

## **EXPERIENCE IN AGRO-INDUSTRIES AND VEGETABLE OILS, FATS AND ALKYD RESINS**

### **1. AREAS OF EXPERTISE**

The Manderstam Group has carried out numerous consultancy assignments in over 85 countries throughout the world. More specifically related to the Oilseeds Production and Processing Sector, the following areas are covered by our Company:

#### **A) Agriculture**

Assessment of the potential availability of a number of food and industrial crops on a regional and national basis including oilcrops and seed cotton.

Analysis of crop cost/price structure; agricultural economics;

Handling and storage of agricultural produce;

Institutional aspects.

#### **B) Agro-Industries**

A wide range of food, feed and industrial products are within the scope of competence of the Company, amongst others:-

- Vegetable oils and fats;
- Production of alkyd resins
- Oilcakes and extraction meals;
- Edible soya protein products;
- Compounded feedstuffs;
- Fatty acids, fatty alcohols, glycerine;
- Soap and synthetic detergents.

In addition, consultancy work has been carried out on the production of canned fruit, bread, biscuits, starch, glucose, confectionery, wood products, pulp and paper and textiles.

### **C) Miscellaneous Industries**

Feasibility and project studies have been carried out and engineering and project management services provided in the following fields:-

- Fertilisers;
- Paints and dyestuffs
- Pesticides;
- Hydrocarbon processing;
- Petrochemicals;
- Plastic products, including packaging;
- Heavy chemicals.

### **D) Pollution Control - Environmental Studies**

The Manderstam Group has undertaken several technological, ecological and economic studies on gaseous and liquid effluents and solid wastes for large projects.

### **E) Energy**

Activities embrace, inter alia, fuel economy and heat recovery, optimisation of fuel utilisation, both for power generation and steam raising for industrial purposes.

## **2. SERVICES PROVIDED**

**The Manderstam Group provides a comprehensive range of consultancy services, from the project inception stage and feasibility studies to project engineering and co-ordination of the implementation.**

### **A) Market Studies**

- Evaluation of past trends;
- Analysis of price structure, marketing and distribution systems;
- Product substitution factor;
- Competition from imported items, consumer's preference; Packaging aspects (cost, attractiveness, etc); Transport systems and costs;
- Medium and long—term home demand forecasts;
- Export potential (countries of destination, handling at harbour, internal and sea freight costing, pricing of products).

## **B) Sectoral Studies**

Several industrial sub-sectors have been surveyed in the past on a national basis and recommendation put forward for their development or rehabilitation, including:

- Edible oils, fats and their derivatives;
- Various food products;
- Feedstuffs;
- Cotton ginning;
- Natural gas, petroleum products;
- Petrochemicals and downstream products;
- Iron and steel products;
- Pulp and paper;
- Fertilisers;
- Pesticides.

## **C) Techno-Economic Studies**

These cover most of the industries mentioned above and incorporate the following aspects:

- Evaluation of resources (physical and human);
- Choice of technology and manufacturing processes;
- Assessment of input requirements and operating costs;
- Site selection;
- Assessment of capital costs;
- Financial analysis of the project;
- Economic analysis of the project;
- Sensitivity and risk analysis;
- Projected revenue and expenditure statements, balance sheets.

## **D) Project Engineering - Co-ordination of Implementation**

Preparation of specifications and tender documents (mechanical, civil and structural, electrical, instrumentation).

Detailed comparative evaluation of offers.

Pre-contract negotiations.

Advice on the selection of the most suitable bidder.

Assistance to the client in contract finalisation.  
Supervision/co-ordination of contractor's design and fabrication of equipment - inspection and testing of equipment at manufacturers' works.

Co-ordination of plant construction, start-up and commissioning.

Training of key personnel.

Advice on marketing.

### **3. OVERSEAS EXPERIENCE**

Over the past fifty years, consultancy assignments have been carried out by the company in the various sectors mentioned above.

Apart from consultancy work carried out for government institutions and private concerns, the Company has undertaken assignments on behalf of international and regional agencies including:-

- United National Industrial Development Organisation;
- Asian Development Bank;
- Commonwealth Secretariat;
- Kuwait Fund for Arab Economic Development;
- International Bank for Reconstruction and Development;
- Overseas Development Administration;
- European Economic Commission.

