certain specific types of packaging materials.

The present mission was conceived within the programme of the project in question, and took place from 12 to 25 March, 1982.

The mission's main recommendations are as follows:

- I. A plan for a small factory for the production of large and small glass bottles and jars, with glass tableware as a complementary product.
- II. A plan and the installation of a small unit for the production of moulded trays in pulped paper for eggs, using recycled paper and cardboard as raw material.
- III. A plan for the manufacture, on a small scale craft basis, of wooden cases for fruit and vegetables, using steel jigs, and a start made to regular production.
- IV. A plan to integrate the processes of extrusion, blown extrusion and thermoforming in the plastics processing factory.
- V. A plan for a small technical library on packaging and packing technology in Guinea-Bissau for consultation by those concerned.

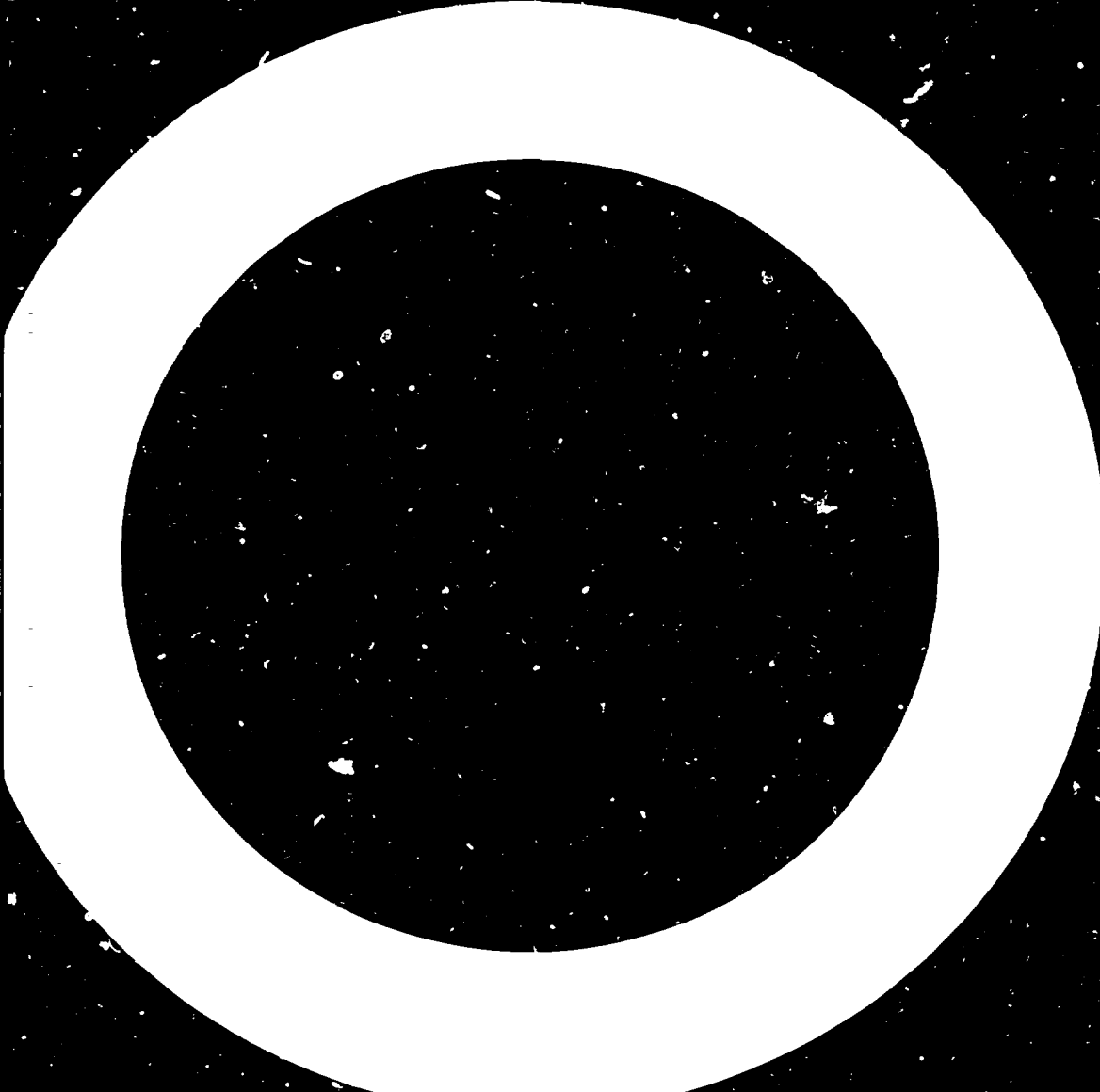
During his visit to Guinea-Bissau Mr. Belo was also to take part in the Interagency Mission for Emergency Multiple Assistance for the Bijagos Archipelago, at the special request of the UNDP Resident Representative in Bissau. Amongst the recommendations for eventual UNIDO assistance to the archipelago (Annex I) particular note may be taken of the relevance of surveys on the installation of a tannery, the semi-craft production of palm and coconut oil, as well as the

shelling of palm nuts, the incorporation of cashew nut treatment in the factory where cashew juice is already extracted, and mobile workshops for the repair of agricultural and fishing equipment.

