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21204



REPUBLIC OF ZAMBIA

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

in cooperation with the

Common Market for Eastern and Southern Africa
(COMESA)

and the Government of Zambia

and with the support of the Technology Exchange,
United Kingdom of Great Britain and Northern Ireland

TECHMART COMESA '95

17-20 October 1995, Lusaka, Zambia
(PTA Village, Show Grounds)

COMPENDIUM OF AGRO-BASED
AND
AGRO-RELATED TECHNOLOGY
AND JOINT VENTURE
PARTNERSHIP OPPORTUNITIES

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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

TECHMART COMESA '95

LUSAKA, ZAMBIA, 17-20 OCTOBER 1995

**COMPENDIUM OF AGRO-BASED AND
AGRO-RELATED TECHNOLOGY AND
JOINT VENTURE PARTNERSHIP
OPPORTUNITIES**

Prepared and compiled jointly by:
Technology Acquisition Section and Industrial Information
Section of UNIDO in cooperation with
Technology Exchange,
United Kingdom of Great Britain and Northern Ireland

Supported by:

Common Market for Eastern and Southern Africa (COMESA)

Government of Zambia

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INTRODUCTION

This compendium has been prepared by The Technology Exchange Ltd to combine the technology offers and requests from the COMESA countries and with corresponding offers sourced by UNIDO and The Technology Exchange from potential developed and developing country partners.

TECHMART COMESA '95

Zambia will be hosting a Technology Market Forum (TECHMART) for small and medium scale industries in the COMESA countries from 17-20 October 1995 at the PTA Village Showground, Lusaka, where individual firm to firm business meetings will take place. This event will focus on agro-based and agro-related industries.

The objective of COMESA TECHMART '95 is to promote direct contacts between technology seekers and technology suppliers from the developed and developing countries. Emphasis will be placed on technologies which will improve the small and medium scale agro-related industries and the Heads of States and Governments of COMESA Countries have given a mandate to the COMESA Secretariat to place a greater emphasis on the development of the agro and agro-related industries in the next five to ten years.

THE COMPENDIUM

This compendium of technology and joint venture partnership opportunities for manufacturing industry is not simply a guide to the TECHMART COMESA Fair in Lusaka, although many of the organizations who have submitted items for it will be attending the Fair as exhibitors or visitors, but it is intended primarily to be used as a handbook to stimulate contacts between technology sources and those with technology needs. Contact may be made by letter, telephone, telex or by fax and we have included all these details, where available, in the directory section at the back of the compendium. A copy of your correspondence should be sent to UNIDO and this should include appropriate reference numbers.

We hope that you will use this information to make contact either directly or, in case of difficulty, via UNIDO, but we do ask that you should only request information on licence and joint-venture offers if you, or your organization, has a positive need for the technology and could have access to the necessary resources to employ or to manufacture and market the item on offer. When making a request to the source you should describe your organization, its size, products and resources, both human, physical and financial, and state your intentions with regard to both the manufacture and marketing of the product or process, this will enable the source of the offer to decide which responding organizations are best placed to exploit the technology in each region.

INTRODUCTION

For new developments which are subject to patent application, before any confidential technical information is sent out by the source to any person or organization, they may require you to sign a confidentiality agreement.

TECHMART COMESA is the seventh in a series of UNIDO TECHMARTS or Technology Transfer Fairs. The preceding events were held in Beijing, China in December 1991, Bulawayo, Zimbabwe in September 1992 and New Delhi in November 1992 and November 1993, Hanoi, Vietnam in November 1994 and New Delhi, India in March 1995. Further TECHMART events are being planned for 1996: India Intechmart, New Delhi 17-20 February; Techmart Pakistan, Islamabad 1-5 April; Techmart Vietnam, Ho Chi Minh City, November; and Techmart China, December.

You are invited to submit your own offers and requests for technology for publication in the next edition of the TECHMART compendium.

Each offer or request should be appropriate to the needs of a developing country and should relate to a specific product or process. **General offers of services or consultancy will not be accepted.**

A For organizations seeking technology and manufacturing or processing partners.

If your search is for a specific item please refer to the keyword index of offers which follows the Technology Offers Section. This index will refer you to the particular offers which appear in numerical order in the Offers Section of the compendium.

If your interest extends to all technology opportunities in a particular category then we recommend that you read through the whole section which most nearly corresponds to your field of interest, e.g. Water Resources and Waste Treatment, etc.

When you have found the item which you require make a note of the catalogue reference number and the title of the offer and look up the organization in the directory section of the compendium. This will give you all the contact details which have been supplied to us by the source of technology when preparing the compendium.

B If you are offering technology:

To find the organizations who are seeking the technology which you are offering use the keyword index to the requests in the second section of the compendium and follow the above procedure to find the contact details of the requesting organization.

It is recommended that all enquiries made should seek from the sources a full description of the technology being offered or requested. If you are responding to a technology request please give full details of the technology projects which you are offering and where possible include a brochure describing your own activities or product range.

Neither UNIDO, the COMESA Secretariat nor The Tehnology Exchange Limited can accept any responsibility for any misunderstandings or loss incurred as a result of using this compendium and it is recommended that you take steps to verify any information provided to you by any of the organizations offering or requesting technology.

FOREWORD

The treaty establishing the Common Market for Eastern and Southern Africa (COMESA) was signed in December, 1994 in Malawi by sixteen countries, namely: Eritrea, Ethiopia, Kenya, Lesotho, Madagascar, Rwanda, Sudan, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe. Angola, Burundi, Comoros and Zaire signed the Treaty later. The Treaty has been ratified by over eleven member States and has therefore entered into force and so its predecessor the Preferential Trade Area has ceased to exist.

The objectives of COMESA are:

- (i) Attainment of sustainable growth of the economies of member States through promoting a balanced and harmonious development of the production and marketing structures;
- (ii) Promotion of joint development in all sectors of the economy and adoption of common macro-economic policies and programmes to raise the living standards of its peoples and foster cohesion among the member States;
- (iii) Co-operation in creating an enabling environment for foreign, cross-border and domestic investments including the joint promotion of research and adaptation of science and technology for development;
- (iv) Co-operation in the promotion of peace, security and stability among the member States in order to enhance economic development in the region;
- (v) Co-operation in strengthening the relations between the Common Market and the rest of the world and the adoption of common positions in international fora; and
- (vi) Serve as a building block for the establishment and realisation of the objectives of the African Economic Community (AEC).

The COMESA Secretariat headed by a Secretary General and is based in Lusaka, Zambia. The programme of activities of COMESA covers all fields of economic activities namely: Trade and Customs; Finance and Monetary; Agriculture, Fisheries and Forestry; Industry, Energy and Environment; and Transport and Communication. Legal and Administration Divisions provide services to the other Divisions in the Secretariat as well as member States.

The full address of COMESA is as follows:

COMESA Secretariat, P.O.Box 30051, Lotti House, Cairo Road, Lusaka, Zambia
Fax.No.: + 260-1-2258-107 Tel.No.: + 260-1-229-726/32

1. ZAMBIA : AN OVERVIEW OF THE TECHMART COMESA HOST COUNTRY by F D Yamba and M J Tambatamba.

This foreword presents an overview of Zambia, its economy, performance and current industrial and investment policies. This is followed by information on the raw material wealth of Zambia for agriculture and agro-related sectors and a selection of processes and technologies could potentially be based on these material resources.

Formerly Northern Rhodesia, Zambia is a land locked country situated in the south-central part of Africa. Zambia occupies an area of approximately 750,000 sq km. The present population of Zambia is estimated at 8.4 million. With an annual population growth rate of 3.2% per year, Zambia's population growth rate is among the highest in the world.

Zambia is a multi-party democracy, politically stable and economically forward-looking. It continues to build on considerable achievements of 30 years of self-government.

With a change of government in November 1991, emphasis has shifted from a command towards a market economy. In an effort to restore economic growth, the government adopted a major reform package which emphasized the need for urgent changes in both the structure, direction and management of the economy. The new initiatives called for, among other things, the opening of the domestic market to allow competitive trade and to encourage positive participation of the private sector in all aspects of economic life. The private sector is to be the main engine to drive and sustain economic growth. Government's liberalization strategy assigned a new role for the State, as a facilitator. Explicitly, this means that the State is withdrawing from active and direct participation in most commercial and industrial activities.

Major economic policies taken in this regard embrace:

1. removal of all forms of subsidies;
2. de-regulation of controls of prices, interest and foreign exchange rates;
3. encouraging private investment, among others, through privatisation of most parastatal firms;
4. strengthening of the financial market, among others, through stock exchange, investment and merchant banking etc;
5. liberalisation of agricultural marketing;
6. removal of all foreign exchange controls.

So far a number of parastatal companies have been privatised. These have been sold to both local and foreign entrepreneurs. Public participation in some of the privatised companies is encouraged through the trading of shares on the Lusaka Stock Exchange. All controls on foreign exchange transactions have been removed and externalisation of money is no longer a hindrance to any investor, foreign or local.

1.1 THE ZAMBIAN ECONOMY

The mining sector, in particular copper, dominates Zambia's economic activities. Currently however, Zambia's economy is characterised by diversification away from mining whose contribution to GNP declined over the past two decades, from about 90% in the mid 70s to current levels of about 70%.

At current prices Gross Domestic Product (GDP) registered an average annual growth rate of about 49.2% between 1982 and 1989. At 1977 prices however, the increase was only 5% between 1982 and 1988. Per capita GDP declined at annual rate of 2.2%. Between 1983 and 1989, the contribution of the mining, manufacturing and agricultural sectors increased by -0.4%, 3.3% and 1.8% respectively.

In 1992, total GDP declined by 3%, while it grew by 9% in 1993. Although the value of Kwacha is showing signs of stabilisation, it has depreciated by about 1,800% between December 1990 and March 1995.

With the bold economic measures taken, annual inflation rate has been reduced from an average of 191.5% in 1991 to 53% in 1994. Government budget deficit dropped from K7366.7 million in 1990 to K32327.7 million in 1993.

1.2 Policy environment

Industrial policy

The government aims to increase the country's productive capacity through a liberalized market economy. The basic framework for the overall industrial policy of the government is provided in the Industrial Policy of 1994. Major elements of this policy include:

- * promotion of private sector development to create employment and economic growth;
- * attraction of foreign and local investment in the economy;
- * promotion of forward and backward linkages and establishment of new areas for industrial activities;
- * strengthening and expanding of the country's technological base;
- * promotion of small and medium scale enterprises to achieve growth and equity through the use of appropriate technology and local raw materials;
- * expansion of the export base through diversification.

Investment policy

Through the Investment Act of 1993, Zambia offers an attractive and safe investment option. An Investment Centre has been established with an upfront role for mobilisation of both local

and foreign investment resources for the joint venture development as well as stimulating direct foreign investment and private sector development.

Coupled with the removal of all controls of the old economic order, the Investment Act provides a whole range of incentives for foreign investors. Some of the general incentives include deduction of capital allowances from profits, exemption of farm dividends from tax for first five years, 15% tax on farm income, 15% tax on traditional export products and allowing foreign tax payable as a credit against Zambian tax for double taxation agreements. Special incentives on the other hand include:

a) Exemption from duty and sales tax on imports of machinery and equipment for exporters of non traditional products with net foreign exchange earnings, enterprises producing inputs for local agricultural and agro-related export commodities, import substitution industries using local raw materials with net foreign exchange savings and investments located in rural areas.

b) For small scale and village enterprises, exemption from income tax payments for three years in urban areas and five years in rural areas and from customs and sales tax on imported equipment, various licensing requirements and from payment of rates for the first five years.

In addition to the above, COMESA treaty provides guarantee and adequate protection for foreign investment.

2. RAW MATERIAL ENDOWMENT

Zambia like most other developing countries in the COMESA region has a substantial raw material base while lacking processes and technology for processing most of the raw materials. As a consequence, a large quantity of these raw materials are consumed and exported in unprocessed form. It is common knowledge that earnings from materials sold in this form are very low as compared to what the country has to pay for the importation of finished products manufactured using the original materials exported. It is only logical therefore that the country increases the value of these raw materials by way of further processing.

While a few entrepreneurs have taken advantage and invested in the exploitation of this raw material base, the majority are hampered by lack of information on this potential and the lack of resources mainly in form of finances, technologies and technical skills. Apart from multiple problems that Zambian small and medium scale enterprises face in acquiring suitable technologies, locating and procuring suitable technologies involve heavy expenditure.

Based on the rural material endowment in the country, the following processes and technologies (sections 2.1-2.6) are recommended for further development and implementation.

2.1 Horticultural and horticultural related products

Zambia has vast expanses of rich land and produces a wide variety of horticultural and horticultural related products. Important among these are mangoes, bananas, pineapples, oranges, lemons, tomatoes, guavas, onions, potatoes, peas, beans, carrots, cabbages, honey, tea, coffee, tobacco and sugar cane.

Although production data on horticultural products is difficult to quantify, the magnitude of the industry can be felt through production data on seed sales from ZAMSEED and other outlets which are estimated at 200,000; 120,000; 65,000 and 3,500 metric tonnes of cabbage, tomato, onion and carrot seeds respectively.

The horticultural sub-sector (including flowers) contributes about US\$ 124 million a year in foreign exchange earnings.

However, both primary and secondary processing of most of the horticultural products is very limited and as a result, most of them go to waste. There is a need to have these products further processed into another form for easier conservation and storage. In fact produce such as mangoes, pineapples and guavas are seasonal. These are always in sufficient amounts at particular time and none at another. At the time of abundance most of these fruits go to waste due to lack of technologies and processes for processing or storage.

Zambia has a great potential for acquiring technologies and processes in the area of processing and preservation of horticultural and related products. Currently the market has more imported processed horticultural products than local ones.

Due to lack of information, a number of entrepreneurs are not aware of processes and technologies for further processing or conservation of horticultural and other related products. In view of this potential therefore, there is no need to tap and encourage and the development of this industry by looking at its technological needs. In this regard, there is great potential for technologies and processes in the following areas:

- i) Fruit juice concentrate/paste including tomato ketchup (mango, pineapple, orange, tomato, guava)
- ii) Preparation of beverage drinks such as squashes/juices (mango, pineapple, orange, tomato, guava)

- iii) Fruit canning: (pineapples)
refrigeration and freezing: (mangoes, guavas, lemons, oranges)
- iv) Vegetable canning: (carrots, peas, beans)
refrigeration and freezing: (tomatoes, potatoes, cabbages, onions)
- v) Preparation of fruit/juice powder (mango, lemon, banana, guava, tomato, pineapple)
- vi) Fruit and vegetable dehydration: banana, onion, potato, peas, wild fruits
- vii) Preparation of jams, jellies and preserves
- viii) Preparation of potato products: flour, flat dry chips, wafers, slices
- ix) Preparation of wax emulsion for extending shelf life of fruits and vegetables
- x) Preparation of strained baby foods: wet or dry (fruit, vegetable)
- xi) Preparation of honey beverage
- xii) Preparation of juice from sugar cane

2.2 The production of cereals

The major cereals grown in Zambia are white maize, wheat, rice, sorghum and millet. Average market production figures per annum of some of these crops between 1990 and 1993 were:

White maize	839,303 tonnes
Wheat	69,535 tonnes
Sorghum	5,310 tonnes

Currently these cereals are mostly used in flour form but there is need to diversify their use to increase the nutritional value. In this respect, there is need to utilise some of these cereals in the bakery industry where wheat is the major flour used. The bakery industry needs to be availed technologies and processes or formulations for composite (blending wheat flour with either that of maize, cassava, sorghum or millet) bakery products. Solar powered technologies could be quite suited for rural environments.

2.3 Oil seeds

Major oil seed crops grown in Zambia are soy beans, sunflower, groundnuts and cotton seed. Average marketed production figures per annum between 1990 and 1993 for sunflower, groundnuts and cotton seed stood at 13,216; 26,453 and 58,324 tonnes respectively. There appears to be a very limited processing capacity of these crops hence the need for an infusion of more processes and technologies. Processes and technologies are required in respect of:

- i) High protein infant foods manufacture;
- ii) Edible oil production from sunflower, groundnuts, cotton;
- iii) Solvent (hexane) extraction of oil from processed sunflower seeds;

- iv) Edible groundnut flour production;
- v) Edible soy flour production.

2.4 Live stock, fish and poultry

Zambia has about 10 million hectares for grazing. The production of cattle and pigs has been on the increase. Between 1990 and 1993, the country had an average, per annum of 2,700,000 of beef cattle and 120,000 goats and sheep. Poultry farming is on the increase though data on production figures is lacking. Fish farming is one other area where Zambia has great potential. Entrepreneurs in the above named fields lack technologies and processes particularly for the following:

- i) Preparation of corned beef
- ii) Beef and pork sausage preparation
- iii) Meat soup cube, gravy concentrate, tenderisation and gravy concentrate preparation
- iv) Bacon and ham preparation
- v) Sausage casings manufacture
- vi) Meat drying and smoking
- vii) Fish meal production
- viii) Fish drying and smoking
- ix) Fish: freezing and refrigeration
- x) Aqua-culture know how

2.5 Dairy products production

Zambia produces about 320 million litres of milk annually. The variety of other dairy products is very limited as there are few enterprises engaged in the manufacture of these products. More specifically, suitable small and medium capacity technologies and processes are required for:

- i) Milk processing
- ii) Butter making
- iii) Cheese making
- iv) Yoghurt making
- v) Powdered milk production

2.6 Cotton and textile production

Zambia grows quite substantial amount of cotton. Part of this is processed in ginneries for local and overseas consumption. There are also factories in the countries for spinning and production finished cloth. Technologies are therefore required in the area of quality garment manufacture.

2.7 Specialised processes

Apart from processes and technologies to exploit Zambia's raw material base, Zambia lags behind in microbial and fermentation products and ingredients. In these areas, technologies and processes would be required for:

- i) Baker's yeast
- ii) Brewer's yeast
- iii) Vinegar generation: natural (including generator design) from jaggery, toddy, pineapple
- iv) Food enzymes
- v) Preparation of cultures
- vi) Ingredients: preservatives for - fruits, vegetables and meats ie meat anti-oxidants, sulphur, nitrates, butylated hydro-xyanisole, sodium bicarbonate, pectin and gelatine, emulsifiers (baking and other food), binders (animal and vegetable) and protein concentrates.

For further information on processes and technology supply for the development of various identified processes and technologies based on the raw material endowment, contacts can be made through the Small Industries Development Organisation and Village Industry Service:

The Director
 Small Industries Development Organisation
 Cairo Rd
 PO Box 35373
 Lusaka
 Zambia
 Fax: 00 260 1 224284

The Chairman
 Village Industry Service
 PO Box 35500
 Lusaka
 Zambia

Ref.No. 1 Agri Contact

CONCRETE TANKS FOR WATER, WASTEWATER AND ANIMAL SLURRY The concept is based on precast elements, which are factory produced and transported to the building sites, where they are assembled to form the tank construction. The concept is widely used in Europe. More than 10,000 tanks are constructed in Denmark. The licensee needs to be a producer of processed concrete.

Stage of Development: Commercialised

Type of Cooperation: Licensing; training; technical assistance

Ref.No. 2 Agricura (Pvt) Ltd

AGRICULTURAL CHEMICAL FORMULATIONS Various agricultural chemical formulations are offered for crop protection (chemicals; flowable; ECs; dusts; WPs).

Stage of Development: Commercialized

Ref.No. 3 Akaki Spare Parts and Hand Tools Factory

AGRICULTURAL TOOLS A range of agricultural tools is offered including: weeding hoes, winnowing forks, spades, shovels, mould ploughs etc.