### **4. SOME ASSIGNMENTS CARRIED OUT BY OUR COMPANY IN THE FIELD OF VEGETABLE OIL AND FATS**

The Manderstam Group has been involved in this field since its formation and a considerable wealth of experience has been accumulated. Some recent assignments are briefly described below:

#### **UNIDO**

In co-operation with the UNIDO Secretariat in Vienna, we have prepared a manual 'Guidelines for the Establishment and Operation of Vegetable Oil Factories', specifically devised for developing countries - United Nations Publication No ID/196, November 1977, Sales No E77.II.B.I. The manual covers the major oil-bearing materials and all aspects of production, investment, organisation and management and incorporates case studies.

## **Algeria**

A preliminary study was carried out for the Government of Algeria on behalf of UNIDO, on the existing state of the vegetable oil industry in Algeria. This covered the agricultural and marketing aspects of oil production and the processing of oils and fats into a range of derivatives such as margarine, fatty acids, but the alkyd resins and soaps, glycerol. This led to a study of the feasibility of establishing two new large solvent extraction and soap complexes. Specifications and tender documents were prepared for process units, offsites, and for harbour installations for seed and meal handling and conveying. Contractors' bids were assessed and recommendations made. This was followed by detailed technical discussions, in conjunction with the client, during contractual negotiations.

## **Ethiopia**

- (i) The Manderstam Group were consultants to the Ethiopian Food Corporation on a multi-oilcake solvent extraction and refining complex. Our duties included the evaluation of tenders, recommendation of contractors and assistance in the preparation of contract documents for the supply, erection and commissioning of the processing facilities.
- (ii) Comprehensive techno-economic study, sponsored by SIDA, was carried out for the same client on the large scale processing of soyabean, primarily for the manufacture of edible soya protein products (soya flour for the enrichment of bread and biscuits, textured products, meat analogue) and edible oil. The study covered agronomic aspects, detailed market investigations with long-term projections which took into account nutritional targets, meat supply/prices, distribution systems, and a full financial and economic analysis.
- (iii) We carried out a detailed study on the rehabilitation and expansion of an oil mill and soap making complex, surveying simultaneously the oil milling sub-sector in the country and making recommendations for its short and long term development.

## **Equatorial Guinea**

A study was undertaken on behalf of UNIDO for the government of Equatorial Guinea which dealt with the rehabilitation of palm oil mills in the Rio Muni Province. In this feasibility study, one out of several non-operational mills was selected as a model for rehabilitation, together with its associated plantation. The study covered the economics of plantation rehabilitation, the replacement and repair of mill equipment, mill expansion, and a phased rehabilitation programme for the palm oil industry. The soap making and alkyd resins sectors were also covered.

## **Mali**

On behalf of the Kuwait Fund for Arab Economic Development, we have acted as consultants to a state-owned company in Mali for the rehabilitation and renovation of a vegetable oil and soap complex. Our work included a feasibility and project study as well as an analysis of the past and present performance of the operations. The report recommended the rehabilitation and expansion of the facilities and supported this with financial and sensitivity analyses for various options. The present and probable future availability of oilseeds (cottonseed and groundnut) was examined.

## **Pakistan**

A preliminary survey was undertaken on behalf of the Asian Development Bank which appraised the medium-term potential of the agricultural and processing sub-sectors relating to vegetable oils and fats, taking into account the targets set by the Fifth Five Year Plan. The survey covered the primary production of oilseed crops as well as a number of other crops used for rotation or inter-cropping. Other important aspects dealt with were co-operatives, marketing, distribution and storage systems, credits, research and extension services.

In the industrial sector, the cotton ginning and vegetable oils and fats industries were examined, and recommendations put forward for their modernisation and expansion. Alternative investment schemes were put forward and the likely benefits to the country were assessed.