Amongst the other observations outside the sphere of packaging, it is worth drawing attention to the very great importance of surveys relating to the energy resources of this country, which at present uses only thermo-electric energy derived from imported fuel; also on the production of chalk from the shell deposits found in the Bijagos archipelago; and the completion of the final construction stage of the Cumeré complex, and its start-up. This will be together with eventual reconversion of some of the processes, so as to get this agro-industrial complex into operation, bearing in mind that about 90% of a very large investment for the country has already been made, and that expensive equipment is deteriorating and depreciating, without use being made of it.

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1. INTRODUCTION

The Ministry of Economic Coordination and Planning of Guinea-Bissau sought, through the UNDP office in Bissau, technical assistance from UNIDO for a study of the problems of packaging in the country, because of its contribution to the development of the productive activities of agriculture, industry and fishing. According to this request, the survey should pay particular attention to the technical and economic comparison of packaging in tin-plate and glass, within the framework of the country's prevailing circumstances.

In view of the wide scope of the request, and the inadequacy of existing data on Guinea-Bissau, above all about its production methods and conditions, and the marketing and distribution systems for foodstuffs and main consumer goods, it was decided that, before any relevant study was specified, a general survey of the country would be taken in terms of the local manufacture and use of packaging materials, and of national conditions relevant to the development under study.

Mr. Belo, an expert in packaging and packing at UNIDO headquarters, was given the task of carrying out this survey. He was to draw up a programme for the mission, and prepare the present report within the general framework of his activities as an industrial development administrator in charge of the planning, support and control of the execution of technical assistance projects for the development of packaging industries.

The main conclusions and recommendations were passed to the Least Developed Countries Section of UNIDO immediately after the mission's return. The present report, as well as its purpose in giving an account of the mission, is intended for the consideration of the Government of Guinea-Bissau, so that it may take decisions about the courses of action to be followed on the basis of the project's preparatory mission.

2. SUMMARY OF ACTIVITIES AND OF DATA COLLECTED

Friday 12.3.1982

- 2.1 Arrival at Bissau and briefing at UNDP office. Meeting with Resident Representative Mr. Tchitov, who summarised the situation in Guinea-Bissau and its position as regards development. Documents giving information about the country were handed over, including the memorandum by Guinea-Bissau to the country consultation meeting of the United Nations Conference on the Least Developed Countries.
- 2.2 As for the position of UNIDO in the Country Programme, Mr. Tchitov stated that, although UNIDO is virtually unrepresented in the Programme, there is a reserve of funds which could allow for the consideration of two or three industrial development projects within the new programme cycle.

Saturday 13.3.1982

- 2.3 Meeting with Mr. Boubakar Touré, Director of International Cooperation at the Ministry of Economic Coordination and Planning; also present were Mr. Bernardino Cardoso and Mr. Mané, economists. Discussion related to the project in general and the local conditions in which it was to be carried out. The problem of the mission's transport as a result of the immobilisation of UNDP vehicles (there being no petrol in the town), was solved by the offer of transport in Government vehicles.

Sunday 14.3.1982

- 2.4 Study of the documents received on Guinea-Bissau, in order to collect as much basic information about the country as possible. Translation of the project document from English into Portuguese.

Monday 15.3.1982

- 2.5 Meeting with the Director-General of Industry, Mr. Afonseca, with the Dutch cooperator Mr. Ferf, and national officials Messrs. Daniel Sala, Dagri and Gabriel present.

The origin and definitive form of project SI/GBS/82/801 were discussed. Mr. Belo pointed out that his preliminary mission had as its primary object the precise definition of the technical assistance to be requested by the Government, consonant with the prevalent national conditions. The carrying out of project activities thereafter would be dependent on future approval of the Project Review Committee of UNIDO.

A copy of the project document in its original English version, together with the Portuguese translation, were handed over to Mr. Afonseca. He in his turn gave Mr. Belo a copy of a preliminary study on the problem of packaging in Guinea-Bissau, which had been made in 1979 by Mr. P.H. Lefèbre, an expert of the Belgian Institute of Packaging, on behalf of the Industrial Development Centre in Brussels.

Mr. Daniel Sala was made responsible for organising the visits recommended for Mr. Belo in the course of his mission, and was to accompany him on them.

- 2.6 During the afternoon a second briefing meeting was held in the UNDP office with Resident Representative Mr. Tchitov and the Deputy Resident Representative Mr. de Jonge. The mission programme, the facilities granted by the Government for its execution and staffing, and its relationship to other previous missions were discussed.

Tuesday 16.3.1982

- 2.7 Visits to CICER, an enterprise producing beer, fizzy soft drinks and table waters. Under present conditions, there is an annual loss of about 400,000 33-centilitre bottles. However, if the plant were working at full productive capacity, the theoretical requirement for replacement bottles would be more than 1,200,000 per year (supplementary data 5.1).