Stage of Development: Commercialized

Ref.No. 4 Alvan Blanch Development Co Ltd

ANIMAL FEED PRODUCTION Fully commercialized equipment for the production of animal feed (cattle, pigs, poultry, sheep, goats, rabbits, fish etc). Milling and mixing equipment, pelleting systems and extruding systems. Also technical expertise and formulative advice. Provision of specialist feed additives. Systems to meet commercial standards. Low cost systems available. Utilization of waste products for conversion to valuable animal feeds.

Type of Cooperation: Licensing; sub contracting; investment; joint venture; turnkey

Ref.No. 5 Asian and Pacific Centre for Transfer of Technology

TECHNOLOGY FOR LURING AND KILLING RATS USING NEW RATICIDE This technology from China is based mainly on the use of a new raticide "Quishi" which attracts the rats

so strongly that the amount of "Quishi" consumed by rats is 2-6 times more than the amount consumed by them of usual raticides. By just throwing the "Quishi" raticide only once, the rate of eliminated rats achieved is as high as 90%. The action is speedy and thorough. The technology is specially suited by killing of rats on a large scale. Advantages: high rate of eliminating rats (90%); 70% bait of usual raticides can be saved; fit to extinguish rats on a large scale and saves time and manpower. Inputs required: 3 sets of special machines; building - 500 sq m; land - 1,200 sq m and power - 30 kw. Manpower required: total - 19; skilled - 2; technicians - 2; unskilled - 10 and others - 5. Production capacity: 36 kg/h, 311.04 t/year (per machine).

Stage of Development: Commercialized

Type of Cooperation: Turnkey; production equipment; technical assistance; training; sub-contracting

Ref.No. 6 Asian and Pacific Centre for Transfer of Technology

SYNTHESIS OF "DOXAN-M" POLYMER FODDER ADDITIVE (PREMIX) Russian company offers technology for production of "Doxan-M" fodder additive (premix). Production of the premix requires specialised reactor for polymerisation, where reaction is controlled by a specially developed programme. Know-how is based on a specific polymerisation regime and polymer formula. Premix is produced from white powder, containing a patented biologically active polymer and magnesium sulfate serving as a stabiliser and filler. Areas of application: intensification of growth and physical development of animals (calves, pigs and poultry); normalisation and prophylaxis of metabolism disturbances of young animals; increase of eggs laying. Advantages: contains no hormone, nor other biologically active substances. Extensive laboratory tests have shown that "Doxan M" is not toxic; it is excreted from the organism within 72 hours, does not accumulate in organs and tissue, has no cancerogenic, embryotoxic or teratogenic properties; egg laying increased by 20-25%; use of 1 kg of "Doxan M" premix increases the weight of animals by 15-18 kg; each US\$ 1

Continued on next page

Cont....

invested in "Doxan-M" brings US\$ 4 in profits; ecologically clean product, environmentally sound technology. "Doxan-M" is completely deintegrated at natural conditions into CO₂ and water. Pay back period: 1 year. Inputs required: land - 250 sq m, power - 5 kW. Manpower required: total - 26, skilled - 4, technicians - 5u12, others - 3. Production capacity: 300 TPA. Economic data: total project cost - US\$ 460,000, equipment (FOB) - US\$ 120,000, know-how fee - US\$ 200,000, operational cost/year - US\$ 40,000, product market price/kg - US\$ 4.

Stage of Development: Commercialized

Type of Cooperation: Licensing; know-how; turnkey; joint venture; equipment supply

Ref.No. 7 Asian and Pacific Centre for Transfer of Technology

MANUFACTURING TECHNOLOGY FOR VACCINES, VITAMINS, FEED ADDITIVES, ANTIBIOTICS AND INSECTICIDES FOR LARGE AND SMALL ANIMALS Korean company offers manufacturing technology for veterinary biological products such as Newcastle disease vaccine, Fowl Pox vaccine, Hog Cholera vaccine, Swine Erypelas vaccine and Rabies vaccine which are still remaining the most important vaccines in the field of animal health. Specifications: biologicals, antibiotics, anthelmintics, disinfectants, antibacterials, coccidiostats, insecticides, vitamins and mineral preparations, amino acid feed additive, vaccination programme, other ethicals. Areas of application: agriculture, veterinary medicine, vaccines, vitamins, feed additives, antibiotics and insecticides for large and small animals. Advantages: high quality, low cost and economical design.

Stage of Development: Commercialized

Type of Cooperation: Joint venture; distribution; licence

Ref.No. 8 B & C Engineering
TOBACCO BAILING, OX-DRIVEN CARTS AND CHICKEN FEED MIXER Various technologies offered for a tobacco bailing process, ox-driven carts and a chicken feed mixer.

Ref.No. 9 Bentall Rowlands Texas Ltd
ANIMAL FEED PRODUCTION EQUIPMENT producing from 100 kg per hour to 2,500 kg per hour finished feed pellets. From individual machines to complete turnkey factories. Installation and training services available.

Stage of Development: Production

Type of Cooperation: Turnkey; production equipment; training

Ref.No. 10 Central Food Technological Research Institute

ANIMAL FEED FORMULATION FOR CATTLE AND POULTRY The raw materials are cleaned, fumigated and pulverised. Ingredients are used in particular ratios to balance carbohydrates, fats and proteins. The individually pulverised materials are mixed and bagged. Major equipment used: screw conveyor, vibrascreen, hammer mill, aspirator and mixer. Application areas: the feed is scientifically processed and nutritionally well balanced and can be used for cattle and poultry feed. Environmental aspects: no pollution problem. Production capacity: 5 tons per day. Inputs: land/bldg (sq m) indoor - 150, outdoor - 1,000; manpower: skilled - 10, unskilled - 20; power: 50 kW; water: 250 l per day. Project cost: equipment/machinery (FOB) - US\$ 30,000, fees for technical know-how/training - US\$ 4,000, operational cost per year - US\$ 130,000.

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 11 Chell Foods and Chemicals Inc
PRODUCTION OF ANIMAL FOODSTUFFS Plant for the production of animal foodstuffs suitable for chickens, pigs, dairy cows, fish and pets etc, from corn, soybean meal or other suitable grains. Annual production capacity of 90,000 m tons (300 days). Process includes: storage, selection, weighing, grinding, mixing, pelletizing, flaking and EP packing (bulk packing). Main equipment comprises: grinder, pellet mill, flaker, extruder and bagging machine. Production process optimised using appropriate control software.

Stage of Development: Commercialized

Type of Cooperation: Technical support

Ref.No. 12 Cundall, D.J. (Farms)
AGRICULTURAL MACHINERY New and used agricultural machinery, design and development of prototype machinery and licence agreement negotiation.

Type of Cooperation: Equipment supply; technical assistance

Ref.No. 13 EDEM Ltd
WATER-SOLUBLE SALTS OF CHITOSAN FOR USE IN AGRICULTURE The products are water-soluble salts of polyaminesaccharid-chitosan with a wide interval of molecular masses. Process scale currently 500-1,000 kg/annum. Product is used in agriculture: to protect seeds, plants, fruit and vegetables from viruses; to depopulate pathogenic microbes in soil.

Stage of Development: Pilot plant

Type of Cooperation: Sub-contract; distribution

Ref.No. 14 EDEM Ltd
WATER-SOLUBLE DERIVATIVES OF CHITOSAN The products are water-soluble derivatives of chitosan of 40-90% substitution degree and of 10-200 kD molecular masses. Production capacity 500 kg/annum. Used in agriculture to protect fruits and vegetables against deterioration for long-term storage. It increases the immune protection of organisms and plants, but depresses pathogenic microbes.

Stage of Development: Pilot plant

Type of Cooperation: Sub-contract; distribution

Ref.No. 15 Emmanuel Jera Dustin Makers
FOOD AND CROP PROCESSING MACHINERY Technology and know-how for the production of a range of appropriate technology food and crop processing machinery including: coffee hullers, jaggery (sugarcane), grinding machines, groundnut grinding machines, flour milling machines and tree seed tumblers. A small range of non-agro products can also be manufactured including water cans, dustbins, vices, clamps and dies. Typical monthly production capacities would be 3-4 hullers, 3-4 groundnut grinders or 3 maize milling machines. Inputs include scrap metal, angle bars etc. The process is low in power consumption. Manpower required for above production rates typically 2-4 skilled personnel.

Stage of Development: Commercialized

Ref.No. 16 Extrade Ltd
AGRICULTURAL HANDTOOLS AND KNAPSACK SPRAYERS A range of handtools are offered including hoes, axes and machetes of various sizes. Also offered is the design and technology for a knapsack sprayer for application of pesticides, herbicides etc.

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 17 Extrade Ltd
ANIMAL-DRAWN AGRICULTURAL EQUIPMENT Technology offered for a range of animal-drawn agricultural equipment including ploughs, harrows etc.

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 18 JNP Agro-Systems Pvt Ltd
ROTARY TILLERS AND POST HOLE DIGGERS Offer of design and licence for production of rotary tillers and post hole diggers for use in agricultural field work. Market price per unit range US\$ 1,200 - 2,500. Power inputs 50 HP including welding power plus nominal water and fuel requirements. Factory space 2,000 sq metres plus 1 hectare outdoor storage. Manpower: skilled 10, unskilled 30. The equipment cost is US\$ 2 million and fees for technical know-how and training US\$ 100,000, plus operational costs for one year. Materials and utilities US\$ 75,000.

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 19 Katopola Agricultural Engineering Services
AGRICULTURAL TRAINING AND FARM IMPLEMENTS The organisation is a project under the Ministry of Agriculture offering training in appropriate technology. In addition, the project manufactures low cost farm implements. The project is thus offering technology in farm implements manufacture on cash investment terms of transfer of the technology.

Ref.No. 20 Kerala Agro Machinery Corporation Ltd

POWER TILLER A power tiller equipped with a powerful engine and unique radiator cooling system, for tilling, ridging, ploughing, puddling, levelling, weeding, pumping, spraying, hulling and transportation of light agricultural goods.

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 21 Malawi Industrial Research and Technology Development Centre

SOLAR POWERED EGG INCUBATORS AND FRUIT DRYERS Technology offered for a solar powered electric egg incubator and a solar powered fruit dryer.

Ref.No. 22 Martin Davoz Trading Ltd

TECHNICAL BIODEGRADABLE OIL PLANT The plant is used for wasteless production of hydraulic fluids, chain saw oils, separating product for forms, decking and stop shutters etc. These biological oils fully substitute fossil oils. The technology can use other sorts of vegetable oils too. The plant capacity is 100-1,500 tons a year. The technology is wasteless and the oils are biodegradable. The oils are manufactured by cold pressing so oil cakes are not biologically depreciated and can be used as valuable animal feeding.

Stage of Development: Commercialized

Type of Cooperation: Turnkey

Ref.No. 23 Miklink Limited

MIKLINK HEAVY-DUTY BICYCLE TRAILER SYSTEM Getting crops to market is a big problem for African farmers, and the Miklink heavy duty bicycle trailer has been designed to do this work, to take big loads quicker and make more money for the farmer. The new hi tech system permits a load of 150 kgs (or 333 pounds) on the trailer with perfect comfort and control of the bicycle, even on rough tracks. The system is patented, and Miklink Limited is seeking partner to assemble and market the system in African countries.

Stage of Development: Commercialized

Type of Cooperation: Licensing; joint venture

Ref.No. 24 National Council for Scientific Research (NCSR)

TISSUE CULTURE PROPAGATION with modern equipment potatoes, cassava, bananas, flowers etc can be grown without danger of changes in their characteristics. Induced mutation to enhance quality of agro-produce is also available.

Ref.No. 25 National Council for Scientific Research (NCSR)

INDUSTRIAL AND MEDICINAL OILS from local and exotic plants, process to extract oils and medicinal compounds is available.

Stage of Development: Laboratory

Ref.No. 26 National Council for Scientific Research (NCSR)

BIOPESTICIDES from local plants such as *Tephrosia vogelii* "cidema

Stage of Development: comes an opportunity to produce environmental friendly acaricides and broad spectrum biopesticides.."

Ref.No. 27 National Council for Scientific Research (NCSR)

UREA/MOLLASES CATTLE BLOCKS to assist small scale farmers provide food to cattle during the stress period using readily available urea/mellases and agro-waste.

Ref.No. 28 National Small Industries Corporation Ltd, India

CATTLE AND POULTRY FEED The manufacture of animal feed stuffs from oil cakes, wheat and maize bran, molasses and salts and 1,000 litres water/day involves grinding, mixing and packing. The machinery involved includes pulveriser, mixing tank and stitching machine. Produces feed for animals and birds and utilises agricultural waste products to produce 240 tons/month of animal feed stuffs. Process requires 40 kW of electrical power and occupies a total area of 2,000 sq metres of which 1,600 sq metres should be under cover. Project cost US\$ 95,000, employs 3 skilled and 10 unskilled workers.

Stage of Development: Commercialized

Type of Cooperation: Turnkey

Ref. No. 29 Poshan Agrovet FORTIFIED VITAMIN ANIMAL FEED SUPPLEMENTS Variety of fortified vitamin supplements in mash and pellet form for various livestock, in addition to mineralized salt bricks for cattle. The production processes involve grinding raw materials (grains, oiled cakes, de-oiled cakes, wheat rice, bran, sugar, mollasses, vitamins and minerals) and the mixing to produce required formulations. The mash obtained is taken into a pelletizer and the resulting pellets are cooled before packing. The proposed offer involves the formation of new projects to help small and marginal farmers by the establishment of a turnkey plant producing feed supplements in appropriate areas. Total plant cost US\$ 100,000 for a plant with a capacity of 30 tonnes per day. Fees for technical know-how and training US\$ 10,000.
Type of Cooperation: Joint venture; turnkey

Ref. No. 30 Rau, John and Company (Pvt) Ltd BEEHIVES AND APIARY EQUIPMENT Technology offered for the manufacture of beehives and various apiary equipment.
Stage of Development: Commercialized

Ref. No. 31 Reaseheath College AGRICULTURAL ENGINEERING AND MECHANICAL TRAINING and consultancy on all aspects of agricultural engineering and machinery. This would range from production engineering to service, repair and operation. A leader in the UK, Reaseheath offers internationally recognised qualifications and tailor-made training to suit the needs of the individual or company.
Stage of Development: Commercialised
Type of Cooperation: Training; technical assistance

Ref. No. 32 Reaseheath College PRIMARY MILK PRODUCTION SKILLS FOR DAIRY FARMERS Specialist skills development includes dairy hygiene, milk yields and composition and farm profitability. Reaseheath can offer internationally recognised qualifications or tailor skills development and technical knowledge to clients needs, including the development of training programmes.

Stage of Development: Commercialised
Type of Cooperation: Training; technical assistance

Ref. No. 33 Reaseheath College MILK PROCESSING AND TECHNOLOGICAL EXPERTISE available for introduction and development of model staff training activities. Programmes develop themes on hygiene, milk collection, microbiology, product knowledge, quality systems, management skills, business management and new product development. Reaseheath offers internationally recognised qualifications for company personnel. Technology transfer experience offers improved company competitiveness through vocational training.
Stage of Development: Commercialised
Type of Cooperation: Training; technical assistance

Ref. No. 34 School of Mines (University of Zambia) PAPER FERTILIZER The project has proven processes at pilot level for the production of partially acidulated phosphate Rock (PAPR) fertilizer. PAPR is produced by reacting less than the stoichiometric quantity of an acid with the phosphate rock. Agronomic tests performed by the Ministry of Agriculture in Zambia using PAPR products on maize, soyabean and finger millet indicated yields comparable of fully acidulated products (SSP or TSP).

Ref. No. 35 Silsoe Research Institute MOBILE MANUALLY POWERED SEED TREATMENT MACHINE A pedal powered batch treatment unit specifically developed for use in African conditions. Existing development versions of the unit use a fixed stator drum having a diameter up to 500 mm and a close fitting rotor mounted in the base. The rotor is driven via the pedal drive at speeds of approximately 250 rev/min. Liquid chemical distribution to the seed batch being mixed on the rotor is from a 150 mm spinning disc mounted on the same shaft as the base rotor. The unit has been designed for small scale local manufacture in Africa. It is portable and efficient and

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requires no additional power source other than the pedal input. Designed to treat small batches of farm produced/saved seed of up to 10 kg. Can be used to treat a wide range of seed types including maize, beans, sorghum and wheat in African locations close to small farming communities. Environmental aspects: better chemical control than traditional seed treatment approaches. Potential to operate as a closed chemical system if liquid seed treatment chemicals become widely available.

Stage of Development: Research project

Ref.No. 36 Sugar & Integrated Industries Company

ANIMAL FOODSTUFFS Technology, plant and machinery for the production of animal foodstuffs.

Stage of Development: Commercialized

Type of Cooperation: Turnkey plant

Ref.No. 37 Technology Exchange Ltd
VERMICULTURE SYSTEM FOR CONVERTING AGRICULTURAL AND DOMESTIC WASTE INTO COMPOST This plant, which has operated for several years on a continuous basis, converts organic waste into a fine granular compost for horticultural use and generates a worm surplus which is converted to high protein animal feed. An ingenious breaker bar design is used to break up the digested material into granular form for discharge and this has other applications. (Our ref: TO 158)

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 38 Technology Exchange Ltd
MULTI-PURPOSE AGRICULTURAL/HORTICULTURAL STEEL HAND TOOL A robust hoe head of advanced design which combines a wide range of individual functions in one implement. It can be used for hoeing/forming seed drills/levelling/scraping and working heavy soils without any adaptation. It can be manufactured as a steel forging or a welded assembly and contains no moving parts. This cost effective implement will increase mobility and reduce the equipment inventory with consequent increase in productivity. (Our ref: TO 297).

Stage of Development: Prototype

Type of Cooperation: Licensing

Ref.No. 39 Technology Exchange Ltd

PRECISION DRILL AND SEED PLANTER A precision, tractor mounted, drill and seed planter incorporating a unique rubber belt metering system. The system, which has been sold in over 60 countries, is now famous for its accuracy, gentleness and adaptability to handle a very wide range of seed types (natural or pelleted) and will plant in single, double or triple lines, with row widths as narrow as 25 mm. The crops planted with this system are given the optimum amount of growing room, moisture and nutrients and so produce a high yielding and regular stand that is quick and economical to harvest. (Our ref: Stanhay Robin 870).

Stage of Development: Commercialized

Type of Cooperation: Equipment supply

Ref.No. 40 Technology Exchange Ltd
DIAGNOSTIC TESTS FOR TUBERCULOSIS IN VETERINARY MEDICINE Patents and know-how are available for three gene probes and

monoclonal antibodies which have been isolated for the rapid detection of TB for use in a diagnostic kit. Can identify specific TB type therefore very effective epidemiology tool. The test can also be used for *Mycobacterium Bovis* as well as M.T.B. (Our ref: TO 167).

Stage of Development: Laboratory

Type of Cooperation: Licensing

Ref.No. 41 Technology Exchange Ltd

HEAVY DUTY SEED PLANTER A precision planter, strongly built for use in the widest range of field conditions. Designed for tough, minimum tillage conditions, it features double disc openers which help to maintain the accuracy of planting, even in trashy or compacted soils. For better prepared seedbeds, a front wheel instead of the disc opener, is available. In addition to being very accurate, the use of the unique rubber belt metering system ensures that the unit is also very gentle, making it particularly well suited to delicate seeds like groundnuts. It is also very versatile and will accurately plant a wide range of other seed types, including acid delinted cotton and all types of bean. It is simple to operate and maintain and has a high workrate. Minimum row sewing is 30 cm. (Our ref: Stanhay Jumbo 3100).