## **Sri Lanka**

- (i) In co-operation with the Asian Development Bank, we carried out a national study for the Ceylon Oils and Fats Corporation on copra, poonac and other raw materials. Apart from assessing the availability of such raw materials, we examined both home and export markets and also the advisability of downstream processing. This involved a feasibility study for the rehabilitation and development of an existing coconut oil and derivatives factory in Sri Lanka.
- (ii) More recently, we provided the services of a senior member of our company to a joint ADD/FAQ multidisciplinary team to investigate in detail the export prospects of all coconut products and coconut oil derivatives.

## **Sudan**

We acted as consultants to El Sheikh Oil Mills in Port Sudan for the expansion and modernisation of an oilmill for the production of groundnut, cottonseed and sesame oils by solvent extraction. Our services included the preparation of specifications, bid documents, bid evaluation and contract negotiations, and the witnessing of guarantee performance tests.

## **Yemen**

- (i) We carried out recently a comprehensive techno-economic study including home and international market aspects, for the modernisation of the vegetable oil, soap and ghee substitute sector in Aden. Detailed financial and economic analyses were prepared, with recommendations on short and long term policy measures.
- (ii) A techno-economic study of the rehabilitation of a soap factory in Aden and the setting-up of a new synthetic detergent manufacturing unit has recently been carried out and the Government is in the process of inviting contractor bids.

## **Turkey**

Preparation of engineering specifications, contract negotiations, co-ordination of erection and start-up of a vegetable oil complex, including solvent extraction, refining, hydrogenation, shortening and soap plants. Oils produced were derived from cotton seed, sunflower seed and tobacco seed.

## **Thailand**

Comprehensive study of the long-term development potential of export-oriented industries based on the country's resources. The study covered major agro-industries, including the production of vegetable oils by solvent extraction. Oil-bearing materials included rice bran, cottonseed, groundnut and soyabean and the production of alkyd resins.

## **Greece**

Project study for the establishment of a cotton seed oil and margarine plant.

## **Uganda**

- (i) The rehabilitation of vegetable oil production facilities as part of a national survey of the agro-industrial sector (UNIDO study).
- (ii) studies were carried out, funded by the IDA, for the rehabilitation of cotton ginning plants with cotton seed recovery, treatment, storage and handling:-
  - South Bukedi
  - Namasale
  - Palanga
  - Parariga
  - Pakwach
  - Bun Yoro

The Manderstam Group were responsible for detailed engineering survey of existing equipment and buildings at each site. Preparation of engineering and financial proposals and design for the rehabilitation of the existing ginnery complex covering both operational and non-operational buildings and services. Preparation of all specifications and tender documents followed by site supervision of construction, equipment installation and plant commissioning.

- (iii) Rehabilitation of tea estates and processing facilities for the Tea Growers Co-Operative. The project covered surveys of tea estates run-down as a result of civil disruption in the areas concerned, and designs to rehabilitate the estates and their processing facilities:-
  - Hydrographic, soil and topographic surveys;
  - Techno-economic study of feasibility processes and commercial production;
  - Research into optimum design;
  - Detailed design, cost estimating, preparation of contract documents, bid analysis, contractor negotiations, procurement, construction, installation supervision;
  - Operations and maintenance planning;
  - Training.
- (iv) Rehabilitation of coffee processing factories for the Commercial Bank of Uganda. The project covered surveys of coffee growing areas affected by the civil disruptions and the redesign of the facilities to rehabilitate the areas and their processing facilities:-
  - Hydrographic, soil and topographic surveys;
  - Techno-economic study of feasibility of processes and commercial production;
  - Research into optimum design;
  - Detailed design, cost estimating, preparation of contract documents, bid analysis, contractor negotiations, procurement, construction, installation supervision;
  - Operations and maintenance planning;
  - Training.



## **Burma**

Survey, on behalf of the Asian Development Bank, of existing oil mills and assessment of the possibilities for modernisation and expansion of the industry, taking into account the future increase in the availability of oilseeds in the country.

## **Indonesia**

Project appraisal (for the Asian Development Bank) of a palm oil mill in Sumatra.

## **Iraq**

- (i) Feasibility study for the solvent extraction of oil seeds for vegetable oil production.
- (ii) Techno-economic study for the hydrogenation of oils and fats for margarine, shortening and ghee production.