Wednesday 17.3.1982

- 2.8 Visit to SEMAPESCA, a Franco-Guinean fishing enterprise. Flat boxes of 2 kg are used for prawns and deep frozen fish fillets, and these are subsequently packed in 16 kg cartons. 12 kg cartons are used for deep-frozen sole, skinned and headless, and 25 kg cartons for whole deep frozen fish. Boxes and cartons are imported from France (supplementary data 5.2).
- 2.9 Meeting at the UNDP office with the Deputy Resident Representative Mr. de Jonge and the Canadian cooperator Mr. Françoise Noël, who will be the counterpart on the Interagency Mission for Emergency Multiple Assistance for the Bijagos Archipelago. This mission will leave for the archipelago on Sunday 21.3.1982. UNIDO has not yet replied to the request for its participation and Mr. de Jonge proposes that Mr. Belo be included in the mission. This request is strengthened by the argument that UNIDO gives very little assistance to Guinea-Bissau.
- 2.10 Visit to CIDOL, a fuel and lubricants depot which has its own plant for manufacturing 200-litre steel drums, utilising sheet metal and bases imported from Portugal. Production capacity is 350 drums per day, which can be delivered to the various users throughout the country.
- 2.11 Visit to SOCOTRAM, a woodworking enterprise primarily making furniture. Thought has already been given to making wooden packing cases for fruit and vegetables, using one workman, one band saw, one nail gun, and very few other tools. However, the standard models for this type of packaging, and rationalised systems for their production are unknown here. (Supplementary data 5.3).

Thursday 18.3.1982

2.12 Visit to the Agro-Industrial Complex of Cumeré, which occupies an area of almost 6 hectares, and was intended for the production of ground-nut oil and cotton, of husked rice, of cattle feed, and kitchen soap. The construction of the buildings and the installation of plant began in 1977 and ceased in 1979 after 90% of the total project had been completed, when doubts were raised about the availability of sufficient national sources of raw materials, and the surplus of processing capacity available on the different production lines. The halt in construction has left very expensive buildings and plant idle, which are steadily deteriorating, and will be ruined if they are not brought into use very soon. From an economic point of view, the loss of productivity during this stoppage is quite horrifying. The absence of any decisions about completion and bringing the complex into production, with or without possible appropriate modifications, or the reconversion of the process systems installed, is continuing to increase the losses. Dismantling and sale of the plant installed, as has already been suggested, would only allow an absolutely minimal fraction of the purchase costs to be recovered. (Supplementary data 5.4).

2.13 Visit to Estrela do Mar, a Soviet-Guinean fishery enterprise. 18 kg, 20 kg and 24 kg cartons are used for deep-frozen prawns which have previously been selected by size. For deep-frozen whole fish, 30 kg cartons are used. All these cartons are received by the Soviet side of the enterprise and are imported from Portugal or Spain. (Supplementary Information 5.5).

Friday 19.3.1982

2.14 Meeting with Messrs. Ferf. Mané and Gabriel, at which impressions received from visits and contacts made so far, were discussed. With regard to daily supply of fruit and vegetables to Bissau, Mr. Belo was informed that most of these products are grown in

orchards and market gardens in the suburbs of Bissau. From there produce is carried into the capital daily, on the heads of the women who come to sell it. Oranges, tomatoes, pineapples, bananas, etc. come from farther afield by lorry, often in bulk. Sacks and baskets are also used.

2.15 Meeting with the Director of the National Energy Institute, Mr. Anastacio Furtado. He confirmed that all the electrical energy used in Guinea-Bissau is of thermal origin, coming from diesel generators, for which all the fuel is imported. At present Bissau has available six groups of generators, with a total of 10,440 KVA and another, of 2,750 KVA, is being brought into service. In the interior (Bafatá, Catic, Farim, Bissora, Cacheu and Canchungo) a total of 6,975 KVA is being installed and a total of 1,000 KVA is planned for the near future on the islands of Bubaque and Boloma. As for hydro-electric power, UNDP has a project to survey for a dam on the river Corubale at Saltinho, which could provide a maximum output of about 10 MW, and as much as 25 MW if Guinea-Conakry would agree to the flooding of certain areas of its territory. All this energy is regarded as being for domestic use, and the possibilities of its use by industry are not envisaged, despite the economic value which local production of aluminium, based on national deposits of Bauxite, would have for the country. On 1 February 1982 a request was made for UNIDO to make a study of the country's resources of non-conventional energy materials, a survey, and the setting up of some pilot projects, the maintenance of the diesel power stations, and the training of technical personnel. (Supplementary data 5.6).

2.16 Meeting at the UNDP office, where Mr. Tchitov stated that the date proposed by UNIDO for the arrival of the consultants appointed to the Inter-Agency Mission would be later than the timetable fixed for the completion of this project. As a result, Mr. Belo agreed to form a part of the mission for its first two days (Sunday and Monday), these also being the days scheduled for visiting the islands where industrial development was to be considered, and to attend the briefing meeting for the same mission.