Stage of Development: Commercialized

Type of Cooperation: Equipment supply

Ref. No. 42 Technology Exchange Ltd
TRACTOR-MOUNTED DEEP BORE HOLE DRILLING RIG This portable rig, which is hydraulically powered from the power take-off on a tractor or truck, can be attached to the vehicle in 10 minutes and will drill to depths of 1,000 feet (300 metres). The rig is of simple and robust construction and ideal for operation in remote areas for mineral exploration, site investigation, water well drilling and oil/gas seismic drilling. It is designed to require the minimum of maintenance and will provide many years of trouble-free operational life in remote areas. The drill head has a twin cylinder feed, applying a maximum thrust of 4,900 Kg (10,400 lb) and an extraction force of 7,400 Kg (16,500 lb). It has a stroke of 500mm, a spindle bore of 125mm and an applied drill torque of 1,000mm (737 lb ft). The rig has a shell and auger for dry sampling, a 140 lb drop hammer for site investigation and a large size casing driver for water well drilling. It has simple controls for wire line or conventional drilling and operational power packs for underground or remote areas. The ground bearing area is 6 sq. ft. and it comes complete with an integral water pump with WAVC control.

Stage of Development: Commercialized

Type of Cooperation: Licensing, Joint Venture

Ref. No. 43 Technology Exchange Ltd
AGRICULTURAL MACHINERY Manufacturer of very wide range of agricultural equipment and distributing through over 500 live accounts, seeks manufacturers or distributors of a complementary range of agricultural equipment, for manufacturing and/or cross distribution agreements. Current equipment: bale handling, fore end loaders, saw benches, wood guillotine, silage and manure handling, subsoilers and mole drainers, straw choppers, pasture toppers, cultivation equipment, post drivers etc. (Our ref: TO 307).

Stage of Development: Commercialized

Type of Cooperation: Joint venture; licensing; technical assistance; distribution

Ref. No. 44 University of Malawi
SOLAR GRAIN DRYER Technology offered for a solar grain dryer with solar powered air circulation.

Ref. No. 45 University of Zambia
NUT AND SEED PROCESSING This is an R&D Unit developing agricultural and rural equipment with proven technologies for commercial manufacture: manual wooden groundnut sheller; manual hand maize sheller. Capacity: 60kg of shelled maize per hour, and manually operated ram press for oil extraction from sunflower seed.

Ref. No. 46 Vogelenzang Anelst BV
THRESHING AND HULLING MACHINES Turnkey cereal threshing machines with capacities from 500 to 1,500 kg/hr and rice hulling machines with capacities of 100 - 400 kg/hr. The machinery is manufactured from ribbed pressed steel and incorporates rotors made of high wear resistant cast iron. Rotors have been developed with the aid of modern computer techniques. The resulting machinery is very efficient, has a good operating capacity, is low on energy consumption and causes less grain loss. Current production capacity is 100 units/year with a unit price of US\$ 2,500. Inputs required: land - indoor 150 sq m, outdoor - 250 sq m; manpower: skilled - 4, unskilled - 6. Project cost: equipment US\$ 50,000; fees for technical know-how US\$ 25,000; and operational cost for one year based on 100 units US\$ 20,000.

Stage of Development: Commercialized

Type of Cooperation: Licensing; turnkey

Ref. No. 47 ZTS Tees Sp Martin
WHEELED SKIDDERS FOR FORESTRY WORK Well known producer of wheeled skidders for use in forestry work seeks co-operation partner to produce several vehicles from the range for Indian and markets in other developing countries. The skidders are designed for the cultivation, cutting, hauling of trees or logs (by means of a rope or bucket) and for semi-suspension hauling of the payload from harvest site to storage site. The skidders are designed to work in terrain with obstacles up to 0.45 m. The skidders can also be used for agricultural operations when using equipment with front and rear power take-off shafts as well as front and rear three-point linkages.

Stage of Development: Commercialized

Type of Cooperation: Joint venture; licensing; distribution

Ref.No. 48 African Regional Centre for Technology (ARCT)

CASSAVA PROCESSING INTO GARI Patented process for the processing of cassava into gari. Production capacity is 1.5 - 3 tons of cassava per day (8 hrs), output: 500 kg of gari. The process undertaken includes: peeling, grating, fermentation, grinding, grading, garification and packaging. The process plant utilizes new and renewable energy sources. In particular, the dehydration phase uses a solar dryer and garification uses a biogas digester. Total project cost is US\$ 132,000.

Stage of Development: Patented

Ref.No. 49 African Regional Centre for Technology (ARCT)

PROCESSING OF PALM NUTS TO PALM OIL Technology for a palm oil extractor which reduces the fuelwood requirements. Project cost US\$ 15,500.

Stage of Development: Pilot plant

Ref.No. 50 African Regional Centre for Technology (ARCT)

FISH AND SEAFOOD PROCESSING Patented technology available for the processing and preservation of 0.1 tonne/day fish and seafood. Processes include: smoking, drying, salting, fermentation and packaging. Technology reduces post-harvest losses. Project cost is US\$ 65,000.

Stage of Development: Patented

Ref.No. 51 AFRO General Engineers & Contractors Ltd'

MAIZE, RICE AND COFFEE PROCESSING EQUIPMENT A variety of machinery for the processing of rice, maize and coffee is available which includes: maize mills; rice, maize and coffee hullers, and oilseed presses. Typical throughput is 600 kg/hr and typical machine cost is US\$ 2,200.

Stage of Development: Pilot plant

Type of Cooperation: Sub contracting; turnkey

Ref.No. 52 Akaki Spare Parts and Hand Tools Factory

SPARE PARTS FOR SUGAR MILLS A range of spare parts is available for sugar mills including: sugar rollers, shells, pinion gears, transplates, scraper plates, gas pipes etc.

Stage of Development: Commercialized

Ref.No. 53 Alvan Blanch Development Co Ltd
RICE PROCESSING Fully proven equipment for the milling, parboiling, cleaning and destoning, packaging, drying and storage. Also technical advice and know-how. Full utilization of waste products.

Type of Cooperation: Licensing; sub-contracting; investment; joint venture; turnkey

Ref.No. 54 Alvan Blanch Development Co Ltd
FRUIT AND VEGETABLE PROCESSING SYSTEMS Equipment for packing, washing, juice and jam production, drying and packaging. Also technical expertise and know-how and assistance with product marketing. Processing of waste fruit products.

Type of Cooperation: Licensing; sub-contracting; investment; joint venture; turnkey

Ref.No. 55 Asian and Pacific Centre for Transfer of Technology

TECHNOLOGY FOR IMPROVEMENT OF SUGAR MANUFACTURING PROCESS AND MANUFACTURE OF DOWNSTREAM VALUE ADDITION PRODUCTS Indian company offers know-how and its experience in the field of production of sugar cane plantlets, cane preparation, milling, pressure evaporation, continuous pan, power economy in injection and spray, juice heating with pan vapour, central condensing system, high efficiency pumps, valves and pipelines, production of alcohol from molasses, cogeneration, bagasse fired lime kiln and value added products from alcohol. Advantages: highly cost effective; lower power consumption; environment friendly and higher process efficiencies.

Stage of Development: Commercialized

Type of Cooperation: Joint venture; turnkey

Ref.No. 56 Asian and Pacific Centre for Transfer of Technology

INNOVATIVE RICE BRAN OIL REFINING TECHNOLOGY BY MOLECULAR DISTILLATION/HIGH VACUUM DISTILLATION/SHORT PATH DISTILLATION Crude oil can have FFA level up to 65% with other impurities: bran, gums, wax etc. Conventional refining technologies result in high losses making it uneconomical to refine. Solvent based processes also have technical limitations. Molecular distillation is a unique, innovative and revolutionary approach to refining of crude oils by directly recovering FFA as a value added product. The technology is a breakthrough due to the application of high vacuum distillation technology. Superior alternative to alkali refining/physical refining miscella refining and fat splitting. For crude oils with FFA above 5% this technique is highly cost effective. Areas of application: food industry, agriproduct processing; edible oils and FFA from medium FFA crude oil; low FFA crude oil; monoglycerides and FFA from high FFA crude oil; any crude oil and any FFA level can be processed. Can be integrated into an existing refinery or solvent extraction plant or fat splitting plant. Used for rice bran oil processing, fatty acids recovery. Advantages: direct recovery of pure FFA, no soapstock, no acid oil; ecologically clean technology, cleaner production; no pollution; no solid or liquid effluents; no acid water discharge; reduction in refinery wash water by 70%; does not involve soapstock splitting responsible for acid water discharge; low energy input; low utility cost; low refinery losses; total losses - 10%; yield of all major products - 90%; low consumption of alkali; low investment; low operational cost and superior oil quality; cheaper raw materials. Pay-back period: 1 to 2 years. Inputs required: steam - 2 tons/hour; building - 1,000 sq m; land - 5,000 sq m; water - 50 cu m/day and power - 500 kVA. Manpower required: total - 35; skilled - 15 and unskilled - 5. Production capacity: 50 tons/day or 15,000 tons/year (input). Raw materials: crude rice bran oil (of any FFA). Economic data: total project cost - US\$ 3 million; machinery/equipment (FOB) - US\$ 2.4 million; operational cost/year - US\$ 1 million; know-how fee - US\$ 200,000 and training fee - US\$ 25,000. *Stage of Development:* Commercialized

Type of Cooperation: Know-how; consultancy; turnkey; equipment supply; technical assistance; training

Ref.No. 57 Asian and Pacific Centre for Transfer of Technology

EDIBLE SALT FROM RAW SEAWATER (KOREA) The process consists of the following steps: seawater, condenser, filter, filtered seawater, secondary filter, electro-dialyzer, brine, triple-effect vacuum evaporator, centrifuge, dryer, packer, common salt (30 kg), table salt (1 kg, 5 kg, 25 kg), special grade salt. Specifications: dry salt (table salt); NaCl < 99.0%; moisture > 0.5%; particle size (145-150 micro-m) < 80.0%; wet salt (common salt); NaCl < 97.0%; moisture < 3.0%; particle size (145-590 micro-m) < 80.0%; manufacturing equipment: (100,000 base): boiler (55 t/hr), turbine generator (6.5 MW, back press. type), electro-dialyzer, triple-effect vacuum evaporator. Areas of application: food industry. During salt production, by products like bromine, magnesium chloride, potassium chloride, magnesium hydroxide, magnesia, magnesium sulfate (crystalline or anhydrous) can also be manufactured via additional processing.

Stage of Development: Commercialized
Type of Cooperation: Turnkey

Ref.No. 58 Asian and Pacific Centre for Transfer of Technology

MANUFACTURING TECHNOLOGY FOR COFFEE WHITENERS (KOREA) The coffee whitener is a powdered non-dairy creamer with vegetable oil which has excellent solubility and improved shelf-life. It enhances the taste of coffee products and can also be added to instant tea and cocoa for richer flavour. Specifications: mixing (60-70 degrees C); pasteurization (72 degrees C, 10-20 sec); homogenization (3,000 PSI) and spray drying. Advantages: economic (cheaper raw material); uniform product qualities; easy to handle, prolonged shelf life and facilitates the production of low calorie products. *Stage of Development:* Commercialized
Type of Cooperation: Licensing, know-how; sub-contracting

Ref. No. 59 Asian and Pacific Centre for Transfer of Technology

NEEM SEED BITTERS FOR PRODUCTION OF ECOLOGICALLY FRIENDLY PESTICIDES/INSECTICIDES AND MEDICINES

"Neem Bitters" have emerged a major breakthrough in the search of ecofriendly pesticides compared with chemical pesticides. The turnkey plant consists of a total package of technology, engineering, design, quality control methods and procedures etc starting from seed collection and storing techniques to the standardized product that is 10% Azadirachtin containing NSKE powder, which is ready for use as technical material by formulators of Neem based safe and ecofriendly pest control agents, for use in agriculture and household. The plant consists of: structural and basic infrastructure; seed pre-processing section; storage system; extraction and recovery plant; purification division; finishing, packing and finished product storage and quality assurance laboratory. Areas of application: the product can be used in agriculture for pest control, formulation of suitable agricultural pesticide formulae, pesticides and insecticides. Neem fractions can also be used for different biological applications in medicine/biomedicine, contraception etc. Advantages: ecologically clean product; totality of all process requirements are covered; conservation of the bio-activity of active principles; minimum consumption of all inputs or production; total quality management; standardized product of internationally accepted quality and state of the art technology appropriate to match the needs of developing countries. Payback period: 3 years. Inputs required: steam - 2 D/day; chilling plant 10 T; building - 10,000/ sq ft; land - 5 acres (7.5 hectares); water - 5,000 gallons/day and power - 75 kw. Manpower required: skilled - 9 and unskilled - 11. Production capacity: processing of 10 tons of seeds per day. Economic data: equipment and plant - US\$ 776,700; know-how fee - US\$55,000; quality assurance laboratory - US\$ 84,000; (the above includes technical know-how and engineering design); royalty fee - 2% of the gross sales turnover of the product for seven year period; cost of production - US\$ 0.4 per gram of Azadirachtin (based on good Azadirachtin containing seeds and the price of seeds prevailing in India). Expected

sales price - US\$ 1.5 per gram of Azadirachtin.

Stage of Development: Commercialized

Type of Cooperation: Know-how; engineering design; turnkey; licensing

Ref. No. 60 Asian and Pacific Centre for Transfer of Technology

PRE-MIX - MIXTURE OF VARIOUS INGREDIENTS FOR COOKING PURPOSES (KOREA)

Pre-Mix is an abbreviation for "prepared mixture". Pre-Mix is a mixture of various ingredients such as sugar, oil, powdered milk, salt, yeast and various flavours. It is prepared in advance for user's convenience. The manufacturing process consists of the following steps: intake and storage (bins for flour and sugar) - proportioning and scaling (tubular screw conveyor and scale hopper with load cell - mixing and homogenizing (lodge mixer and paddle conveyor and sifter) - bagging and packing (packed into large bags of 10 kg to 25 kg). Various pre-mixes can be produced: frying butter mix, donut butter mix, hot cake butter mix, green bean pancake butter mix, hamburger bun butter mix, cracker butter mix, corn biscuit butter mix, nut bread butter mix etc. They are used for fried dishes, fried chicken, baking fresh bread/pancakes, cooking of traditional Korean dishes etc. Manufacturing equipment and facilities: flour storage bin, sugar storage bin, scale hopper for ingredients, lodge mixer, set of fittings for liquid fats, paddle conveyor, sifter (turbo star), bagging machine, dust collector, other facilities. Time for delivery: 10 months. Advantages: users safe time and efforts to purchase and prepare ingredients; storing space can be minimized; consistency and high quality of products; manufacturing process is simple and fully automated. Inputs required: power - 3 phase AC 220V, 60 Hz. Production capacity: 60 tons/day (16 hours, 2 shifts). Raw materials: flour, sugar, corn starch, soya flour, skimmed milk powder, baking powder, salt, vegetable oil, emulsifier, flavours, spices, seasoning, egg yolk powder, oxidizer, improving agents, other food additives. Economic data: total project cost - US\$ 670,000.

Stage of Development: Commercialized

Type of Cooperation: Turnkey

Ref.No. 61 Asian and Pacific Centre for Transfer of Technology

VANASPATI GHEE AND ALTERNATIVE REFINED OILS FOR FOOD INDUSTRY Indian company offers technology for manufacturing Vanaspati ghee or alternative refined oils. The process involves refining of edible oils, hardening through hydrogenation and de-odourization. The process consists of the following steps: neutralization; bleaching; hydrogenation; post refining; de-odourization. Areas of application: Vanaspati and alternative refined oil - in food industry for cooking media. By products: acid oil - in soap manufacturing; oxygen - for industrial use. Inputs required: steam - 500 kg/h; water - 40 cu m/day for 50 TPD plant; power - 2,000 kVA/day. Production capacity: 30 TPD to 100 TPD. Economic data: total project cost - US\$ 1.6 million; US\$ 2.2 million and US\$ 3.3 million for 30 TPD; 50 TPD and 100 TPD plants.

Stage of Development: Commercialized

Type of Cooperation: Turnkey

Ref.No. 62 Asian and Pacific Centre for Transfer of Technology

"DASHIDA" AND OTHER ARTIFICIAL SEASONINGS WITH VARIOUS NATURAL FLAVOURS Korean company has created 15 different high quality seasonings, including a series of new farious Dashida used with meat meals. The company has also developed nucleic acid condiments. These seasonings are not only being exported, but are being manufactured overseas as well. For seasonings, the company provides such key technologies as: manufacturing of Monosodium Glutamate (MSG) and manufacturing of Nucleic Acid Condiments. The company is manufacturing about 15% of the MSG world market. Process for MSG consists of the following steps pretreatment: fermentation, glutamic acid crystallization, neutralization, decolourization and filtration, MSG crystallization, packing. Major technologies: fermentation, crystallization and purification. Manufacturing equipment: fermentation tanks, glutamic acid crystallizer, evaporator, centrifuger, MSG crystallizer. Advantages: low production cost, energy efficient technology and a product with good export potential. Manpower required: total - 56. Production capacity: 100 kg/h. Raw materials:

cane molasses, salt, powdered soy sauce, monosodium glutamate, starch, onion, other natural ingredients. Economic data: total project cost - US\$ 2,100,000.

Stage of Development: Commercialized

Type of Cooperation: Licensing; sub-contracting; joint venture; turnkey

Ref.No. 63 Asian and Pacific Centre for Transfer of Technology

INNOVATIVE CENTRIFUGELESS ALKALI REFINING LLX PROCESS PRODUCING HIGHEST YIELD OF EDIBLE OILS Conventional alkali refining processes use centrifuges for all unit operations such as soapstock removal and waterwashing. Based on the principle of the liquid-liquid extraction, the new process does not use centrifuges or any moving parts thus reducing associated time losses, requirement of spare parts, costs and maintenance. It occupies less space, needs less steam, power and manpower. The technology essentially eliminates the emulsion/saponification problems of conventional refining. It can satisfactorily refine upto 10% FFA feedstocks of crude edible oils. It eliminates the need for waterwashing, single or double and drying. Static components ensure high reliability, availability and eliminates breakdowns. It can easily be fitted into an existing plant. Areas of application: food industry; processing of edible oils; refining of crude oils and fats for further processing; Vanaspati manufacturing; manufacturing of hydrogenated oils and fats; suitable for rice bran oil/cotton seed oil with high colour, 10% FFA and applicable to all types of crude oils. Advantages: environmentally sound technology; soap is recovered in a high fatty matter semi-solid form; low noise level. About 250 litres of water with pH 5 is generated per ton of oil. This water form oil fatty matter should be neutralized before discharge; highest yield of edible oil; approaches theoretical values, no emulsification/saponification problems in processing; no moving parts, hence no breakdowns; no centrifuges, drive, etc; compact system; energy efficient technology; consumes less power and steam and eliminates the need for water washing and drying. Pay back

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period: 6 months. Inputs required: steam - 250 kg/hour at 1 bar; building - 100 sq m; land - 100 sq m; water - 280 litres/ton of oil; power - 15 HP. Manpower required: total - 2; skilled - 1 and technicians - 1. Production capacity: 50 tons per day (input of crude oil). Raw materials: crude oils - rice, bran oil, cotton seed oil, palm oil, plum kernel oil, rapeseed/mustard oil, coconut oil, soybean oil, sunflower oil, groundnut oil, lard, mutton tallow etc. Any oil can be processed. Economic data: total project cost - US\$ 100,000 (for machinery/equipment); know-how fee - US\$ 30,000; training fee - US\$ 5,000 and operational cost/year - US\$ 150,000.