## **Kenya**

Study on the economic and technical feasibility of hydrogenation of vegetable oil for margarine and shortening production.

## **Cameroon**

For the Societe Nationale d'Investissement Du Cameroon (SNI), a project was carried out which included surveys of existing estates at Dibombari near Douala and an existing palm kernel pressing plant at Nkapa, followed by the design of a palm oil extraction and fractionalting plant for Nkapa. Preparation of tender documents, and subsequent bid evaluations were made with recommendations for a plant supplier and plant erection contractor. At this point the project was handed over by SNI to a private sector company.

## **Portugal**

- (i) Study and design for the extraction of coconut oil and the production of lauryl alcohol.
- (ii) Feasibility study on the production of ground nut oil by pressing and by solvent extraction.

- (iii) Review of the vegetable oil seeds industry and recommendations for its reorganisation on a national scale.

## **Afghanistan**

Studies were carried out for the IDA and the Government of Afghanistan for the rehabilitation of oil seed processing plants at several locations. All studies included on-site inspection and surveys followed by plans for rehabilitation, equipment specification and engineering design at:

Kunduz	North-east Afghanistan. Study and design for 250 t/d oil mill with refinery, ghee production and soap manufacture.
Baghlan	North-east Afghanistan. Study on cotton ginning, cotton seed recovery, storage and handling.
Taloquan	North-east Afghanistan. Study on cotton ginning, cotton seed recovery, treating, storage and handling.
Khawjaghar	North-east Afghanistan. Study on cotton ginning, cotton seed recovery, treating, storage and handling. Rehabilitation design.
Dasht Arc	North-east Afghanistan. Study on cotton ginning, cotton seed recovery, 75 t/d oil mill, storage and handling.
Lashkargah	South-west Afghanistan. Study and design for 75 t/d oil mill with refinery and ghee production.
Girishk	South-west Afghanistan. Study and design for 150 t/d oil mill, oil refinery with ghee production and soap manufacture.
Herat	West Afghanistan. Study and design for 75 t/d oil mill with refinery and ghee products.
Makr-el-Sharig	North Afghanistan. Study and design for 200 t/d oil mill, refinery, ghee production and soap manufacture.

## **Spain**

Feasibility and design studies leading to production of tender documents for a vegetable oil seeds solvent extraction plant.

## **Malawi**

A techno-economic study was carried out into a proposed plant near Lilongwe for the Government of Malawi, for the extraction of edible oil by solvent extraction of a range of oil seeds, together with the use of its extracted cake for animal feed.

## **Ghana**

A techno-economic feasibility study was carried out for a proposed expansion of a vegetable oil and soap plant at the Appiah-Menka Complex, Kumasi, for the Africa Project Development Facility (APDF), Atidjan, Ivory Coast. The study considered the expansion of palm oil production, refining of 100 t/d palm oil and margarine manufacture, expansion of laundry soap manufacture to 13500 t/a and of toilet soap to 2700 t/a, purification of crude glycerine lye currently being dumped, and effluent treatment.

## **China**

Process design, project costing for manufacture of cellulose acetate from cotton linters.

## **Nigeria**

Techno-economic feasibility study on a vertically integrated jute spinning and weaving operation in three stages:

- (i) weaving imported semi-finished jute yarn
- (ii) spinning imported jute
- (iii) growing and processing raw jute in Nigeria

An environmental impact study was made, and a scheme proposed where no effluent was produced, all waste products being recycled.

## **Saudi Arabia**

Following an evaluation of various bidders and proposed buy-back agreements, Manderstam were awarded a project management with technical and supervisory commissioning services contract for a factory to produce 60,000 tons/annum of edible vegetable oil in Damman. Client-Nabati Vegetable Oil Company.

In addition, Manderstam carried out, on behalf of Nabati, a market and technical feasibility study of the production of margarine and ice-cream as downstream added value products for the above vegetable oil plant.

## **UK**

Rehabilitation of a cereal processing plant, including factory redesign at Welwyn Garden City.

## **Arabian Gulf**

Techno-economic feasibility study, commissioned by UNIDO, for the production of date dibis and date honey for export.