Saturday 20.3.1982

- 2.17 Visit to the MACA enterprise, a subsidiary of SOCOTRAM, which manufactures furniture, doors, and other articles for the building trade. Thought had already been given to the manufacture of wooden cases but raw materials are lacking (cheap soft-wood and nails) and there is no data available on the most appropriate types of case. (Supplementary data 5.6).
- 2.18 Visit to the CABEVI enterprise which has, on the one hand, a carpenter's and joiner's shop, and on the other a metal-working shop and plant for manufacturing nails of 3 to 12 centimetres length. Nail manufacture ceased almost a year ago because of lack of raw material, which is imported. (Supplementary data 5.7).
- 2.19 Meeting of members of the Inter-Agency Mission for Emergency Multiple Assistance to the Bijagos Archipelago, at the Directorate-General of Planning, with the attendance of Messrs. Vasco Cabral and Manuel dos Santos, respectively Ministers of Economic Coordination and Planning and of Transport; Mr. Boubakar Touré, Director of International Cooperation; Messrs. Dino and Diôgenes and other officials on the Government side; also Mr. Tchitov, Resident Representative of UNDP. The members of the mission present were Messrs. de Jonge (UNDP), Morilla (WHO), Kyazze (UNESCO), Koonai (WFP), Belo (UNIDO), and Messrs. Noel and Gadri from the Bolama Regional Development Department. Messrs. Ortola, Carpenter, Gaye and Robinson, who were already in Guinea-Bissau on another project, would, it was stated, represent FAO on the mission, which would be led by Mr. Harris, who was not yet present but would arrive during the afternoon.

Sunday 21.3.1982

- 2.20 Departure by air for Bolama Island as part of the inter-agency mission. After arrival, discussions were held with Mr. Ortola, head of the FAO mission, who has been working a long time in Guinea-Bissau, to consider the possibilities for development of agro-industries in the archipelago. The conditions for production of palm and coconut oil, for the shelling of palm nuts, and the processing of cashew nuts, the flesh of which is already used for producing juice, were discussed in particular.

- 2.21 Visit to the fishing port which faces the mainland and is only separated from it by 500 metres, although there is no regular means of communication between them. The importance of a motor ferry was discussed, capable of carrying heavy laden vehicles. The construction of fishing boats suitable for the conditions of small scale fishing and the availability of cold storage for the eventual surpluses of the daily fish catch were regarded as priority needs.
- 2.22 Visit to a group of buildings in the interior of the island which could be used for setting up small industries. Mention was made of the need for the production of leather shoes and sandals, which would be possible after a tannery had been installed, using mainly hides coming from the slaughter house in Bissau. At present all the footwear used in Guinea-Bissau is imported and, because of the price, plastic sandals are mostly worn. Presses for oil production might be sited in these buildings, and also craft industries might be concentrated here, including a very simple workshop for producing wrought iron goods.
- 2.23 Visit to the Titina factory, the only one in Guinea-Bissau producing fruit juices and preserves, using cashews, mangoes, marrows and oranges. 200,000 returnable 0.17-litre bottles were bought in 1979, and 100,000 and 80,000 metal cans of 0.16 l were bought in 1979 and 1980 respectively, for fruit juices. The bottles have already been used five times and about 150,000 are still usable. The metal cans, which cost about 10% more than the bottles, are mostly intended for export. For the packaging of preserves, 450 gram glass jars are used, of which 200,000 were bought in 1979 and 100,000 in 1980. The annual installed production capacity of the factory is 200,000 bottles of fruit juice and 150,000 jars of preserves, but raw materials available locally are thought to be sufficient for production of up to 1,000,000 bottles of fruit juice and 650,000 jars of preserves a year. (Supplementary data 5.8).

Monday 22.3.1982

- 2.24 Journey by boat to Galinhas Island, to see the manual construction of fishing boats. These boats, with raised bow and stern sections, are about 15 m long and are constructed of long planks of wood joined together, with no more than two in any one strake. Near the stern the boats have an internal well with sides sufficiently high to prevent entry of water, where the engine is installed. The seams of the planks are made watertight by the application of thick coatings of tar.
- 2.25 From Galinhas Island the journey continued in the same boat to Bubaque Island, where the local small scale fishing centre was visited. It appeared to have good commercial and administrative organization and be equipped with adequate cold storage.
- 2.26 Visit to the factory for producing palm oil and husking of palm nuts which was set up before 1929 by the German Krupp enterprise. The factory has an old steam engine, with a boiler in which, amongst other materials, a large part of the factory's waste products may be burned, and a much more modern diesel engine. Motive power to the different working parts is conveyed by axles, pulleys and belts, as it is also to the factory's electric generator and some machine tools for the possible production of spare parts. The factory's output was 160 200-litre barrels in 1980 and 48 in 1981, but 500 barrels in a season has been achieved in the past. The main problem currently concerns the supply of raw materials, which is assured neither as regards regularity nor in a manner to allow full utilisation of the factory's capacity.

Tuesday 23.3.1982

- 2.27 Return to Bissau by air, accompanied by the Minister of Transport, who also returned to the capital after this first part of the inter-agency mission.

2.28 Meeting at the Directorate-General of Natural Resources with Mr. Antonio Cardoso, Director of Mines and Geology, and a group of four geologists, a geophysicist and a chemist from neighbouring countries.

The existence of sand that in principle could be used for glass production in the Varela and Pecixe regions, was confirmed. But the properties of the sand, as regards its use for glassmaking, have not yet been studied in specialised technical laboratories.

The survey of national resources and conditions for producing sodium carbonate, a second important raw material for the glass industry, and the relative advantages of using feldspar or hydrated aluminium, for which there is bauxite available in the country, could be undertaken in cooperation with this directorate-general. The most difficult problem is posed by limitations of available energy.