Stage of Development: Pre-launch

Type of Cooperation: Know-how; equipment supply

Ref.No. 64 Asian and Pacific Centre for Transfer of Technology

SPIRULINA ALGAE AND RELATED PRODUCTS PRODUCTION Spirulina, a microscopic blue-green algae has been predicted as one of the most promising candidates for the production in situ of high amounts of protein, vitamins and mineral rich foodstuffs. The algae is known to contain 60-70% protein on a dry weight basis, and large amounts of pro-vitamin A, cyanocobalamin and iron. In the technology on offer, algae are grown in outdoor horizontal photo-bioreactors. Algal biomass is separated from the liquid phase by filtration, rinsed and then dried by means of contact with a gaseous phase having a lower water partial measure than the wet product. The product itself can be transformed into tablets, capsules, health food, pharmaceuticals, cosmetics etc. A food colouring agent or fluorescent dye for medical tests preparation can be easily extracted from the product. Advantages: qualitative and quantitative advantages with regards to photosynthetical food production (425 kg edible dry weight per hectare and per day production); environmentally sound technology. The "impact" is release of oxygen to the atmosphere; a number of solutions are available for each particular step resulting in flexibility of the process; and the product bears a high price at the international market (raw powdered product up to

US\$ 40/kg. Production capacity: from 1 to 200 tons/year and more.

Stage of Development: Commercialised

Type of Cooperation: Manufacturing licence; know-how; consultancy; turnkey; equipment supply; technical assistance; training

Ref.No. 65 Avec Industries

CORRUGATED FIBRE BOARD CARTONS for the packaging of fruit, edibles, vegetables and other items. The plant utilizes state-of-the-art technology for heavy duty corrugation and allows wide variation in carton sizes. A complete package is offered to include equipment and training of the local workforce. The packaging is very light, maintains moisture and prevents bruising. The plant can produce in excess of 100,000 cartons per day. Project cost: equipment - US\$ 9.95 million; technical know-how fees - US\$ 0.05 million. Manpower required: 8 skilled and 6 unskilled.

Stage of Development: Commercialized

Type of Cooperation: Joint venture; turnkey

Ref.No. 66 B & C Engineering

MAIZE MILL AND MACADAMIA DEHUSKER Technology offered for a maize mill and a macademia dehusker.

Ref.No. 67 B & C Engineering

COOKING POTS Technology offered for wood-fired and electric cooking pots.

Ref.No. 68 B & C Engineering

TEA AND COFFEE PROCESSING Technology and machinery offered for the processing of tea and coffee.

Ref.No. 69 Bentall Rowlands Texas Ltd

COFFEE WASHING AND TRANSPORTATION PUMP MACHINES to handle Arabica coffee throughout wet processing facilities. 5.5 kW drive. Installation and training services available. *Stage of Development:* Production *Type of Cooperation:* Turnkey; production equipment; training

Ref. No. 70 Bentall Rowlands Texas Ltd
COFFEE CLEANING, GRADING AND DESTONING MACHINES with capacity from 1,000 kg per hour to 10,000 kg per hour working on both Arabica and Robusta varieties. Installation and training services available.

Stage of Development: Production

Type of Cooperation: Turnkey; production equipment; training

Ref. No. 71 Bentall Rowlands Texas Ltd
COFFEE DRYING MACHINE both batch and continuous types to handle Arabica and Robusta varieties. Fuel for drying can be liquid gas, oil or coffee husk. Installation and training services available.

Stage of Development: Production

Type of Cooperation: Turnkey; production equipment; training

Ref. No. 72 Bentall Rowlands Texas Ltd
COFFEE POLISHING MACHINE with capacity of 1,000 kg per hour on parchment coffee. 11 kW drive. Phosphor bronze polishing components. Installation and training services available.

Stage of Development: Production

Type of Cooperation: Turnkey; production equipment; training

Ref. No. 73 Bentall Rowlands Texas Ltd
COFFEE HULLING MACHINES with capacity from 100 kg per hour up to 1,600 kg per hour working on both Arabica and Robusta varieties. Drives from 4 kW to 22 kW - electric or engine prime movers. Installation and training services available.

Stage of Development: Production

Type of Cooperation: Turnkey; production equipment; training

Ref. No. 74 Bentall Rowlands Texas Ltd
BULK STORAGE AND MECHANICAL HANDLING OF GRANULAR CROPS AND MEALS Storage from 5,000 t to 5,000 tonnes. Conveying systems from 5,000 kg per hour to 100 tonnes per hour. Installation and training services available.

Stage of Development: Production

Type of Cooperation: Turnkey; production equipment; training

Ref. No. 75 Bentall Rowlands Texas Ltd
MAIZE MEAL PRODUCTION EQUIPMENT both plate and hammer machines to handle between 300 kg per hour and 3,000 kg per hour from 4.0 kW to 40 kW drives. Either electric or engine prime movers for human or animal consumption. Installation and training services available.

Stage of Development: Production

Type of Cooperation: Turnkey; production equipment; training

Ref. No. 76 Bentall Rowlands Texas Ltd
COFFEE PULPING MACHINES with capacity from 300 kg per hour up to 3,000 kg per hour. Hand powered to 22 kW electric or engine drives. Installation and training services available.

Stage of Development: Production

Type of Cooperation: Turnkey; production equipment; training

Ref. No. 77 Biomachinostroene Ltd
FOOD PROCESSING MACHINERY Company offers technology and equipment for the following range of activities within the food processing sector: stainless steel containers of various designs to a maximum capacity of 50 cu m; small plants for production of dairy products; spirits; flavoured syrups and beer; machines for producing carbonated soft drinks, bottle washing machines, closing and filling machines and screw cap glass bottle capping machines.

Stage of Development: Production

Type of Cooperation: Production equipment; licensing

Ref. No. 78 Central Food Technological Research Institute

PRODUCTION OF FISH PICKLE The fish is dressed, filleted, cut and put into tubs. The pieces are marinated with salt and vinegar and then fried in oil. The fried fish is placed in a bath of acetic acid and salt. After conditioning, the pieces are mixed with spices, sugar syrup and vinegar. The product is filled in sterilized bottles. Major equipment: grinder, friers, packing machine. Application areas: used as pickle and taste enhancers. Environ-

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mental aspects: does not pose any pollution problem. Production capacity: 100 kg pickles/day. Inputs: land/bldg (sq m) indoor - 100, outdoor - 500; manpower: skilled - 3, unskilled - 5; power: 8 kW; water: 5 kl per day. Project cost: equipment/machinery (FOB) - US\$ 7,000, fees for technical know-how/training - US\$ 4,000, operational cost per year - US\$ 26,000.

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 79 Central Food Technological Research Institute

STRAINED BABY FOOD The raw materials after cleaning are passed through a pulper to get a smooth paste. In case of meat it is cooked, minced and mixed with spices, salt and passed through a finisher to get smooth paste. This paste is filled in a rigid container and processed to obtain commercial sterility. The major equipments are washer, cutter, pulper, sieve, homogenizer, retort, cooker, boiler etc. Application areas (uses): ready to eat baby food, either wet or dry (fruit, vegetable, meat or egg). Environmental aspects: effluent treatment system may be needed. Production capacity: 5 tons per day. Inputs: land/bldg (sq m) indoor - 1,000, outdoor - 4,000; manpower: skilled - 50, unskilled - 80; power: 125 kW; water: 10 kl per day. Project cost: equipment/machinery (FOB) - US\$ 340,000, fees for technical know-how/training - US\$ 60,000, operational cost per year - US\$ 300,000.

Stage of Development: Pilot plant

Type of Cooperation: Licensing

Ref.No. 80 Central Food Technological Research Institute

INSTANT PICKLES OF MANGO AND LIME Fully matured fresh raw mangoes/limes are washed and cut into uniform sizes, brine cured at optimal conditions and dried suitably. Cleaned and dried spices like red chillies, turmeric and mustard are ground separately and are mixed with cured and dried mango/lime pieces and packed in polythene bags. Reconstitution of dry mix is to soak overnight in water and oil to get the pickle ready for use.

Major equipment: cabinet drier spice grinder, frying pan, heat seekers etc. Application areas: instant pickle mix can be converted to a palatable pickle at home without any difficulty by simple addition of water and oil. The dry mix is convenient product to pack, transport and handle in the trade channel. Environmental aspects: does not pose any pollution problem. Production capacity: 250 kg per day. Inputs: land/bldg (sq m) indoor - 100, outdoor - 600; manpower: skilled - 10, unskilled - 20; power: 40 kW; water: 5 kl per day. Project cost: equipment/machinery (FOB) - US\$ 15,000, fees for technical know-how/training - US\$ 10,000, operational cost per year - US\$ 80,000.

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 81 Central Food Technological Research Institute

FRUIT JUICE CONCENTRATE AND PASTE FROM MANGO, PINEAPPLE, ORANGE AND TOMATO Ripe fruits are cut and passed through a pulper to get a smooth pulp. The pulp is pasteurized, cooled and evaporated and passed through an aroma recovery system. The aroma is collected and added back to the concentrate. Major equipment needed: fruit washer, fruit mill, pulper, blancher, evaporator, centrifuge, pasteurization plant, chilling plant and aseptic processing unit. The concentrates can be used to make RTS, squash, jams, salads and ice creams. Environmental aspects: effluent treatment plant will be needed. Production capacity: 6,000 mt per annum. Inputs: land/bldg (sq m) indoor - 3,000, outdoor - 15,000; manpower: skilled - 15, unskilled - 4; power: 200 kW; water: 20 kl per day. Project costs: equipment/machinery (FOB) - US\$ 2.5 million, fees for technical know-how/training - US\$ 120,000, operational cost per year - US\$ 3.6 million.

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 82 Central Food Technological Research Institute

NATURAL SAUSAGE CASINGS The intestines are washed thoroughly, loosened and after grading given salt curing. This is done to loosen the slime and prevent bacterial weakening. Then the casings are cleaned, graded and salted and can be stored in polybags for a period of 1 year at room temperature without any bacterial deterioration. The equipment required includes: intestine crusher, jet washing system, tubs, chlorinator and water pumps. Application areas: can be used in sausage preparation, in surgical ligatures, in sport for racket cutting and in musical instruments as strings. Environmental aspects: an effluent treatment plant may be required. Production capacity: 1,000 sheep intestines per day. Inputs: land/bldg (sq m) indoor - 100, outdoor - 500; manpower: skilled - 10, unskilled - 10; power: 10 kW; water: 1,250 lit/hr. Project cost: equipment/machinery (FOB) - US\$ 20,000, fees for technical know-how/training - US\$ 5,000, operational cost per year - US\$ 75,000. *Stage of Development:* Pilot plant
Type of Cooperation: Licensing

Ref.No. 83 Central Food Technological Research Institute

SAUSAGES FROM MEAT, FISH, CHICKEN AND PORK Deboned minced meat is mixed with fat, ground spices, salt, green vegetables, fillers and binders. This emulsion sausage is filled into casings and stored in a refrigerated condition. Major equipment: meat deboner, mincer, filling machine, retorts, boiler and refrigerated store. Environmental aspects: effluent treatment plant may be needed. Production capacity: 500 kg/day. Inputs: Land/bldg (sq m) indoor - 100, outdoor - 600; Manpower: skilled - 5, unskilled - 5; power: 25 KW; water: 10 kl per day. Project cost: equipment/machinery (FOB) - US\$ 20,000, fees for technical know-how/training - US\$ 4,000, operational cost per year - US\$ 1,20,000. *Stage of Development:* Commercialized
Type of Cooperation: Licensing

Ref.No. 84 Central Food Technological Research Institute

DEHULLING OF SUNFLOWER SEED The cleaned sunflower seeds are graded into three fractions: small, medium and bold. The seeds are fed to centrifugal sheller and the hull gets cracked and shelling takes place. After dehulling, the seeds are sieved to separate kernels, broken fines and hulls. Principal equipment used: destoner, cleaner cum grader, centrifuger sheller and aspirator. Application areas: the products obtained from the sunflower seed can be used for: preparation of snacks and confectionery item; edible quality oil rich in unsaturated fatty acids; edible quality cake/flour; hulls for production of wax/fuel. Environmental aspects: the processing of sunflower seed does not pose any problem for pollution. Production capacity: 1 ton per hour. Inputs: land/bldg (sq m) indoor - 200, outdoor - 1,000 sq m; manpower: skilled - 5, unskilled - 8; power: 40 kW; water: 5 kl/day. Project cost: equipment/machinery (FOB) - US\$ 35,000, fees for technical know-how/training - US\$ 15,000, operational cost per year - US\$ 78,400. *Stage of Development:* Commercialized
Type of Cooperation: Licensing

Ref.No. 85 Central Food Technological Research Institute

PRODUCTION OF JAMS, JELLIES AND MARMALADE Good quality ripe fruits are washed, peeled and cut into small pieces. These are pulped and heated in steam jacketed kettles. Sugar is added and heated further until mass becomes thick in consistency. At this stage colour, flavour and preservatives are added. The hot products are bottled and cooled. Principal equipment needed: pulper, SS kettle, fruit mill, bottle washing machine, bottle filler, boiler etc. Environmental aspects: no environmental problem. Production capacity: 1 ton per day. Inputs: land/bldg (sq m) indoor - 100, outdoor - 600; manpower: skilled - 10, unskilled - 20; power: 20 kW; water: 10 kl/day. Project cost: equipment/machinery (FOB) - US\$ 20,000, fees for technical know-how/training - US\$ 5,000, operational cost per year - US\$ 90,000. *Stage of Development:* Commercialized
Type of Cooperation: Licensing

Ref.No. 86 Central Food Technological Research Institute

EDIBLE SOYA FLOUR (FULL FAT) The whole soyabean is soaked in water overnight. The soaked beans are subjected to cooking for a minimum amount of time to reduce the beany flavour. The cooked beans are dried. These are cracked in a suitable mill and hulls are separated. Dehulled meals are ground to the desired particle size. The principal equipment needed includes: destoner, roaster, cooler, tray drier, dehuller, aspirator and pulveriser. Application areas: soya flour is extensively used in fabricated foods, meat products, ready to eat products, instant mixes, food drinks, confectioneries and high protein foods. Environmental aspects: the process does not pose a pollution problem. Production capacity: 25 mt per day. Inputs: land/bldg (sq m) indoor - 200, outdoor - 1,000; manpower: skilled - 10, unskilled - 20; power: 50 kW, water: 10 kl. Project cost: equipment/machinery (FOB) - US\$ 14,000, fees for technical know-how/training - US\$ 4,000, operational cost per year - US\$ 1,58,000.

Stage of Development: Commercialized
Type of Cooperation: Licensing

Ref.No. 87 Central Food Technological Research Institute

CANNED FRUIT AND VEGETABLES Selection and preparation of raw material is important. The preparation and treatment varies from fruit to fruit and vegetable to vegetable. The prepared fruits are subjected to a fruit mill followed by a pulper to get a smooth pulp. The pulp is standardised and heated to 90 degrees C, hot filled in pre-sterilized cans. The cans are sealed and processed in boiling water. The processed cans are cooled, dried and labelled and carton packed. Vegetables are canned in 2% brine solution and the filled cans are processed in retorts under pressure. The equipment required includes: fruit mill, pulper, SS jacketed kettle, retorts, boiler etc. Application areas: canned fruits and vegetables have a good demand in export and domestic market. Mango, pineapple products find a large export market. The advantage of canned fruit and vegetables are that they are available to the consumer throughout the year. Environmental aspects: the unit does not pose an environmental problem. Production capacity: 4

tons raw material per day. Inputs: land/bldg (sq m) indoor - 100, outdoor - 1,000; manpower: skilled - 10, unskilled - 22; power: 40 kW; water - 40 kl. Project cost: equipment/machinery (FOB) - US\$ 18,000, fees for technical know-how/training - US\$ 4,000, operational cost per year - US\$ 150,000.
Stage of Development: Commercialized
Type of Cooperation: Licensing

Ref.No. 88 Central Food Technological Research Institute

BOTTLING AND PRESERVATION OF SUGARCANE JUICE BEVERAGE Fresh juicy and matured sugarcane is selected for crushing. The juice so obtained is clarified and filtered to get a clear solution. Required quantity of permitted preservatives, additives and flavours are added. The final solution when incubated at a desired temperature for about a week turns out to be a malting beverage with good storage life and no sign of fermentation. The juice is packed in 200 ml bottles and crown corked. The major equipment needed are cane crusher, plate and frame filter press, boiler, bottling plant and water treatment plant. Environmental aspects: the unit will not pose a pollution problem. Production capacity: 3,000 bottles/day. Inputs: land/bldg (sq m) indoor - 150, outdoor - 600; manpower: skilled - 10, unskilled - 18; power: 20 kW; water: 10 kl per day. Project cost: equipment/machinery (FOB) - US\$ 21,000, fees for technical know-how/training - US\$ 5,000, operational cost per year - US\$ 47,000.

Stage of Development: Pilot plant
Type of Cooperation: Licensing

Ref.No. 89 Central Food Technological Research Institute

POTATO PRODUCTS Potatoes are washed and peeled in an abrasion peeler and are sliced. The slices are blanched in hot water and after cooling and dewatering they are dried. To prepare potato flour, the slices are soaked overnight in a salt solution and are granulated using a mincer and the granules are dried. After drying the granules are ground in a plate mill to obtain flour. To make potato chips the slices after dewatering are deep fat

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fried. The fried chips are cooled and packed in aluminium foil and flushed with nitrogen for a longer shelf life. Application areas: a number of traditional products can be made. It can be used for making soup, and also can be used as a thickening agent. Fried chips are extremely popular as snack item. Environmental aspects: effluent treatment system may be needed. Production capacity: 500 kg per day. Inputs: land/bldg (sq m) indoor - 100, outdoor - 600; manpower: skilled - 12, unskilled - 16; power: 20 kW; water: 8 kl per day. Project cost: equipment/machinery (FOB) - US\$20,000, fees for technical know-how/training - US\$5,000, operational cost per year - US\$ 63,000.

Ref.No. 90 Central Food Technological Research Institute

INSTANT TEA Fresh tea leaves are cleaned, shredded, cut and fermented. The fermented leaves are subjected to counter current extraction. The extract is filtered and centrifuged. This is then concentrated and dried in a spray dryer. The product is packed in an air tight container. Major equipments are evaporator, centrifuge, filter, spray dryer and steam generator. Environmental aspects: no pollution problem. Production capacity: 1.5 tons per day. Inputs: land/bldg (sq m) indoor - 2,000, outdoor - 10,000; manpower: skilled - 25, unskilled - 50; power: 416 kW; water: 20 kl per day. Project cost: equipment machinery (FOB) - US\$700,000, fees for technical know-how training - US\$200,000, operational cost per year - US\$ 1,500,000.

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 91 Central Food Technological Research Institute

WAX EMULSION FOR FRUIT AND VEGETABLE PRESERVATION The process of wax emulsion involves preparation of waxol w 12 and waxol 0 12. These emulsions are prepared separately and finally mixed together to get the required solution. In the preparation of wax emulsion are waxes, emulsifying agents, shining agents and fungicides. Equipment required for the preparation of wax emulsions are stainless steel and aluminium

vessels, motor operated stirrer, LPG stores, weighing balance, refractometer and thermometer. Application areas: the wax emulsion when applied to fresh, healthy matured fruits and vegetables, will protect them against excessive moisture loss, higher respiration rate, heat built up or thermal decomposition as a result. Texture and quality of fresh produce will be maintained for a considerably longer time. Environmental aspects: does not pose problem for pollution. Production capacity: 300 litres per day. Inputs: land/bldg (sq m) indoor - 150, outdoor - 600; manpower: skilled - 5, unskilled - 11; power: 2 kW; water: 5 kl per day. Project cost: equipment/machinery (FOB) - US\$ 7,000, fees for technical know-how/training - US\$ 5,000, operational cost per year - US\$ 55,000.

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 92 Central Food Technological Research Institute

FLAVOURED TEA Suitable flavours like lemon, ginger, bergamot, mint and their blends are sprayed into the black tea. To spray the flavours, a special technique is used which allows the flavour to remain in the tea for longer time. The flavouring system consists of inclined drums provided with feeding hopper, flavour application system, heating facility and arrangement of self discharging. All the suitable flavours have been standardised. Environmental aspects: pollution free. Production capacity: 8 tons per day. Inputs: land/bldg (sq m) indoor - 400, outdoor - 1,600; manpower: skilled - 10, unskilled - 20; power: 130 kW; water: 10 kl per day. Project cost: equipment machinery (FOB) - US\$ 150,000, fees for technical know-how training - US\$ 100,000, operational cost per year - US\$ 3.4 million

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 93 Central Food Technological Research Institute

BAKING POWDER Raw materials such as sodium bicarbonate, edible starch, acid and reacting components such as tartaric acid, are finely powdered and mixed thoroughly to ensure that they

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are free flowing in nature. It is then packed in LDPE pouches with duplex board carton to prevent atmospheric moisture ingress into the product. The equipment needed includes: sieve, ribbon blender, packing machine etc. Application areas: it is used as chemical leavener in the manufacture of bakery goods. Environmental aspects: pollution free. Production capacity: 1 ton per day. Inputs: land/bldg (sq m) indoor - 200, outdoor - 800; manpower: skilled - 10, unskilled - 16; power: 10 kW; water: 5 kl per day. Project cost: equipment/machinery (FOB) - US\$ 10,000, fees for technical know-how/training - US\$ 3,000, operational cost per year - US\$ 90,000.

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 94 Central Food Technological Research Institute

PRODUCTION OF HAM AND BACON The carcass of a pig is cut into ham, shoulders and bacon and is deboned. The legs are injected with salometer curing brine and cured for two weeks and product is stored. Cured ham and bacon are immersed in water for desalting and are hung in a smoke house. The equipment required includes: knives, table, stick pumping, mincer, smoke house and refrigerator. Environmental aspects: effluent treatment plant may be required. Production capacity: 200 kg per day. Inputs: land bldg (sq m) indoor - 50, outdoor - 200; manpower: skilled - 2, unskilled - 3; power: 5kW; water: 5 kl per day. Project cost: equipment, machinery (FOB) - US\$ 9,000, fees for technical know-how/training - US\$ 4,000, operational cost per year - US\$ 30,000.

Stage of Development: Pilot plant

Type of Cooperation: Licensing

Ref.No. 95 Central Food Technological Research Institute

TOMATO PRODUCTS (JUICE, PUREE, KETCHU AND CHUTNEY) Cleaned tomatoes are crushed and pulp is extracted. The pulp is concentrated to 12-15 Brix and mixed with sugar, salt, spice extracted vinegar. The mass is boiled and bottled hot. Similarly other products are also made from pulp juice. Principal equipment is: pulper, steam jacketted kettles, fruit mill, spice grinder,

bottling plant. Environmental aspects: does not pose a pollution problem. Production capacity: 1 ton per day. Inputs: land/bldg (sq m) indoor - 100, outdoor - 600; manpower: skilled - 10, unskilled - 15; power: 20 kW; water: 10 kl per day. Project cost: equipment/machinery (FOB) - US\$ 25,000, fees for technical know-how/training - US\$ 2,000, operational cost per year - US\$ 136,000.

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 96 Central Fox 1 Technological Research Institute

PRODUCTION OF NATURAL VINEGAR

Vinegar fermentation is essentially an aerobic fermentation. It involves oxidation of alcohol to acetic acid. The rate of oxidation is increased using the simple vinegar generator made of either birch wood, oak wood or teak wood. 200 kg of pineapple waste liquor is fermented to get 4% acetic acid in 24 hrs. Major equipment: vinegar generator, hydraulic press, weighing scale etc. Vinegar is used in pickles, chutney, tomato ketchup, sauces and various other condiment preparations. It is understood that vinegar aids in digestion and improves the quality of cooked meat and fish. Production capacity: 240 litre day. Inputs: Land bldg (sq m) indoor - 400, outdoor - 1600; manpower: skilled - 3, unskilled - 5; power: 6 kW; water: 4kl per day. Project cost: equipment machinery (FOB) - US\$ 10,000, fees for technical know-how/training - US\$ 4,000, operational cost per year - US\$ 13,000.

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 97 Central Food Technological Research Institute

THERMALLY PROCESSED FISH PRODUCTS

The raw fish is eviscerated, brined and thermally processed. The product is frozen to blocks and covered with batter. This is then stored in cold storage. Major equipments are autoclave, plate freezer, cookers, grinders and batter mixer. Product can be used as a snack food and can be served by frying in oil. Environmental aspects: effluent treatment plant may be needed. Production capacity: 500 kg day. Inputs: land bldg (sq m)

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indoor - 150, outdoor - 600; Manpower: skilled - 8, unskilled - 20; power: 13 kW; water: 10 kl per day. Project cost: equipment/machinery (FOB) - US\$ 20,000, fees for technical know-how/training - US\$ 10,000, operational cost per year - US\$ 85,000.

Stage of Development: Pilot plant

Type of Cooperation: Licensing

Ref.No. 98 Central Food Technological Research Institute

PRODUCTION OF MEAT GRAVY CONCENTRATE Prepared meat is cut into chunks and cooked. The cooked meat is mixed with ingredients and minced. The product is pre-heated to 85 C and filled in SR lacquered cans, sealed and processed. The equipment required includes: spice grinder, meat mincer, steam jacketed kettle and canning equipment. Environmental aspects: does not pose problem of pollution. Simple effluent treatment is sufficient. Production capacity: 500 kg per day. Inputs: land/bldg (sq m) indoor - 100, outdoor - 400; manpower: skilled - 10, unskilled - 20; power: 30 kW; water: 20 kl per day. Project cost: equipment/machinery (FOB) - US\$ 38,000, fees for technical know-how/training - US\$ 25,000, operational cost per year - US\$ 155,000.

Stage of Development: Pilot plant

Type of Cooperation: Licensing

Ref.No. 99 Central Food Technological Research Institute

FRUIT TOFFEES The process involves cooking of the fruit pulp until the volume is reduced to one-third. Other ingredients are added and thoroughly mixed. The cooked mass is subject to flavour addition and spread to a thin sheet. After cooling, the sheet is cut to desired shape and wrapped in cellophane paper. Principal equipment needed: pulper, steam jacketed kettle, cabinet drier, homogenizer, wrapping machine. Application areas: fruit toffees are a highly nutritious product. It is a ready-to-eat product and has a good shelf life. Environmental aspects: it does not pose a pollution problem. Production capacity: 100 kg per day. Inputs: land/bldg (sq m) indoor - 100, outdoor - 400; manpower: skilled - 4, unskilled - 4; power:

15 kW; water: 3,000 litres. Project cost: equipment/machinery (FOB) - US\$ 12,000, fees for technical know-how/training - US\$ 5,000, operational cost per year - US\$ 37,000.

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 100 Central Food Technological Research Institute

MILK-BASED INFANT FOOD Infant food prepared from bovine milk has several advantages. The milk is pasteurized and vegetable fat, vitamins, minerals, maltodextrins, canesugar and minerals are added. The mix is homogenised and concentrated to a solid level of 36% and dried by a spray drying process. Major equipment: homogenizer, evaporator, spray dryer. Environmental aspects: no pollution problem. Production capacity: 5 mt per day. Inputs: land/bldg (sq m) indoor - 1,200, outdoor - 6,000; manpower: skilled - 20, unskilled - 70; power: 70 kW; water: 15 kl per day. Project cost: equipment/machinery (FOB) - US\$ 540,000, fees for technical know-how/training - US\$ 300,000, operational cost per year - US\$ 3 million. *Stage of Development:* Commercialized *Type of Cooperation:* Licensing

Ref.No. 101 Central Food Technological Research Institute

BREAD PRODUCTION (BROWN, PLAIN, SWEET, MILK, WHOLE WHEAT AND FRUIT) The raw material wheat flour is sieved and mixed with other ingredients including yeast and a dough is formed. The dough is allowed to ferment and given a "knock-back" to keep the temperature even. The dough is subjected to following operations: proofing, dividing, rounding, moulding and par-baking. The pans are kept inside the oven and after the baking is complete, the bread is cooled and sliced. To perform all the above operations the following equipment is needed: a mixer with sifting arrangement, moulder, proofing cabinet, electric oven and slicer. Environmental aspects: does not pose any pollution problem. Production capacity: 1.2 tons per day. Inputs: land/bldg (sq m) indoor

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- 50, outdoor - 400; manpower: skilled - 4, unskilled - 5; power: 40 kW; water: 10 kl per day. Project cost: equipment/machinery (FOB) - US\$ 28,000, fees for technical know-how/training - US\$ 20,000, operational cost per year - US\$ 47,000.

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 102 Central Food Technological
Research Institute

PRODUCTION OF BISCUITS Essential ingredients like flour, fat, sugar, chemical flavours and colours are mixed to get dough which is fed to a moulder to get required shape of biscuit. The biscuit is baked in an oven at about 300 C, cooled and packed. Major equipment: mixer, rotary cutting and moulding machine, baking oven and cooling conveyor. Application areas: ready to eat; provides more food value, energy, protein, carbohydrates at less cost. Environmental aspects: pollution free. Production capacity: 1 ton per day. Inputs: land/bldg (sq m) indoor - 100, outdoor - 400; manpower: skilled - 10, unskilled - 22; power: 60 kW; water: 10 kl per day. Project cost: equipment/machinery (FOB) - US\$ 20,000, fees for technical know-how/training - US\$ 3,000, operational cost per year - US\$ 1,06,000.

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 103 Central Food Technological
Research Institute

CLARIFIED FRUIT JUICE FROM PULPY FRUITS The process consists of washing, pulping of fruits and warming the pulp. After cooling pectic enzyme is added and mixed thoroughly. The juice is separated from pulp using a plate and frame filter press and is pasteurized and filled in bottles. The major equipment includes pulper, steam jacketted kettles, filter press, bottle washing machine, boiler and bottle filler. Application areas: liquid fruits provide natural alternative to synthetics and can be used by proper dilution and carbonation as effective soft drinks. Removal of pulpy material from the juice makes it easier to preserve by pasteurization and amenable to carbonation. Environmental

aspects: does not pose problem for pollution. Production capacity: 1,000 bottles per day. (600 ml each). Inputs: land/bldg (sq m) indoor - 100, outdoor - 500; manpower: skilled - 5, unskilled - 10; power: 12 kW; water: 8 kl per day. Project cost: equipment/machinery (FOB) - US\$ 25,000, fees for technical know-how/training - US\$ 20,000, operational cost per year - US\$ 65,200.

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 104 Central Food Technological
Research Institute

HONEY-BASED BEVERAGE Hot sugar syrup is prepared using sugar, citric acid and water, then filtered. Quality honey is mixed and allowed to settle for a day. The clear liquid is filtered using vacuum filter. The clarified beverage is heated to desired temperature, permitted food colour is added, filled hot into sterilized bottles, crown corked and pasteurized. Principal plant and equipment includes steam jacketted kettles, stainless steel tanks, bottle washing machine, bottle filling machine, crown corking machine, vacuum filter and retorts. Application areas: honey is used as antiseptic material and is applied to mouth ulcers. It is also used in ayurvedic medicine as cough mixtures and sedative etc. Due to its aroma and flavour it is being used as beverage for thirst quenching and as an energy drink. Production capacity: 2,000 bottles per day. Inputs: land/bldg (sq m) indoor - 100, outdoor - 500; manpower: skilled - 15, unskilled - 17; power: 25 kv; water: 10 kl per day. Project cost: equipment/machinery (FOB) - US\$ 21,000, fees for technical know-how/training - US\$ 5,000, operational cost per year - US\$ 45,000.

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 105 Central Food Technological
Research Institute

PRODUCTION OF EDIBLE GROUNDNUT FLOUR Decorticated groundnut kernels are graded according to size and are given a mild roasting which helps in removal of red skin known as cuticle. The skin and germ is separated over a vibratory sieve. The split kernels are spread on a

Continued on next page

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conveyor for manual picking of good kernel. The selected kernels are subjected to expeller press for recovery of oil. The cake thus obtained is allowed to cool and ground in a hammer mill. The ground edible flour is packed in polylined gunny bags. The equipment required for the processes are: decorticator, grader, roaster, decorticator, baby expeller, cake grinder, and picking belt. Application areas: in production of fortified flour; energy food preparation; preparation of supplementary food; ready to eat food formulation. Environmental aspects: pollution free. Production capacity: 0.5 tons per day. Inputs: land: bldg (sq m) indoor - 100, outdoor - 500; manpower: skilled - 4, unskilled - 4; power - 14 kW; water - 5 kl/day. Project cost: equipment/machinery (FOB) - US\$ 20,000, fees for technical know-how/training - US\$ 5,000, operational cost per year - US\$ 42,000.

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 106 Central Food Technological Research Institute

BAKER'S YEAST The process consists of fermentation of sterilized molasses using yeast culture. Urea and superphosphates are used as nutrients. Aeration is employed and fermentation takes nearly 13 hours for completion. The wort is centrifuged to harvest the yeast. Cream is washed to remove residual sugar and colour. It is then filtered and packed in wax coated paper. The major equipment is fermentors, clarifier, centrifuge, plate heat exchanger, filter press, extruder, boiler, chiller, cold room, biogas plant and effluent treatment plant. Environmental aspects: effluent treatment plant is essential. Production capacity: 1 ton per day. Inputs: land: bldg (sq m) indoor - 2000, outdoor - 10,000; manpower: skilled - 30, unskilled - 60; power: 200 kW; water: 10 kl per hr. Project cost: equipment/machinery (FOB) - US\$ 800,000, fees for technical know-how/training - US\$ 200,000, operational cost per year - US\$ 250,000.

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 107 Cheil Foods and Chemicals Inc
WHEAT FLOUR MANUFACTURING SYSTEM Wheat flour production system producing

flour suitable for instant foods such as doughnuts and hot cakes. System offers high yield, low ash and high quality flour with excellent blending technology. Annual production capacity of 75,000 m tons (300 days). Process includes: cleaning, tempering, milling and packing. Main equipment comprises: classifier, moisture tempering, roller mill, sifter and packing machine. Flour specification: yield - min 74, ash - max 0.58.

Stage of Development: Commercialized

Type of Cooperation: Licensing, joint venture, sub-contracting and turnkey

Ref.No. 108 Cheil Foods and Chemicals Inc
FRANKFURTERS SAUSAGE MANUFACTURING SYSTEM Production system for frankfurter sausages from pork, chicken and turkey etc, with an annual capacity of 3,000 m tons (300 days). Incorporates a flexible manufacturing system including time and economised analysis of raw materials. Process includes: raw material handling, grinding, mixing, cutting, stuffing, smoking, cooling and vacuum packing. Main equipment comprises: defrost machine, grinder, mixer, cutter, vacuum stuffer and smoke chamber. Technology incorporates optimization and sanitation elements.

Stage of Development: Commercialized

Type of Cooperation: Technical support

Ref.No. 109 Cheil Foods and Chemicals Inc
MANUFACTURE OF MONO SODIUM GLUTAMATE Plant for the production of mono sodium glutamate from various raw materials including sugar and with an annual production capacity of 5,000 m tonnes (300 days). Output suitable for use with various fermentation products (eg Lysine, Citric acid and Succinic acid etc). Process includes: pre-treatment, fermentation, glutamic acid crystallization, neutralization, decolourization and filtration, MSG crystallization and packaging. Main equipment includes: fermentation tanks, glutamic acid crystallization, evaporator, centrifuge etc. Company already has experience of constructing and operating a plant in Indonesia and technical transfer to China.

Stage of Development: Commercialized

Type of Cooperation: Licensing; joint venture; sub contracting; turnkey; investment, others

Ref.No. 110 Cheil Foods and Chemicals Inc
ALCOHOL MANUFACTURE FOR PRODUCTION OF DEXTROSE Plant for the production of edible alcohol (ethyl alcohol), with an annual capacity of 12,000 m tonnes (300 days). Advantages include high yield, low comparative investment and high flexibility in choice of raw material. Process includes: raw material (eg wheat), storage, crushing, mixing, liquidization, saccharification, fermentation and distillation. Main equipment includes: grinder, mixer, liquidization tank, saccharification tank, fermentation tank and distillation tank. Main technology: alcohol fermentation, yeast cultivation and enzyme technology.

Stage of Development: Commercialized

Type of Cooperation: Licensing; joint venture, turnkey and know-how

Ref.No. 111 Cheil Foods and Chemicals Inc
FRUIT BASED BEVERAGES Production equipment for producing various beverages incorporating fruit juice concentrates, with a daily capacity of 70 m tons (24 hrs). Process includes: raw material handling, blending, homogenization, pasteurization, filling, seaming, cooling, inspection and packaging. Main equipment comprises: homogenizer, plate heat exchanger, filler, seamer, cooler and level inspector auto packer.

Stage of Development: Commercialized

Type of Cooperation: Licensing; joint venture; turnkey and technical support

Ref.No. 112 Cheil Foods and Chemicals Inc
SOYBEAN OIL AND SOYBEAN MEAL PRODUCTION Plant for the production of oil and meal from soybean for use in soya yoghurt, soya ice cream, soya sausages, soya milk powder and textured soya protein. Highly efficient process offering a high yield, full automation and energy saving, with an annual capacity of 300,000 m tons (300 days). Process includes: preparation (cleaning, heat treatment, dehulling, cracking, flaking), extraction (extraction, distillation, solvent recovery), meal crushing and refining (degumming, neutralization, bleaching, deodorization). Main equipment comprises: dehulling system, flaker, extractor, centrifugal separator, filter and deodorizer.

Stage of Development: Commercialized

Type of Cooperation: Licensing; joint venture; turnkey; technical support

Ref.No. 113 Cheil Foods and Chemicals Inc
COSMETIC SOAP MANUFACTURING USING SUGAR Plant for the manufacture of cosmetic soaps from sugar, with an annual capacity of 5,000 m tonnes (300 days). Process includes: raw material storage, refining, saponification, drying, ploding, stamping and packing finished products. Main equipment comprises: oil refiner, saponifier, dryer, ploder, stamper and packaging machine. Major technology includes: oil mixing and soap manufacture.

Stage of Development: Commercialized

Type of Cooperation: Licensing; joint venture; turnkey; other

Ref.No. 114 Cheil Foods and Chemicals Inc
MANUFACTURE OF DETERGENTS FROM RAW SUGAR Plant for the manufacture of detergents from raw sugar suitable for the washing of clothes, with an annual production capacity of 5,000 m tonnes/year (300 days). Facilities include: processing of raw material, storage, weighing, spraying, drying and particle milling. Main equipment includes: spray dryer, double clone, dust collector, kneader, plodder, mill and trommel. Optimum performance assured via specialist software and bulk minimization via concentrated particles.

Ref.No. 115 Cheil Foods and Chemicals Inc
SUGAR REFINING PLANT Full manufacturing plant for refining white and light brown sugar with an annual capacity of 100,000 m tonnes (300 days). Good technology allows optimal refining and reduces operating costs. Process includes: raw sugar, decolourization, filtration, evaporation, crystallization, drying, cooling and packaging. Equipment includes: centrifuge, filter, evaporator, vacuum fan, compressor, dryer & cooler and packer. Finished product specification: polarization - Min 99.8, ash content 0.03 and moisture content 0.04.