As regards chalk, the third important raw material for glass in terms of volume, a report already exists that was produced by a Soviet group, prospecting for raw materials in the construction industry. Deposits of about 150,000 tonnes have already been identified in the Bijagos Archipelago.

Most of the raw materials referred to above, which make up 99% of those needed for glass manufacture, would appear not to require importation. Everything depends, however, on what progress can be made in the energy field.

Wednesday 24.3.1982

2.29 Visit to the plastics factory, which is shut down for lack of raw materials.

The factory is equipped with a very complete range of KUAZY (GDR) injection moulding machines, made in 1978. It also has auxiliary equipment such as grinders, mixers, and drying ovens, and all plant

is well sited in a large and suitable modern building.

The mechanical workshop is also adequately equipped, and the factory as a whole is ready for regular production as soon as the problem of raw materials imports is resolved.

It was stated that Guinea-Bissau also has a polyurethane foam factory for the production of mattresses, which is quite independent of this factory, and is situated elsewhere in the same town of Bissau.

However there is no plastics factory equipped for extrusion, blown extrusion or thermoforming, which means that no packaging materials other than rigid containers such as boxes, crates, tubs and racking, can be produced. The injection process also requires the availability of extremely heavy and accurately tooled moulds, which are very costly to produce, and which have to be imported each time a new product is to be made.

- 2.30 Visit to SUINAVE, a national enterprise for rearing pigs and poultry, the principal products being eggs, chicken and pig meat.

Shaped pulp paper trays are used for eggs, 5 x 6 per tray in reusable container type cases. Anticipated production is 2.9 million eggs in 1982 and 5.5 million in 1984. There is also an output of 10,000 chicks per week, expected to rise to 20,000 in 1986.

All pulp paper egg trays are imported, as are the special plastic trays for the fertile eggs. Containers for the transport of chicks are also needed.

The consumption of concentrate feeds for pigs is 1,000/2,000 tonnes, forecast to rise to 5,000 tonnes in 1985, which represents a requirement for about 60,000 multiple (three) ply paper sacks per year.

The chicken meat is distributed in 70 kg capacity moulded plastic trays. (Supplementary Data 5.9).

- 2.31 Visit to the People's Stores, which is the largest distribution network for foodstuffs, everyday consumer goods and clothing in the country. The sale of foodstuffs is wholesale to the Socomin and Galeria Amura supermarkets, which sell retail. These stores and supermarkets are state-owned.

The goods enter and leave the People's Stores in the same packaging as when received. Imports, which form the largest part of the merchanted goods, are received in export packaging, inside which they are unit packed ready for sale.

National products, such as palm oil and local brandy, are received in 200-litre drums, and are mostly destined for export. Retail sale within the country is made in the customer's own bottles into which the required quantity is poured. For fruit and fresh vegetables, and also for eggs, purchasers also bring bags or buy plastic bags at the same time.

Attempts have been made to sell palm oil for the local market in glass bottles, prepacked at the stores. However this had to be abandoned because of the permanent shortage of bottles.

Textiles, ready-made clothing and builders' materials such as paint, which are also merchanted by the People's Stores, are usually stored on shelves. Pallets received from abroad are also used and amongst these models from the European pallet pool can be seen, but there is no national manufacture.

- 2.32 Visit to the Bufo milk factory, which reconstitutes milk from powder and butter oil imported from Europe.

After reconstitution, the milk is irradiated and packed in 1-litre bags. These bags are in an opaque plastic laminate, white on the outside and black on the inside, and are made on an automatic form fill and seal line.

The packaging material is received from Europe, pre-printed in blue and red, on reels which are fed directly into the filling line.

The full bags are distributed in plastic containers of 10-litres capacity, which have a system of loop handles which, when folded, form the base for the container above.

There are also plans for the production of sterilised milk, for which a study has already been made, for which packing in plastic bottles has been recommended, and subsequent sterilisation by autoclave at 120°C for 25 minutes.

- 2.33 Debriefing meeting at the UNDP office, where the UNIDO recommendations concerning the Inter-Agency Mission for Multiple Emergency Assistance to the Bijagos Archipelago (Annex 1) were handed over to the Resident Representative, Mr. Tchitov, for forwarding to Mr. Harris, leader of that mission, after his return at the end of the mission, together with a rough draft of the conclusions and recommendations for decision by the Government, regarding the direction that the subsequent activities of the project might take.

3. MAJOR NATIONAL FACTORS IDENTIFIED

- 3.1 The present principal products of Guinea-Bissau are from agriculture and fishing, and have a total value of about twice that of industrial production.
- 3.2 The limitations of transport and the transport network make it difficult to bring agricultural goods into the processing and distribution centres. This results in consumption being mainly local, and agro-industrial development, which should be an object of particular concern in the country's present situation, is still hardly developed.
- 3.3 The absence of manufacture of any packaging materials in the country, with the sole exception of the 200-litre metal drums, makes transport and distribution even more difficult and is also a problem for the export trade. In effect the value added by packaging does not remain in the country, and the uncertainty of importing the necessary packaging, on account of the shortage of convertible currency and the country's foreign debt, allows for no programming of exports unless the foreign importer provides the empty packaging.
- 3.4 The market survey which should precede the planning of any industry, and also any pre-feasibility study in Guinea-Bissau, should take account of the import restrictions imposed by the extremely slender resources of foreign exchange. In some cases the indispensable nature of certain products, such as packaging materials, could justify net production costs higher than the cost of importing them. Furthermore, the prices fixed by the National Committee responsible within the Government, do not correspond exactly to the prices that would arise from a free system of supply and demand. This will make it necessary in the future to consider more widely fluctuating prices, and especially comparison with those abroad.