Stage of Development: Commercialized

Type of Cooperation: Joint venture; sub contracting; turnkey or other

Ref.No. 116 Cheil Foods and Chemicals Inc
MANUFACTURING PLANT FOR FROZEN FOODS Production system manufacturing frozen dumplings, hamburgers and pork cutlets from meat (pork, chicken etc), seafood (squid, pollack etc) and vegetables (onions, garlic etc). Incorporates quick freezing process to preserve high quality freshness, taste, colour and nutritive value. Annual production capacity: dumpling 0.5 mt/hr; hamburger patty 0.05 mt/hr or 12 mt/day (8 hrs); pork cutlet 0.5 mt/hr. Process includes: pre-treatment, mixing, forming, steaming, coating, freezing and packing. Main equipment comprises: mixer, chopper, kneading machine, steamer, former, freezer and packing machine.

Ref.No. 117 Clearing House Network
RE-USE OF ALOE WASTES FOR DIETARY FIBRES Production technology for the re-use of aloe wastes for the provision of dietary fibres in health foods. Process includes: preparation of water-soluble or total fibres.

Ref.No. 118 CNTA
PALM-NUT GRINDING Easy to use technology utilizing a crushing mill with either an electric or diesel motor. None polluting technology. Production capacity is 5 tonnes per day. Project cost is US\$ 5,000.
Stage of Development: Commercialized

Ref.No. 119 CNTA
CEREAL AND CASSAVA GRINDING Easy to use, non polluting technology for the grinding of cereals and cassava utilizing an electric or diesel powered mill. Project cost is US\$ 6,000. 100 sq m building required.
Stage of Development: Commercialized

Ref.No. 120 CNTA
CASSAVA GARI TRANSFORMATION Easy to use technology incorporating a manual rasp and an electric rasp with a diesel motor, pressing machine and a torre factor. Non polluting technology.
Stage of Development: Commercialized

Ref.No. 121 Coffee Technology; and Engineering Enterprise
COFFEE PULPING MACHINE Coffee pulping machine with a 520 ton annual production capacity, for the production of washed coffee, which commands a higher price than sun dried coffee. Equipment costs: US\$ 15,350 and technical know-how and training US\$ 10,000.
Type of Cooperation: Turnkey

Ref.No. 122 EDEM Ltd
FODDER ADDITIVE AND ECOLOGICALLY PURE FERTILIZER (ELITE) ELITE is produced from natural raw materials with use of ecologically pure technology. It contains growth stimulating substances and a great quantity of proteins balanced naturally in their amino acid composition as well as vitamins and mineral elements in their optimal combination. Production capacity of 100 tons/month or more. Its use reduces the expenditure of fodder in stock breeding, animal husbandry, agricultural and decorative plant-growing, fish farming, silkworm breeding.
Stage of Development: Commercialized
Type of Cooperation: Sub-contract

Ref.No. 123 EDEM Ltd
BIOLOGICALLY ACTIVE NUTRITIONAL ADDITIVE A powder named Alexandrine which contains in an optimal natural combination the vital amino acids, vitamins and a complete set of trace elements required daily for the human and animal body. Manufacture in pellet form is possible. Gives immune protection and aids vitality. An ecologically pure product. Production rate 50 tons per month or more priced at US\$ 50 per kilo.
Stage of Development: Commercialized
Type of Cooperation: Sub-contract

Ref.No. 124 Engineering and Foundry Company
ANIMAL FEED MIXERS AND MAIZE MILLS Technology offered for maize mills and animal feed mixers designed for chickens and other livestock.

Ref.No. 125 Extrade Ltd
WHEAT, MAIZE, SOYA AND OIL MILLS A range of mills are offered as follows: wheat and maize flour mills with capacities of 30 - 60 tonnes per day; soya mills with a capacity of 20 - 50 tonnes per day; and oil mills for oil extraction from groundnut and soya.

Stage of Development: Commercialized
Type of Cooperation: Licensing

Ref.No. 126 Food Canners Ltd
FRUIT AND VEGETABLE CANNING Joint venture offer for establishment of a canning plant processing fruit and vegetables to produce jam, fruit juices and snacks in addition to the canned fruit and vegetables. Planned production capacity of 1,000 tons per year of various products. Project cost: equipment - US\$ 1 million; fees for technical know-how - US\$ 60,000.

Stage of Development: Commercialized
Type of Cooperation: Joint venture

Ref.No. 127 Foxwell, Charles E. Food and Drinks Consultancy
FOOD AND DRINK PRODUCTS The purchasing, sale, marketing, quality control and training for a full range of food and drink products. Drinks: wines, spirits, liquors, ciders, beers, stouts and soft drinks. Food: able to source and sell any processed food, in cans, bottles or other packaging in the UK and worldwide, also dried food.

Ref.No. 128 Foxwell, Charles E. Food and Drinks Consultancy
WINERY, DISTILLERY, BREWERY, BOTTLING PLANTS AND FOOD PROCESSING PLANTS Full product training, sales, marketing, purchasing and quality control facilities. Technology available in the design, development, sourcing, equipping and training in the installation for the above food and drink plants. New and second-hand plants supplied.

Stage of Development: Commercialized
Type of Cooperation: Equipment supply

Ref.No. 129 Heat Systems
WOOD BURNING STOVE (PRIAGNI) The project is offering the manufacture of a high efficiency wood burning stove, the Priagni. This is a portable, inexpensive domestic cooking device operating with a correct proportion of air and fuel mixture to achieve a less smoky less luminous steady and well directed flame. The technology is not patented and is offered as social obligation non profit. Collaboration is sought on sub-contracting or turnkey basis.

Type of Cooperation: Sub-contracting; turnkey

Ref.No. 130 Hitech Instruments Ltd
DUAL GAS ANALYSER which combines the accurate measurement of oxygen in mixtures with one other constituent suitable for measurement by thermal conductivity. Other gases measured include helium, neon and argon, giving the analyser a wide range of applications. These applications include: food packaging; produce and fruit storage; environmental monitoring, hydrogenation processes; and products of fermentation.

Stage of Development: Commercialized
Type of Cooperation: Equipment supply

Ref.No. 131 Hitech Instruments Ltd
FOOD PACKAGING ATMOSPHERE MONITOR AND GAS ANALYSERS A transportable atmosphere monitor for measuring simultaneously the oxygen and carbon dioxide concentrations in food packaging atmospheres, particularly for MAP/CAP (modified and controlled atmosphere packaging). Features: simultaneous analysis of carbon dioxide, oxygen and the nitrogen balance; easy-to-use 5 second response time; optional programmable pumped sampling system; four groups of adjustable 'pass/fail' limits; and microprocessor-based with optional built-in printer. An alternative version has been produced as a work bench model for regular quality control tests.

Stage of Development: Commercialized
Type of Cooperation: Equipment supply

Ref.No. 132 Institute of Production
Innovation

SMALL SCALE SUGAR PROCESSING EQUIPMENT Equipment for the small scale processing of sugar at a village level. Operating statistics: capacity 20 tonnes of cane per day; sugar recovery 5-6% of cane; manpower 10 people. Equipment includes: sugarcane crusher, clarification system, evaporators, crystallizer and centrifuge. The technology is ideal for small farmers or villages with up to 50 acres of sugarcane. The return on investment is good with IRR at 54% and a cost benefit ratio of 1: 1.3. The break even in Tanzania has proved to be about 3 years. The technology is labour intensive and not capital intensive. The equipment is environmentally friendly and the fuel requirements are met by by-product bagasse instead of firewood. Complete plant and installation in Tanzania approximately US\$ 25,600. Fees for technical know-how US\$ 5,000. Operational cost for one year US\$ 6,700.
Stage of Development: Commercialized
Type of Cooperation: Turnkey

Ref.No. 133 Institute of Production
Innovation

SMALLSCALE PROCESSING OF RED PALM OIL. Equipment for the small scale processing of red palm oil. Equipment produces 55 kg of oil from 240 kg of palm fruits in an 8 hour shift. The technology is ideal for farmers with less than 25 acres of oil palm trees. The process has an internal rate of return of 51% and in Tanzania break even takes 2 years. The processing equipment consists of: sterilizer, digester and clarifier and produces red palm oil and is manually operated. Machinery is likely to cost approximately US\$ 700 and will require 4 operators. Operational cost for one year is estimated at US\$ 18,500.
Stage of Development: Pilot plant
Type of Cooperation: To be decided

Ref.No. 134 Interface Packaging (Pvt) Ltd
CONTROL INSTRUMENTATION FOR FOOD PROCESSING Consultancy for the design of electrical instrumentation used in the control of food processing and packaging.
Type of Cooperation: Documentation and reports

Ref.No. 135 Korea Advanced Food Research
Institute

FERMENTATION TECHNOLOGY Technology offered for the fermentation of beverages and glutamic acid.

Ref.No. 136 Malawi Industrial Research and
Technology Development Centre
BREADOVEN Technology for a bread oven able to utilize multiple fuels to meet local fuel supply conditions.

Ref.No. 137 Martin Davoz Trading Ltd
EDIBLE VEGETABLE OIL PLANT Oil is manufactured by cold pressing with physical treatment only. There is no chemical treatment. Physical treatment runs in a high vacuum with natural materials only. The technology can use various sorts of seeds. The plant capacity is 500-3,000 tons a year. Sunflower oil manufactured by this technology can be used as a fluid medium for injections in medicine. The oil is manufactured by cold pressing so oil cakes are not biologically depreciated and can be used as a valuable animal feeding. The oil manufactured by this technology keeps all the biologically valuable nutrients necessary for human body.
Stage of Development: Commercialized
Type of Cooperation: Turnkey

Ref.No. 138 Martin Davoz Trading Ltd
MINI DIETETIC OIL PLANT The technology separates unpleasant smell and taste of Oleum Jacorie Aseli (fish liver oil). This oil is mixed with high quality vegetable oil and is used as dietetic oil. Physical treatment does not destroy valuable fatty acids necessary for human body.
Stage of Development: Commercialized
Type of Cooperation: Turnkey

Ref.No. 139 Mather and Platt (I) Ltd
PRE-COOLING/COLD STORAGE OF FRUITS Complete plant for removing field heat of various fruits for increased shelf life of fresh fruits by its cold storage at 4 degrees C at 95% RH. Project costs US\$ 150,000 for 5 MT/hour capacity pre-cooling and 30 MT cold storage but various capacity plant available.
Stage of Development: Commercialized
Type of Cooperation: Turnkey

Ref.No. 140 Mather and Platt (I) Ltd
PROCESSING, CANNING AND PACKAGING OF FRUIT AND VEGETABLES Complete plant and machinery on turnkey basis for preparation, processing and packaging of various fruit and vegetables, including their dehydration and bottling of fruit juices. Semi and automatic plants available in range of capacities. Typical 1 tonne/hr. Equipment cost US\$ 350,000 approx. 20 employees.

Type of Cooperation: Turnkey

Ref.No. 141 Mather and Platt (I) Ltd
POTATO CHIPS/FLAKES Complete plant for manufacture of salted potato chips and wafers and potato flakes including washing, grading, slicing, frying, flaking and packing. Project cost US\$ 350,000 to US\$ 600,000. Chips are sold as snacks, flakes as RM for baby foods, soup, snack foods etc. A 1,000 sq mt building area required and 2,000 sq mt outdoor.

Type of Cooperation: Turnkey

Ref.No. 142 Mather and Platt (I) Ltd
NUT ROASTING/FRYING Roasting plant for processing peanuts/almonds/pistachio nuts, peanut butter plant and machines available in different capacities from 200 kg/hr to 600 kg/hr. Cost US\$ 80,000 to US\$ 300,000, employs 15 people.

Stage of Development: Commercialized

Type of Cooperation: Turnkey; equipment

Ref.No. 143 Mather and Platt (I) Ltd
FISH MEAL PLANT Complete plant and equipment for manufacturing of fish meal from fish waste, using latest technology. Economical plants of various capacities are available. Fish meal product used for poultry feed and for fish oil production. Input 1 mt/hr, buildings - 1,500 sq metres, land - 2,000 sq metres, employs: 5 skilled workers, 15 unskilled workers. Equipment cost US\$ 1/4 million.

Stage of Development: Commercialized

Type of Cooperation: Turnkey

Ref.No. 144 Mauritius Biscuit Making Co Ltd
BISCUIT MANUFACTURE Know-how and technology for the manufacture of biscuits with a capacity of 5 tons per day. Inputs: buildings - 5,000 sq m; manpower: skilled - 5, unskilled - 20. Project cost: equipment - US\$ 1,400,000; fees for know-how and training - US\$ 250,000. Operational cost for one year - US\$ 450,000.

Stage of Development: Commercialized

Type of Cooperation: Joint venture

Ref.No. 145 Mihwa Chemical Co Ltd
MANUFACTURE OF SODIUM GLUCONATE Manufacturing technology for the production of sodium gluconate from glucose for use in the food and pharmaceutical industries, with an annual production capacity of 3,000 tonnes. Technology offered includes better fermentation and refining processes than those commonly used. Processing includes: fermentation, refining, evaporation, crystallization, centrifuge, drying and packaging. Main equipment comprises: fermentor, filter, evaporator, crystallizer, dryer and decolorizer.

Stage of Development: Commercialized

Type of Cooperation: Investment

Ref.No. 146 Mukisa Engineering Services
OIL SEED AND COFFEE PROCESSING EQUIPMENT Turnkey equipment is offered for the processing of oil seeds, coffee and various other crops. The equipment includes oil seed hullers and millers, hullers and millers for maize, millet and casava and a coffee bean huller. All the machines run on a single-phase electricity or manually. Typical unit cost US\$ 8,000. Fees for technical know-how and assistance US\$ 120 per annum.

Stage of Development: Commercialized

Type of Cooperation: Turnkey

Ref.No. 147 National Council for Scientific Research (NCSR)

TOMATO COCKTAIL from tomato fruit comes a drink for all. With tomato fruit readily available and a labour intensive process, employment generation at maximum profits is guaranteed.

Stage of Development: Laboratory

Ref.No. 148 National Council for Scientific Research (NCSR)

MUNKOYO DRINK from roots of a special plant and also laboratory work comes a beverage that is irresistible to many. With main raw materials being maize meal and a process based on labour intensive techniques. Market studies have already been undertaken.

Stage of Development: Laboratory

Ref.No. 149 National Council for Scientific Research (NCSR)

GUAVA NECTAR from guava fruit comes a nectar to use as a beverage. Abundance of raw materials and less capital investment makes it a must for small scale producers.

Stage of Development: Laboratory

Ref.No. 150 National Council for Scientific Research (NCSR)

SORGHUM/WHEAT OR CASSAVA/WHEAT COMPOSITE BAKERY PRODUCTS from readily available sorghum and cassava blended with local wheat provides bakery products of very high quality in terms of palatability and nutritional status.

Stage of Development: Laboratory

Ref.No. 151 National Council for Scientific Research (NCSR)

TIP-TOP a carbonated soft drink from locally available fruits (lemons, guavas, pineapples). The drink at one time reigned supreme in the country and competed extremely well with world renowned brands. A local entrepreneur is assured of a large market that is already known out not only for the nutritional value of this product but for its quality as well.

Stage of Development: Commercialized

Ref.No. 152 National Council for Scientific Research (NCSR)

MASUKU WINE a high grade wine from local uapacca kirkiana or locally known as masuku that has already tested the local market. The production of this wine is an opportunity an entrepreneur can go into with the least investment other than containers and the raw material.

Stage of Development: Pilot plant

Ref.No. 153 National Council for Scientific Research (NCSR)

FORMULA A AND NUTRIFEX BABY FOODS Main raw materials are sorghum, groundnuts/soy flour. These baby foods have been formulated to assist the usually disadvantaged weaned children. The foods have already undergone stringent scientific real-life evaluation in Zambian hospitals.

Stage of Development: Pilot research programme

Ref.No. 154 National Council for Scientific Research (NCSR)

CHIKANDA SNACK produced from a local tuber (chikanda) or botanically called *Satyria satiya*. The other ingredients are groundnuts. Evaluation of the product indicates a well deserved market share which is further expanded by its palatability with polony-like features and taste therefore a wider acceptance compared to the product currently on the market.

Stage of Development: Laboratory

Ref.No. 155 National Council for Scientific Research (NCSR)

SORGHUM CLEAR BEER Local sorghum using local yeast isolates produces a clear beer of high quality that is as good as any on the market without having to queue up for import permits as sorghum is locally available in adequate quantities and the yeast also is local hence does not need long processes to acquire or maintain.

Ref.No. 156 National Council for Scientific Research (NCSR)

START-UP CULTURES FOR BAKING, BREWING AND YOGHURT PREPARATION Local yeast and bacteria isolates for use in baking, brewing and sour milk product preparation provides an opportunity for an entrepreneur to go into business for the local and regional market which at the moment is dependent on imports.

Ref.No. 157 National Council for Scientific Research (NCSR)

RADIATION PROCESSING using the latest nuclear technology to extend shelf-life of agricultural produce and produce environmentally friendly rubber medical products etc.

Ref.No. 158 National Council for Scientific Research (NCSR)

BANANA DRINK made from bananas, a wholesome drink is available and may be carbonated to suit certain desires. The labour intensive process requires minimum investment.

Stage of Development: Laboratory

Ref.No. 159 National Small Industries Corporation Ltd, India

ICE CREAM CONE Produces 5,000 cones/day, the process includes mixing, deeping, filling of moulds, baking and packing which involves the use of a turbo mixer and an automatic cone making machine. This is a low cost project for self employment and produces cones which are supplied to ice cream parlours. The raw materials are flour, oil and preservatives plus 1,000 litres/day and 8 kW of electrical power. Total land area required is 300 sq metres of which 50% is indoors. Project cost US\$ 9,000, employs 1 skilled and 5 unskilled workers.

Stage of Development: Commercialized

Type of Cooperation: Turnkey

Ref.No. 160 National Small Industries Corporation Ltd, India

WHEAT FLOUR MILLING Process involves cleaning, conditioning, milling, finishing and packing of flour. The equipment involved includes drum sieve, separator, elevator, cyclone, roller mill, shifter, purifier, finisher etc. The process produces 10 tons/hour of flour and uses 2,000 litres/day water and 150 kW of power. Occupies a total land area of 600 sq metres of which 500 sq metres must be under cover. Project cost US\$ 150,000. Employs 10 skilled and 20 unskilled workers.

Stage of Development: Commercialized

Type of Cooperation: Turnkey

Ref.No. 161 National Small Industries Corporation Ltd, India

POTATO CHIP MANUFACTURE This snack food can be produced in quantities of 2 tons/day for domestic consumption from potatoes and chemical preservatives. The process involves peeling, chip cutting, dehydration and packing and the equipment involved includes boiler, dryer, chipping machine, peeler and tanks. The process consumes

5,000 litres water/day and 30 kW of electrical power. Occupies 500 sq metres land of which 300 sq metres should be covered. Project cost US\$ 56,000, employs 4 skilled and 8 unskilled workers.

Stage of Development: Commercialized

Type of Cooperation: Turnkey

Ref.No. 162 National Small Industries Corporation Ltd, India

SUN FLOWER OIL MILLING The process involves seed preparation, oil extraction and filtration followed by canning. The machinery includes decorticator, expeller, boiler, filter press, filling machine etc. Production capacity is 5 tons/day of cooking oil for domestic consumption. Requires 40 kW of electrical power. Land area of 350 sq metres and a covered area of 200 sq metres. The project cost is US\$ 62,500 and gives employment to 2 skilled and 6 unskilled workers.

Stage of Development: Commercialized

Type of Cooperation: Turnkey

Ref.No. 163 National Small Industries Corporation Ltd, India

MUSTARD OIL EXTRACTION Process involves cleaning, oil expelling and filtering. The equipment required includes boiler, expeller, filter press. The process produces 10 tons/day of cooking oil for domestic consumption and requires 1,000 water/day and 40 kW of electrical power. Total land required is 450 sq metres of which 300 sq metres should be under cover. Project cost US\$ 84,000 and gives employment to 4 skilled and 6 unskilled workers.

Stage of Development: Commercialized

Type of Cooperation: Turnkey

Ref.No. 164 National Small Industries Corporation Ltd, India

GROUND NUT OIL EXTRACTION The extraction and filtration process for ground nut oil involves cooking of seeds, removal of shells, expelling the oil and then filtration. The equipment comprises a boiler, filter press, expeller and de-sheller and has a capacity of 1 ton/day. Produces cooking oil for domestic consumption and gener-

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ates employment in rural areas. Electricity demand 30 kW. Building area required 200 sq metres. Gives employment to 6 skilled and 9 unskilled workers for a capital cost of US\$ 25,000.

Stage of Development: Commercialized

Type of Cooperation: Turnkey

Ref.No. 165 National Small Industries Corporation Ltd, India

MAIZE FLOUR MILLING Process involves cleaning, milling and sieving, involving the following equipment: pulverizer, vibratory screen, sieving and packing equipment. Production of 800 kg/day for domestic consumption as a staple food. Involves normal supply of water and 20 kW of power. Land area of 150 sq metres of which 100 sq metres is under cover. Project cost US\$ 20,800. Employs 2 skilled and 3 unskilled workers.

Stage of Development: Commercialized

Type of Cooperation: Turnkey

Ref.No. 166 National Small Industries Corporation Ltd, India

BREAD AND BISCUIT MANUFACTURE This offer is for the production of 1.5 ton/day of bread, biscuits, patties etc and involves grinding, mixing, filling, baking and slicing. Machinery includes oven, flour sifter, mixer and grinder. The raw materials are flour, sugar and baking powder etc plus 2,000 litres water/day and 30 kW of electrical power. The total land area is 700 sq metres of which 500 sq metres should be under cover. Project cost US\$ 30,000, employs 3 skilled and 12 unskilled workers.

Stage of Development: Commercialized

Type of Cooperation: Turnkey

Ref.No. 167 National Small Industries Corporation Ltd, India

SPICE GRINDING Starting from raw materials of turmeric seeds and other spice seeds, process produces for example turmeric powder and other spices for cooking, involving cleaning, drying, grinding, sieving and packing. The equipment involved includes dryer, pulveriser and packaging machines. A normal supply of water and electrical power of 15 kW. Land area required is 400 sq

metres of which 150 sq metres should be under cover. Project cost US\$ 25,000, employs 1 skilled and 4 unskilled workers.

Stage of Development: Commercialized

Type of Cooperation: Turnkey

Ref.No. 168 National Small Industries Corporation Ltd, India

SOYA NUGGET MANUFACTURE Process involves mixing, grinding, extrusion, drying and packing. Equipment required includes extruder, mixer, blender and sieve. The plant produces 10,000 kg of soya nuggets per month; which is a low cost protein food from raw materials of soya grits, rice and oil. Requires 1,000 litres/day and 10 kW of electrical power. It requires 2,000 sq metres land of which 1,000 sq metres should be under cover. Project cost US\$ 55,000. Employs 4 skilled and 11 unskilled workers.

Stage of Development: Commercialized

Type of Cooperation: Turnkey

Ref.No. 169 National Small Industries Corporation Ltd, India

FRUIT JUICE EXTRACTION Process consumes 1 ton of fruit/day and involves washing, peeling, extraction, filtering and pasteurisation. Equipment required includes tanker, pulper, press, steam kettle, filter press and filling machine and requires 5,000 litres water/day and 75 kW electrical power. The land area required is 500 sq metres of which 300 sq metres should be under cover. Project cost US\$ 65,000. Employs 7 skilled and 15 unskilled workers.

Stage of Development: Commercialized

Type of Cooperation: Turnkey

Ref.No. 170 National Small Industries Corporation Ltd, India

EXTRACTION OF ESSENTIAL OILS Process utilizes waste agricultural products, produces essential oils for medicinal perfumery and industrial use and involves the feeding of leaves, condensation and collection of the oil. Equipment includes boiler, extractor and condenser. Raw materials are Eucalyptus leaves and the production capacity is 35

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MT/month, utilising 3,000 water/day and 20 kW of electrical power. Land area of 1,000 sq metres of which 400 sq metres is under cover. Project cost US\$ 45,000, gives employment 4 skilled and 6 unskilled workers.

Stage of Development: Commercialized
Type of Cooperation: Turnkey

Ref.No. 171 National Small Industries Corporation Ltd, India

KHANDSARI (BROWN) SUGAR MANUFACTURE The process manufactures 17 MT/month of Kandsari sugar and involves crushing, juice extraction, purification and crystal formation. The equipment includes a crushing unit, juice pump, filter press, centrifugal machine and produces low price sugar for domestic consumption. Raw materials required are sugar cane, lime and sulphur etc plus 3,500 litres/day of water and 25 kW of electrical power. Total area required is 2,000 sq metres of which 50% is under cover. Project cost US\$ 165,000, employs 15 skilled and 50 unskilled workers.

Stage of Development: Commercialized
Type of Cooperation: Turnkey

Ref.No. 172 National Small Industries Corporation Ltd, India

TOMATO KETCHUP AND SAUCE MANUFACTURE from raw materials of tomato, sugar and preservatives, tomato ketchup and sauce can be produced by a process of washing, crushing, steaming, pulping, sieving, concentrating and filling. The equipment required includes boiler, steam kettles, crusher, pulper and canning machine to produce 1 ton/day for domestic and hotel consumption. The process consumes 5,000 litres of water per day and 20 kW of electrical power. Occupies a total land area of 500 sq metres of which 300 sq metres should be under cover. Project cost US\$ 45,000 and employs 6 skilled and 12 unskilled workers.

Stage of Development: Commercialized
Type of Cooperation: Turnkey

Ref.No. 173 National Small Industries Corporation Ltd, India

FRUIT JAM MANUFACTURE This process produces jam for domestic consumption and involves washing, pulping, boiling, mixing and filling. Equipment required includes boiler, pulper, steam kettle and a filling and sealing machine. Raw materials required are fruits, sugar and preservatives, 2,000 kW of water per day and 75 kW of electrical power. The total area required is 500 sq metres of which 50% should be under cover. Project cost US\$ 75,000, employs 4 skilled and 10 unskilled workers.

Stage of Development: Commercialized
Type of Cooperation: Turnkey

Ref.No. 174 National Small Industries Corporation Ltd, India

EXTRUSION OF PUFFED SNACK FOOD Process produces a puffed snack from rice, pulses, oil and spices. Involves cooking, extrusion, drying, oil mixing and packing. Equipment includes extruder, mixing machine and ribbon blender and produces a low cost snack food for domestic consumption of quantities of 250 kg/day. The process requires 1,000 litres water per day and 6 kW of electrical power. Occupies a total land area of 600 sq metres of which 250 sq metres should be under cover. Project cost US\$ 25,700 and employs 2 skilled and 7 unskilled workers.

Stage of Development: Commercialized
Type of Cooperation: Turnkey

Ref.No. 175 North, G. and Son (Pvt) Ltd
GRAIN AND SEED PROCESSING EQUIPMENT Small agricultural implements and equipment both hand and power operated, such as maize shellers, grinding mills, grain winnowers and grain threshers.

Stage of Development: Commercialized

Ref.No. 176 Protech Food Systems
MEAT AND POULTRY HYGIENIC PROCESSING AND PACKAGING Complete meat and poultry processing lines, including handwashing and tray washing equipment, sterilising equipment, utensil sinks, bootwashers and drinking fountains in stainless steel, together with

workstations and conveyor systems for red meat and carcass into primal and primal into retail packs. Also design and supply of conveyor equipment and workstations for poultry de-boning lines typically processing 22,000 birds per day with automatic grading of breast portions.

Type of Cooperation: Licensing; distribution

Ref.No. 177 Protech Systems Private Limited
MINI SUGAR PLANT Mini sugar plant with crushing capacity of 100 tonnes per 24 hours. Processing equipment includes: weighbridge, crushing unit, cane knives, juice tank, pump, sulphitation tank, sulphur furnace, scrubber, stirrer, settling tanks, crystallizers, pug mill, molasses tanks, sugar dryer, laboratory testing equipment. Project cost: equipment US\$ 283,175; fees for technical know-how US\$ 50,000.

Stage of Development: Commercialized

Type of Cooperation: Turnkey

Ref.No. 178 Seskel Foods Ltd
MEAT CANNING Meat canning plant for corned-beef and stewed steak offers its facilities in the form of a joint venture. Production capacity 100 ml tons per month for export. Current unit prices: 1 CTN corned-beef US\$ 24 and 1 CTN stewed steak US\$ 23.

Stage of Development: Commercialized

Type of Cooperation: Sub-contracting; joint venture

Ref.No. 179 Shipchandler & Co/Shipco Foods
BISCUITS, WAFERS, BREAD AND CONFECTIONERY Turnkey plants available for the manufacture of biscuits, wafers, bread and confectionery as well as packing lines.

Stage of Development: Commercialized

Type of Cooperation: Turnkey

Ref.No. 180 Sugar & Integrated Industries
Company

BAKER'S YEAST Technology, plant and machinery for the production of fresh and dry baker's yeast.

Stage of Development: Commercialized

Type of Cooperation: Turnkey plant

Ref.No. 181 Sugar & Integrated Industries
Company

SUGAR PRODUCTION PLANT Technology, plant and machinery are offered to produce sugar from cane and beet.

Stage of Development: Commercialized

Type of Cooperation: Turnkey plant

Ref.No. 182 Sugar & Integrated Industries
Company

VINEGAR AND GLACIAL ACETIC ACID Technology, plant and machinery for the production of vinegar and glacial acetic acid.

Stage of Development: Commercialized

Type of Cooperation: Turnkey plant

Ref.No. 183 Sugar & Integrated Industries
Company

MOLASSES PROCESSING Technology, plant and machinery for the de-sugarization of molasses and the production of alcohol from molasses.

Stage of Development: Commercialized

Type of Cooperation: Turnkey plant

Ref.No. 184 T & T International Foods Ltd
PASTA MANUFACTURING LINE Complete automatic or semi-automatic production line for the manufacture of pasta. Pasta types include: macaroni and long or short-cut spaghetti.

Type of Cooperation: Equipment supply; know-how; technical assistance; turnkey

Ref.No. 185 T & T International Foods Ltd
MAIZE PROCESSING LINE Semi-automatic processing line to convert maize into a variety of forms.

Type of Cooperation: Equipment supply; know-how; technical assistance; turnkey

Ref.No. 186 T & T International Foods Ltd
STARCH FROM CASAVA Fully automatic production line for producing starch from casava.

Type of Cooperation: Equipment supply; know-how; technical assistance; turnkey

Ref.No. 187 T & T International Foods Ltd
NOODLE PRODUCTION LINE Fully automatic production line to produce instant noodles, dry noodles and high fibre noodles.

Type of Cooperation: Equipment supply; know-how; technical assistance; turnkey

Ref.No. 188 Tanroy Engineering (Pvt) Ltd
NUT AND GRAIN PROCESSING EQUIPMENT Technology for the manufacture of grain dehullers, hammer mills, oil presses, groundnut shellers and peanut butter mills. In addition, a machine for removing bran from various grains (maize, sorghum etc) is also offered. The bran remover has a capacity of 1/4 tonne per hour and the waste products can be used for animal feed.

Type of Cooperation: Sub-contract; joint venture

Ref.No. 189 Tanzania Engineering and Manufacturing Design Organization
SCREW-TYPE OIL EXPELLER Expels oil from oil bearing seeds with an efficiency of over 75% and at low cost. The seed case, a by-product of the expeller can be used as an animal feed; there is no waste. Unit price per machine US\$ 5,000.

Stage of Development: Commercialized

Type of Cooperation: Negotiable

Ref.No. 190 TCO International Inc
FLOUR MINI-MILLS AND ANIMAL FEED MILLS Mini-mills are small, easy to maintain and designed for use by farmers, bakers or flour millers to grind wheat, rice, corn, maize, barley or other small free flowing grain. The mills are built in heavy duty steel and use pink granite stone grinding wheels. An optional automatic sifter separates flour into 35% very fine white pastry flour, 35% almost white cake flour, 25% bread flour and 5% coarse bran. Five mills are available ranging from the 8

Stage of Development: SHP 20 - 30 kg AC model to the 30, 35 HP model grinding 318 - 568 kg 1:1 and higher capacity hammer mills.

Ref.No. 191 Teacraft
TEA PROCESSING PLANT UPGRADING Technical advice and equipment design and sourcing to modernize and improve tea manufacturing processes. Use of a technical audit and process monitor-

ing to establish baseline. Introduction of modern equipment, methods and quality assurance techniques. Advantages: enhancement of product quality whilst minimizing cost of production and introduction of appropriate management techniques to ensure that technology is understood and incorporated. Particularly suited to black tea factories. Fees for technical know-how and training typically US\$ 25 - 150,000 per factory.

Stage of Development: Ongoing capability

Type of Cooperation: Joint venture; turnkey; technical assistance; training

Ref.No. 192 Technology Exchange Ltd
FOOD PROCESSING EQUIPMENT Preparation of vegetables, fish and fruit involving cleaning, blanching, peeling, separating, cooling, washing, elevating etc equipment together with fully automatic production lines. Reduced wastage of food, improved quality, fast efficient production. (Our offer TO 283).

Stage of Development: Commercialized

Type of Cooperation: Licensing; equipment supply; turnkey plant; joint venture

Ref.No. 193 Technology Exchange Ltd
SMALL PORTABLE TABLE-TOP ELECTRIC FLAT DOUGH BAKING OVEN A two-step electric dough baking oven which is small in size and has low power consumption and rapidly reaches working temperature. Despite its small size this dough baking oven will produce a wide variety of pizzas, pancakes, breads and tortillas, extremely rapidly and in production quantities ie 50 - 100 items per hour. Although this machine is small in physical size and consumes only 1.65 kW of electrical power, it can be operated from a 3 pin 13 amp plug and its low cost makes it attractive for domestic as well as commercial use. The oven, with its accessories, constitutes a complete and unique baking kit of compact size 310 mm x 340 mm x 220 mm high. It is easy to clean and will produce Pita, Arabic bread, Naan, Taftoon, Lavash, thin bread, Barbary, thick bread, Chinese pancakes, pancakes, tortillas, pizzas and filled pastries. (Our ref: TO 324).

Stage of Development: Commercialized

Type of Cooperation: Licensing; joint venture

**Ref.No. 194 Technology Exchange Ltd
SOLID STATE ELECTRONIC CONTROL
UNIT FOR COMMERCIAL REFRIGERA-
TION SYSTEM**

A modular electronic unit for direct control of refrigeration systems. The use of solid state electronics on single board design layout allows the creation of a compact unit of external dimensions 40 cm square by 10 cm thick which can be conveniently stacked for multiple unit installations or for mounting alongside the condensing unit. The unit embodies all the normal control functions and a widely variable defrost cycle time and frequency. Applications: large refrigeration systems (not air conditioning systems). Advantages: high reliability from solid state switching. Ease of maintenance, installation and board replacement. Modular design for versatility and suitable for volume production. (Our ref. TO 08).

Stage of Development: Pre-production prototype
Type of Cooperation: Licensing

**Ref.No. 195 Tinytech Plants
OILMILL MACHINERY**

Tiny oil mill consists of expeller, filter press, boiler, decorticator etc. All the machinery can be manufactured in a mechanical workshop. Scope of thousands of tiny oil mills in every country. Provide edible oil to 5,000 people. Simplest but most modern technology. Runs on 10 HP diesel engine motor. The capacity is to crush 60 kgs of oil seeds per hour. It suits edible or non edible oil seeds and is most appropriate for rural application.

Stage of Development: Commercialized
Type of Cooperation: Licensing

**Ref.No. 196 Tinytech Plants
SUGAR CUM JAGGERY PLANT**

Crystal sugar and jaggery both can be produced in the farm itself without the use of sulphitation process. So natural sugar is obtained without any chemical contamination. Combined recovery more than big sugar factory. Hence strongly viable. Simplest machinery. Low investment project. Skilled workers essential.

Stage of Development: Commercialized
Type of Cooperation: Licensing

**Ref.No. 197 Tropical Foods International
PROCESSING OF TROPICAL VEGETABLES
AND EGGS**

The technology utilizes locally available materials, supplies and services and eliminates wastage of vegetables, particularly food staples such as cassava, plantains and the various root crops used as a source of starch in the diet. Advantages: totally eliminates wastage of vegetables, resulting from a lack of ready market. The technology offers industrial utilization of eggs, even in remote areas. The technologies are self-sustaining, with little dependence on importation. Fees for technical know-how: training US\$ 15,000.

Stage of Development: Available for commercialization

Type of Cooperation: Know-how; training and technical assistance provided on a fee basis

**Ref.No. 198 United Technology Engineers Pvt
Ltd**

OXALIC ACIDS Technology to produce oxalic acid and diethyl oxalates by oxidation of sugar, molasses and other carbohydrates with nitric acid in the presence of a catalyst and then to produce oxalate for a small to medium size unit offering higher yield and low capital cost.

Stage of Development: Commercialized
Type of Cooperation: Licensing; turnkey

**Ref.No. 199 United Technology Engineers Pvt
Ltd**

DISTILLERIES Technology is based upon batch/continuous fermentation and distillation to produce industrial alcohol potable alcohol starting from sugar molasses, malt and other raw materials. The design incorporates high yield, energy conservation and pollution control measures economically.

Stage of Development: Commercialized
Type of Cooperation: Licensing; turnkey

**Ref.No. 200 United Technology Engineers Pvt
Ltd**

BREWERIES Starting from barley, malt, rice, corn grits or a mixture of these to produce grades of beer. Technology offers low capital and operating costs based breweries to serve various market segments and pollution free units. Breweries can be

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designed for various capacities starting from malt unloading, malt mill, washing, wort separation, boiling, fermentation, conditioning, filtration, pasteurization, bottling/canning to storage/market.

Stage of Development: Commercialized
Type of Cooperation: Licensing; turnkey

Ref.No. 201 United Technology Engineers Pvt Ltd

REFINED/HYDROGENATED EDIBLE OIL AND GLYCERINE PLANTS Starting from raw oil-groundnut, cottonseed, soyabean, sunflower, corn etc or a mixture of it can be processed to produce edible refined oil or edible hydrogenated oil for small to large size plants. The spent lye can be used for soap manufacturing or to produce free fatty acids and glycerine products economically.

Stage of Development: Commercialized
Type of Cooperation: Licensing; turnkey

Ref.No. 202 United Technology Engineers Pvt Ltd

SUGAR MILL Technology to produce white crystal sugar by milling (crushers/fibrizer) or by thermal diffusion process, offering high yield, efficient steam/water management, reduced energy consumption and pollution free units for medium to large sized units. The process saves over 10% in capital and operating costs as compared to prevailing designs.