- 3.5 The national raw materials to be used should be researched in efficient laboratories abroad, so as to confirm the feasibility of the production envisaged and the choice of appropriate technology.
- 3.6 In a number of cases, the staff and workmen responsible for the running and operating of a factory to be installed in the future should be very carefully trained, the lack of experience of the majority of the personnel available being particularly borne in mind. It would be very advantageous if long periods of assistance could be given locally by foreign technicians.
- 3.7 The maintenance of equipment to be handed over also requires to be planned carefully, in terms of spare parts, repair workshops, and competent technicians.
- 3.8 The energy requirements will represent another factor of the highest importance, in view of the fact that at present almost all energy is imported. The survey and utilisation of as many energy resources as possible is a basic condition for development of the country, as important as the setting up of a transport network and facilities that can provide for the movement of goods over the whole area of the country.
- 3.9 Preference should be given to industries which depend as little as possible on imported raw materials, so that their functioning will not have to rely on the current availability of foreign exchange whenever new supplies have to be ordered. The size of the selected industries should be limited to the requirements of the market and the availability of raw materials, and the processes of semi-craft manufacture could present advantages in cases where the net production costs are not as a result unduly higher.
- 3.10 Guinea-Bissau is still predominantly in a traditional agriculture stage. Mineral resources such as oil, bauxite, etc. are currently being surveyed. The economic situation requires exports in order to cover the cost of indispensable imports. But the export of raw materials without any value added, which benefits the importing countries far more than Guinea-Bissau, should be avoided as far as possible.

- 3.11 Since the industrial development of the country is absolutely essential, but the conditions for this are difficult, a programme of progress by stages is necessary. Rendering its development complementary with that of its neighbours could still make a very positive contribution to future commercial exchanges. But the export of raw materials alone, and the import of processed goods, will keep the country in an even more unbalanced economic situation, as the other countries progressively industrialise.
- 3.12 Bearing in mind the great difficulties of this least developed country with regard to payments abroad, technical assistance projects for industrial development should be planned so as to provide for as small an element as possible of national counterpart investment. Consequently grant aid should be sought, preferably from countries with diplomatic representation in Guinea-Bissau.

4. CONCLUSIONS AND RECOMMENDATIONS

- 4.1 In the field of transport packaging, the minimum requirements are for textile sacks in natural fibres or plastics, paper sacks of several plies, and wooden and corrugated cardboard boxes.
- 4.2 In the field of unit sales packs, absolutely indispensable for protection and distribution, mainly of foodstuffs, the minimum requirements are for small and medium sized paper bags, small and medium plastic bags, large and small bottles, glass jars and cardboard boxes.
- 4.3 Amongst other requirements, the production of which would produce additional economic advantages, ensure more regular availability in the country, and serve to introduce the development of certain important industries in the near future, mention should be made of pulp paper egg trays, rigid plastic bottles for oil, milk, etc., and thermoformed plastic cartons for yoghurt and similar products.
- 4.4 As for the relative advantages of using glass versus metal cans for products capable of using both these types of packing, present conditions favour glass. In fact the price of glass packs is for the same volume of contents, slightly lower, and comes lower still by virtue of the possibilities for re-use and recycling. Furthermore re-use and eventual recycling being possible if there is local glass production, offers the further advantage of a reduction in environmental pollution. Only for products destined for export to markets where glass receptacles offer no marketing advantage should easily opened imported metal cans continue to be used.

- 4.5 Local manufacture of metal cans would require the setting up of an industry totally dependent on imported raw materials - tinsplate and the interior protective lacquer - and to make this profitable would normally require a production of more than 30 million a year, which would far exceed the foreseeable consumption in the country in the next few years.
- 4.6 Local production of glass would make use of national raw materials and would provide for a progressive development in terms of industrial process. A start could be made with a plant for small scale automatic production of the most necessary bottles, in parallel with the part hand-made production of a number of articles of glass tableware, much needed in the country: present prices are very high owing to the problems with imports.
- 4.7 The shortage of energy poses the most difficult problem at present. But there is a need to press on with surveying the country's needs and resources of energy, and at the same time with finding solutions rather than the resignation and inertia which seem to have dogged development of the country in the past.
- 4.8 According to the information collected, only between a third and a half of each tree cut down for building or furniture is actually used. The other half or two thirds remains in the forest, because of transport problems, and the lack of any use for it. The production of charcoal, partly by hand as done in many countries before other forms of energy became available, would allow a valuable use of the waste product, and its subsequent transport in a very much lighter form to the place of consumption.
- 4.9 The production of shaped trays in paper pulp could make use as raw material of recycled paper and cardboard collected from urban waste. This practice would assist later with semi-craft production of recycled paper and cardboard, and would provide a minimal base for an eventual interest in the production of paper pulp, using straw or other suitable waste products from agriculture.

4.10 On the basis of the foregoing considerations, the recommendations are as follows:

- I.1 - Survey of existing raw materials in the country for the production of glass containers.
- I.2 - Planning a model of a factory for the production of glass containers and eventually glass tableware in Guinea-Bissau, taking account of anticipated consumption, the minimal investment envisaged, and energy constraints. This model should consider the foreseeable evolution of the country's energy resources, with possible medium-term prospects.
 - Survey of the most favourable options for siting this factory, allowing for the location of raw materials, access to sources of energy, and communications with consumer markets.
- I.3 - Planning a programme, on a trial basis, for setting up this factory, and training the personnel needed to operate it.
- I.4 - Study of the conditions for profitability of this factory, taking account of the relevant factors in the present climate of Guinea-Bissau, and its foreseeable development in the short and medium term.
- II - Planning a model factory for the semi-craft production of shaped trays for egg packing, using paper and cardboard collected from urban refuse, together with its supply systems and general operation.
- III - Design of prototypes for standardised wooden cases for the transport of fruit and vegetables, and also of steel jigs and simple tools for semi-craft manufacture in a local furniture-making factory.

- IV - Planning and discussion of the minimum equipment necessary for the production of plastic film, plastic bottles, thermoformed cartons, plastic bags, and plastic piping in the plastics processing factory that already exists in Guinea-Bissau.

- V - Drawing up a list of technical books on packaging and packing, to be donated to a technical school or other national institution which would encourage their use by the people concerned in this technology.

Note: Other recommendations beyond the basically technical scope of this mission are referred to in the summary at the beginning of this report.

5. SUPPLEMENTARY DATA COLLECTED

- 5.1 CICER is a mixed economy company, with 120,000,000 Guinean pesos capital, 38% Portuguese ownership, and 62% in Guinea-Bissau hands.

There is an annual production . 15 million litres of beer, 5 million litres of fizzy soft drinks, principally orangeade, cola and lemonade, and also 1 million litres of fizzy table water.

For the home market, glass bottles of 0.33 litres capacity are used, and for export metal cans of 0.34 litres capacity. In 1974, 3 million bottles were bought, of which 1.5 million remain having been used about 25 times.

Returned bottles are washed automatically with hot water, on a continuously moving belt, and are then filled at 6°C and sterilised at 60°C.

At present there are many breakages during filling. Mr. Belo explained that this happens normally when bottles with scratches on the outside resulting from re-use are then subjected to sudden internal cooling when filled. This leads to a contraction of the inside layers and a consequent stress in relation to the outside layers of the wall of the glass container. The scratches set off the breaking effect of this contraction, to which glass is much less resistant than compression. A longer cooling period for the bottles between washing and refilling would reduce the thermal shock and save many more bottles.

- 5.2 SEMAPESCA is a mixed Franco-Guinean enterprise, the productive activity of which is fishing.

Normally about 30% of the fresh produce is sent in plastic trays of 75 kg and 25 kg for local consumption and the remaining 70% is deep-frozen - part with and part without preliminary processing.

Sole, for instance, are often deep-frozen without skin or head, or already filleted.

Prawns are packed in cartons of 2 kg capacity, and these are then packed in 16 kg boxes of treated corrugated cardboard.

There is no standardisation of packaging between this enterprise and the rival Estrela do Mar, which also uses 2 kg cartons for prawns, but of different dimensions.

Another example of this lack of standardisation is in the boxes of treated corrugated cardboard, which are of 25 kg contents at SEMAPESCA and 30 kg at Estrela do Mar.

Cartons and boxes are imported from France from CETEC. The most difficult problem in this respect is lack of foreign exchange, as the Guinean peso is not convertible.

The fish produce arrives by boat at -18°C . Deep-freezing is at -45°C and final storage at -25°C . 26 kg of fresh fish is frozen to provide 25 kg for sale.

The shelled prawns, after freezing, are dipped quickly into cold water to form a coating of ice, which protects the product and compensates in part for the loss of weight. Fillets are individually wrapped in plastic film to separate them when frozen.

SEMAPESCA exports about 30 tonnes a month. There is as yet no distribution network for fish in the interior of the country, which limits the domestic market.

- 5.3 SOCOTRAM is an enterprise converting wood for the building trade and furniture industry.

It was stated that at present no-one is manufacturing packaging for fruit and vegetables in Guinea-Bissau. Cases coming in from abroad with some other contents are all that is used.

Now a timber mill is being set up in Buba, for the production of thin planks. The poorer quality production will be used to make plywood for the home market.

SOCOTRAM uses 15,000 m³ of wood per year.

- 5.4 The agro-industrial complex of Cumeré has an installed annual production capacity of 70,000 tonnes of husked ground-nut fruit (peanuts), of husked rice corresponding to 48,000 tonnes before husking, 1,000 - 3,000 tonnes of soap (1 to 3 shifts), up to 6,000 tonnes of cattle feed, and 20,000 tonnes of untreated oil including 5,000 of refined oil.

73% of the capital of the complex belongs to Guinea-Bissau and the remaining 27% to the Islamic Society. Another 6 million dollars are available to complete the investment.

Plant manufactured 4 years ago and delivered on time has not yet been installed because of the shortage of cement and steelwork to complete the buildings.

The delay has led to difficulties with the European company which supplied the equipment, and should have provided technical assistance for the first 2½ years of operation.

- 5.5 The fishing enterprise Estrela do Mar has 14 boats of Russian construction which, together with their fishing gear, are refitted every six months in Dakar or Las Palmas, and every two years in Russia for major repairs.

The boats take on their packaging supplies in the port of Bissau, from whence they sail regularly for 15 day fishing trips. Fuelling is at sea by Soviet ships as is the freezing of the fish, and the transfer of 90% of the catch for export.

The catch of prawns is between 800 and 1,000 tonnes a year. Biostop, a product from Spain, is used for preserving the prawns.

At the end of April 1982, the processing factory for the preparation of fish fillets, skinned and headless fish, etc. will be completed. Crab bodies will also be prepared, the claws are already exported. The factory has a capacity of 8,000 tonnes of cold storage.

- 5.6 The nails used by the MECA enterprise are imported, since production by the Guinean manufacturer CABEVI ceased more than two years ago.

The quality of the wood used is too good for making wooden packing cases. It also appears generally to be too hard. The supply of wood received from SOCOTRAM is irregular, and second class wood, suitable for packaging, is not supplied. Furthermore, the price of the wood is fixed by the Government, so it is not known what economies would be effected by using kinds other than those supplied at present.

As softer woods that might be suitable for manufacture of packaging, Pan Leite, Wild Guava and Cabopa have been suggested.

The present price of wood 2.5 cm thick is 146.5 Guinean pesos per square metre. A workman costs 40 Guinean pesos per hour.

In a previous meeting elsewhere, it was stated that the minimum wage in Guinea-Bissau was 3,000 pesos per month, but in the case of casual labour in the building industry, only 1,800 pesos was paid.

- 5.7 In the CABEVI enterprise, nails can be manufactured as soon as there is availability of suitable iron wire, which has to be imported. There are also problems due to a shortage of parts for the machines, but they are still working without serious problem.

The problem of lack of parts affects almost all the plant in Guinea-Bissau. On the one hand it is very difficult to get an import permit, and on the other there is no precision machinery workshop where the parts required can be made.

5.8 The TITINA factory has been operating since 1979 and its annual processing capacity was about 60 tonnes of cashews, 35 tonnes of mangoes, 25 tonnes of marrows and 55 tonnes of oranges. Normally there are cashews during the months of March, April and May; mangoes at the end of May, June and July; marrows in November and December; and oranges in December, January and February.

A fault in the steam boiler caused a production stoppage for half a year during 1980. Consequently, nothing was done that year with regard to mangoes, marrows and oranges.

Only the fruit juice is sterilised. The preserves, after treatment with citric acid, remain with a pH between 3.3 and 3.5.

At TITINA, besides the equipment for filling and sealing glass bottles and metal cans, there is also an automatic machine for packing fruit juice in preformed flexible bags. But the experience of 1977/78 was unfavourable, as the juice deteriorated before consumption.

The objective for 1982 is 180,000 bottles of fruit juice and 150,000 jars of preserves. The productive capacity of the equipment installed is 200,000 of fruit juice and 150,000 of preserves.

The raw material present in the region formed by the archipelago and the nearest part of the mainland would permit an annual production of 1,000,000 bottles of fruit juice and 650,000 jars of preserves, according to relevant surveys already made.

5.9 In 1984 SUINAVE will create a factory for the production of fish meal in Bubaque, in liaison with the centre for small scale fishing. This factory is now being planned by SIDA (Sweden). There is no call to seek investment from any other source.

Sufficient production of maize is assured to meet the needs of the enterprise.

In about 1940 there was already a fish meal factory of German origin, which was shut down during the war.

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Suggestions for projects, the execution of which could be put forward for consideration by UNIDO:

1. The planning and supply of equipment, either manual or power driven but mechanically as simple as possible, for the small scale production of palm oil and copra, and also for the husking of "tabancas" palm nuts. About 20 sets would be a reasonable number.
2. The planning and installation of a plant for treatment of cashew nuts, which could be sited alongside the TITINA factory where cashew juice is already extracted. Capacity could be up to 30/40 tonnes per year.
3. The planning and installation of a tannery with a capacity of between 7,000 and 10,000 hides per year, or 20,000 as a maximum. It could take on the 5,000 hides per year coming from the slaughterhouse at Bissau and at present exported to Portugal for treatment. Siting the tannery at Bijagós would avoid water pollution problems in the Bissau area.
4. The planning and supply of mobile workshops for the repair of agricultural and fishing equipment, and in particular small fishing boat engines. (Three units in vehicles, one in a boat).
5. Design and construction of a motor raft, for the transport of people, goods, light vehicles and lorries between Bolama Island and the mainland, a distance of about 500 metres.
6. Construction of wooden boats with outboard motors for small scale fishing, having regard to the Senegalese models and also the model hand built on Galinhas Island.

7. Cooperation with FAO and UNESCO in the repair or replacement of the generator and two cold storage rooms of the Bolama school, for short-term storage of surplus fish from the fishermen's association of the island.

These notes are intended for the consideration of Mr. Harris, Head of the Mission.

Bissau, 25.3.1982.