Stage of Development: Commercialized
Type of Cooperation: Licensing; turnkey

Ref.No. 203 United Technology Engineers Pvt Ltd

OIL EXTRACTION AND ANIMAL FEED PLANTS Different types of oil seeds eg groundnut, soyabean, sunflower, cottonseeds etc are processed to produce raw oil (non edible) and spent seed husks are used to produce animal feed. The units can be designed from small to large scale at highly competitive prices.

Stage of Development: Commercialized
Type of Cooperation: Licensing; turnkey

Ref.No. 204 United Technology Engineers (Pvt) Ltd

CHEMICAL AND FOOD PROCESSING The company has the following technologies and processes: caustic-chlorine and its derivatives; sulphuric acid, SSP, TSP, alum; sulphur recovery; breweries; distilleries; sugar mills; solvent extraction, animal feed, glycerine plants and water treatment systems.

Ref.No. 205 URAI Impex
VEGETABLE OIL PRODUCTION Production of household and industrial cooking oils semi-automatic but labour oriented and produces 1,200 tons of oil/annum from oil seeds such as groundnut, palm kernel, salt flour seed etc. The seeds are first decorticated in a decortivating machine and the shell of the oil seeds is removed. The seeds are then fed into an oil expeller where they are crushed and then packed into containers of 1/2 kg, 1 kg, 5 kg and 25 kg as required. Total project cost is estimated at US\$ 500,000 of which machinery and equipment accounts for US\$ 425,000. The operating cost is US\$ 900,000/annum and buildings of 1,500 sq metres and land of 2,500 sq metres are required with 110 cu metres of water and 200 HP mechanical energy. The plant gives employment to 65 people of whom 10 are skilled, 5 technicians and 50 unskilled workers.

Stage of Development: Commercialized
Type of Cooperation: Know-how; production equipment; technical assistance

Ref.No. 206 Walcon Industries
POULTRY FEED Equipment and technical assistance for the production of poultry feed for poultry farms and hatcheries.

Type of Cooperation: Equipment supply; consultancy

**INTERMEDIATE TECHNOLOGY DEVELOPMENT GROUP
FOOD PROCESSING TECHNICAL BRIEFS**

The following technical briefs are designed to answer specific technical enquiries regarding the processing of the subject items or to give advice on quality and hygienic aspects of food processing facilities. Single copies of any individual technical brief can be provided free of charge from:

Intermediate Technology Development Group, 7 Jason Moyo Avenue, Gorlan House, Second Floor P.O. Box 1/44, Harare, Zimbabwe.
Tel: +263-4-796420 Fax: +263-4-796409.

or

Technical Enquiry Unit, Intermediate Technology, Myson House, Railway Terrace, Rugby, CV21 3HT, UK.
Tel. +44-1788-560631 Fax. +44-1788-540270

DESCRIPTION	DESCRIPTION
Biltong production	Lime marmalade
Canning	Lime oil and juice
Yoghurt production	Clear lime juice cordial
Small scale butter making	Fruit waste utilization
Tray drier	Vegetable pickles
Drying of foods	Tomato processing
Spice processing	Manufacture of Nas naran juice at small scale
Processing of Cardamom	Manufacture of whole lime juice at small scale
Processing of Chillie	Manufacture of papaya pickle at small scale
Processing of Pepper	Manufacture of water melon jam at small scale
Processing of Cumin	Manufacture of mixed fruit juice at small scale
Processing of Cloves	Manufacture of passion fruit juice at small scale
Processing of Corriander	Manufacture of strawberry jam at small scale
Processing of Coffee	Manufacture of passion fruit jam at small scale
Processing of Turmeric	Manufacture of pineapple jam at small scale
Processing of Nutmeg & Mace	Cold storage of fruit & vegetables
Processing of Cinnamon	Peanut butter production
Essential oil production	Principles of oil extraction
Fruit leathers	Soap manufacture
Apricot drying	Liquids filling and packaging
Design & Construction of a building for Food Processing	Solids filling and packaging
Water supplies and sanitation	Packaging materials
Hygienic design of food processing equipment and facilities	Packaging in glass
Fruit juice processing	Washing and steam sterilizing of bottles
Jam and marmalade production	Low cost bottle cooling system
Papain production	Quality control in food processing business
	Honey processing
	Food poisoning and its prevention

Ref.No. 207 African Regional Centre for Technology (ARCT)
BIOGAS PRODUCTION A pilot plant for the production of biogas using a biodigester (volume 3 - 50 cu m). Project cost is US\$ 17,500.
Stage of Development: Pilot plant

Ref.No. 208 ARIST Alsace
ECCOFEND WOOD LOG CHOPPING MACHINE A new product to chop wooden logs for use on domestic fires without the need for electrical power or physical exertion. The machine incorporates a hand pneumatic pump delivering 11 tonnes of power, allowing the wood to be split by people with limited physical strength (the old, disabled etc). ECCOFEND is made with a vertical column 1.5 metres high, weighs 40 kg and can be easily moved due to the incorporation of two wheels. The system incorporates safety features.
Stage of Development: Commercialized
Type of Cooperation: Licensing

Ref.No. 209 Beacone Engineering (Pvt) Ltd
FUEL EFFICIENT BIOGAS STOVE Fuel efficient biogas stove fabricated in steel utilizing waste produced from farms and livestock. Provides an excellent alternative to wood and coal and produces a virtually smokeless emission. Recommended economic scale 5 - 10 units per week.
Stage of Development: Patented
Type of Cooperation: Joint venture

Ref.No. 210 Beyen (Thailand) Co Ltd
INSTANT RUBBER STAMP MACHINE the size of an average typewriter converts any written, typed design or drawing, computer print-out into a high quality rubber stamp in just 5 minutes. New polymer technology. Patent pending. Utilizes UV lamps, negative foil and special plastic, extremely simple to use. Compact, inexpensive. Requires a laminator only. 110v - 220/240v. The only one of its kind. Gold Medal winner of Guinness Effort Award 1994.
Stage of Development: Pre-production
Type of Cooperation: Licensing; joint venture

Ref.No. 211 Ecoelectric Ltd
SOLAR PUMPING AND LIGHTING SYSTEMS Technology is offered for solar water pumping systems, solar lighting systems and electric water pumps.

Ref.No. 212 Garfield Smith & Associates
WASTE-FIRED BOILER SYSTEMS for wood, paper, cardboard, bagasse, straw, nut shells etc. Can be used to provide hot water and steam for turbine/electricity generation.
Stage of Development: Production
Type of Cooperation: Turnkey; joint venture

Ref.No. 213 Leicester Southfields College
WOOD TRADES AND PRINTING Unique vocational courses in wood trades and printing to develop local industries and improve export potential using natural materials in a sustainable manner. Offer: 2 year full-time or short courses.

Ref.No. 214 Martin Davoz Trading Ltd
BIODIESEL PLANT The plant is used for wasteless manufacturing of biodiesel (plant oil methyl esters). The technology can use other sorts of vegetable oils too. Biodiesel is ecological fuel that fully substitutes fossil diesel. The plant capacity is 500 - 10,000 tons a year. Biodiesel is manufactured by cold pressing so oil cakes are not biologically depreciated and can be used as valuable animal feeding. The other by-products are glycerine and organic layer. The technology offers processing to final products.
Stage of Development: Commercialized
Type of Cooperation: Turnkey

Ref.No. 215 National Small Industries Corporation Ltd, India

EGG AND FRUIT PACKAGING FROM WASTE PAPER This process which recycles waste paper into eco-friendly packaging materials for eggs and fruit transportation makes 350 - 400 trays per hour and consumes 1,000 litres water/day and 140 kW of electrical power. Equipment involved includes fibre reduction unit, pulp system, moulding unit and drying unit etc. The total area occupied is 500 sq metres of which 300 sq metres are buildings. Project cost US\$ 35,000, employs 6 skilled and 10 unskilled workers.

Stage of Development: Commercialized
Type of Cooperation: Turnkey

Ref.No. 216 National Small Industries Corporation Ltd, India

MANUFACTURE OF FUEL BRIQUETTES The process produces 350 kg/hour of fuel briquettes and involves pulverising, drying and briquetting machines. The raw materials include saw dust and agricultural waste and produces fuel for both domestic and industrial use. The total land area required is 1,000 sq metres of which 25% should be under cover. Project cost US\$ 45,000, gives employment to 3 skilled and 4 unskilled workers.

Stage of Development: Commercialized
Type of Cooperation: Turnkey

Ref.No. 217 National Small Industries Corporation Ltd, India

HAND MADE PAPER MANUFACTURE Process for recycling waste paper and agricultural waste materials involving pulping, moulding, pressing, drying, calendering and cutting to produce 2 MT/day of hand made paper. Equipment involves chopper, digester, pulper, mould press and calendering machine and water supplies of 1,500 litres/hour and power of 100 kW. Total area occupied is 6,000 sq metres of which 1,500 sq metre is under cover. Project cost US\$ 102,000 which gives employment to 10 skilled and 20 unskilled workers.

Stage of Development: Commercialized
Type of Cooperation: Turnkey

Ref.No. 218 Protech Systems Private Ltd
PENCIL MANUFACTURING UNIT with a capacity of 100 gross per day. Equipment, machinery offered: automatic grooving machine, hydraulic glue press, shaping machine, sand papering machine for round pencil, colouring machine, cutting machine, stamping machine, dipping machine, dust collector, tipping machine and punching machine. Project costs: equipment/machinery - US\$ 46,000; fees for technical know-how US\$ 15,000.

Stage of Development: Commercialized
Type of Cooperation: Turnkey

Ref.No. 219 STC Corporation

PVC WRAP FILM Technology for the production of PVC wrap film suitable for wrapping fruit, vegetables, meat, fish, bread and frozen foodstuffs. Product specifications: thickness (14-17 mic); roll width (200-450 mm); roll length (20-500 m). Process includes: raw material blending, feeding, extruding, ageing, slitting and packaging. Main equipment comprises: mixing unit, extruder, winder, side cutter, re-winder, ageing room. Annual production capacity 1,000-1,500 mt.

Stage of Development: Commercialized

Ref.No. 220 STC Corporation

POLYESTER FILM Technology for the production of polyester films suitable for foods, textiles, hot stamping, electric cables and adhesive tapes. Product specifications: thickness (12-25 mic); roll width (400-1,500 mm); roll length (4,000-12,000 m); Sp-gr (1.4). Technical specifications: strength (kg/mm²) MD (19-22), TD (18-21); elongation MD (140-160), TD (160-165); haze (2-3). Process includes: chip feeding, extruding, orientation, ageing, slitting and packaging. Annual production capacity 3,000-7,200 mt.

Stage of Development: Commercialized

Ref.No. 221 STC Corporation
CPP PACKAGING FILM Technology for the production of CPP film suitable for packaging foods, textiles and stationery. Product specifications: thickness (20-70 mic); roll width (300-1,270 mm); roll length (1,000-4,000 m); Sp-gr (0.9). Technical specification: tensile strength (kg/mm²) MD (3-6), TD (2.5-3); elongation MD (400-800), TD (600-850); haze 2-6; coefficient of friction 0.2-0.7 film to film. Process includes: resin feeding, extruding, ageing, slitting and packaging. Main equipment comprises: resin feeding unit, extruder, orientation unit (MD, TD), winder and slitter. Annual production capacity 2,400-7,000 mt.

Stage of Development: Commercialized

Ref.No. 222 Sugar & Integrated Industries Company
PAPER AND BOARD FROM BAGASSE Technology plant and machinery are offered to produce paper pulp, paper and particle board from bagasse.

Stage of Development: Commercialized

Type of Cooperation: Turnkey plant

Ref.No. 223 Technology Exchange Ltd
SELF CUSHIONING PACKAGING CARTON This integral packaging unit can be produced to any size and shape from a single sheet of packaging material (fibreboard, plastic etc). It can be simply adjusted to hold and cushion different quantities and sizes of contents. The package has been transit and drop tested to PIRA standards. (Our ref: TO 309).

Stage of Development: Pre-production

Type of Cooperation: Licensing; joint venture

Ref.No. 224 Technology Exchange Ltd
EASY TO OPEN FLEXIBLE PACKAGE BagBuster is the flip-top of flexible packaging. Easy-snap levers are separated with a simple action to open packages which would otherwise require scissors or knives. Samples are available heat sealed in high density polyethylene onto low density polyethylene packages, but can be used on all flexible packaging materials with other fixing methods. (Our ref: TO 286).

Stage of Development: Pre-production

Type of Cooperation: Licensing

Ref.No. 225 Technology Exchange Ltd
PULPROMAC Waste paper recycling machine for the production of egg packaging, biodegradable plant pots, food trays etc. Basic technology manually operated plant with simple maintenance procedures. Low floor loading, low initial capital cost, easy operation - high standard finished products. All electric 220/240 single phase. Production output egg trays 4 moulds x 60 strokes - 240 per hour. Materials required waste paper, water waxes (emulsified) and dyes. Training course available. (Our ref: TO 104).

Stage of Development: Commercialized

Type of Cooperation: Equipment supply; turnkey; licensing

Ref.No. 226 URAL Impex
REHABILITATION AND MANUFACTURE OF ELECTRIC MOTORS Copper wire is wound in the form of coil of specific length and diameter. The coil is fitted into the body of the motor with the help of scraping machine. Ends of the coil are connected to the contactor. Each coil is separated from the other with the help of insulators. Fine copper wire is wound on steel stamping sheet. Stamping unit is fixed into the slots of rotor shaft. The shaft is machined and balanced dynamically before fitting in centrally into the body of the motor. Each motor is tested for ampere rating, horse power, insulation, heat build-up before final despatch.

Type of Cooperation: Production equipment; know-how; technical assistance

Ref.No. 227 ARIST Alsace
CIRCULAIR DEODORANT SHOES A new shoe manufacturing process which allows the circulation of air within the shoe and kills the bad smells through an antiseptic product. A special air pump with a reservoir is integrated into the sole. A special liquid antiseptic produced is placed in the reservoir and utilizing foot movements of the pump, circulates the deodorant through the shoe. Ideal partner would be a footwear manufacturer with a DESMA PUZD machine.

Stage of Development: Commercialized

Type of Cooperation: Licensing; technical assistance

Ref.No. 228 ARIST Alsace
TEXTILE SPINNER, CABLE WINDER & UNWINDER A new development of a machine designed to wind and unwind cables and wire, for textile spinning or for knitting machines. The preferred partner would be a company already in the business of cables or textile spinning.

Stage of Development: Prototype

Type of Cooperation: Licensing; technical assistance

Ref.No. 229 Leicester Southfields College
FOOTWEAR TECHNOLOGY AND DESIGN The School of Footwear offers education, training and consultancy in the design and manufacture of footwear. The School aims to improve and update footwear companies by the introduction of new technology, by assisting in exports and by setting-up training facilities for the workforce. The School also offers its assistance in the establishment of new footwear schools in developing countries. In the UK the School offers 2 year full-time courses in addition to 12 week short courses.

Type of Cooperation: Training; technical assistance

Ref.No. 230 Leicester Southfields College
FASHION AND FABRICS Unique vocational courses in fabrics to develop local industries and improve export potential using natural fibres, wool and cotton in a sustainable manner. Offer 2 year full-time or short courses.

Ref.No. 231 Malawi Industrial Research and Technology Development Centre
LEATHER HANDICRAFT TOOLS Technology offered for tools to aid handicrafts in the leather industry.

Ref.No. 232 National Council for Scientific Research (NCSR)

HANDLOOMS Production of handlooms from local raw materials, mostly wood with some metal components that may also be locally secured. These looms produce a large variety of textile products ranging from grain bags, tea towels to bed spreads.

Ref.No. 233 Natural Fibres Organisation
NATURAL FIBRES FROM PLANTS A decorticator has been developed for on farm use to extract fibre from plants, particularly from linseed straw. Linseed straw is a waste product from oilseed production and its fibres have useful properties for industrial textiles (linen manufacture) and other applications including mats to control soil erosion, for pollution absorption, sound insulation and as a strengthening agent for paper or composites.

Stage of Development: Pilot plant

Type of Cooperation: Turnkey

Ref.No. 234 Orient Syntex Ltd
COTTON YARN AND FABRICS Technology, joint venture and marketing assistance offered for the manufacture of cotton and blended spun yarn and the weaving and processing of fabrics. Highly cost effective and environmentally friendly technology offered.

Stage of Development: Commercialized

Type of Cooperation: Joint venture

Ref.No. 235 Rainbow Laces
LACE, FABRICS AND KNITTED GARMENTS Joint venture offered by an established manufacturer, for the production of elastic tapes and garments using knitted and other fabrics.

Stage of Development: Commercialized

Type of Cooperation: Joint venture; investment

Ref.No. 236 Saini Leather Co
MANUFACTURE OF LEATHER GARMENTS
Joint venture offered with established manufacturer of leather garments with a production capability of 3,000 skins or 5,000 garments per month.
Stage of Development: Commercialized
Type of Cooperation: Joint venture

Ref.No. 237 Technology Exchange Ltd
MANUFACTURING PROCESS FOR ABSORBENT COTTON WOOL PRODUCTS AND MEDICAL AND COSMETIC/ DOMESTIC APPLICATIONS A firm with 25 years experience in the manufacture of hygienic disposable products have developed a plant for processing bleached cotton fibres to provide absorbent cotton wool products using, in part, fully reconditioned and modified carding machinery. The offer includes supply, installation and commissioning of plant, training of personnel on site and assistance in sourcing raw materials etc. (Our offer ref: TO 165).
Stage of Development: Commercialized
Type of Cooperation: Licensing

Ref.No. 238 Asian and Pacific Centre for
Transfer of Technology

QUICK RECYCLING OF ORGANIC WASTES

INTOMANURE (JAPAN) The technology utilizes the specific function of bacteria at a particular temperature and humidity, converting them into good organic manure and animal fodder. Organic manure produced by this system is dehydrated as high as 10% for animal fodder at reasonable costs. Areas of application - This system is applied for quick recycling of organic wastes produced in the course of: food industry; fishery industry; agroindustry and agriculture (utilization of animal wastes) Advantages: waste utilization; minimization of waste disposal costs, sanitation costs, manure purchasing costs and high speed operation due to the addition of specific bacteria and some moisture controller in three hours.

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 239 Asian and Pacific Centre for
Transfer of Technology

NEW TECHNOLOGY FOR WASTE WATER TREATMENT IN MEAT PROCESSING FACTORIES (RUSSIA)

Although waste waters of meat processing factories are not so toxic as waste water from electroplate production, the excess of proteins, fats and other organic components in water may cause negative and irreversible influence on the metabolism of living organisms. The most trivial method of waste water is the biological one, but this method has many problems. Although this company does not reject biological methods for waste water treatment, a new task has been formulated to create a new technological concept. The concept was developed based on careful study of proteins, fat and other organic component destruction. As a result, a new process for waste water treatment in meat processing factories was developed by the company. This technology also represents an effective method for precipitate production that can be used as feed additives in livestock farming. Based on the findings of its research, the company involved one more transformation contour that has radically changed the structure of organic molecules and lowered the waste concentration to the estimated level acceptable for fish farming. The reduction in the concentration

(mg/litre) of contaminants in the waste water is shown below (figures in brackets show the concentration achieved due to additional transformation contour). COD: from 2,500 to 80-400 (5-10); solutions: from 300-500 to 20-40 (less than 10); suspended solids: from 800-2,200 to 20-80 (5-10). The equipment can fit to almost any meat processing factory. Advantages: high level of water purification, higher level of waste utilization, simple to maintain, easy to install.

Stage of Development: Commercialized

Type of Cooperation: Turnkey; joint venture

Ref.No. 240 Asian and Pacific Centre for
Transfer of Technology

INNOVATIVE ELECTROCHEMICAL PROCESS FOR WASTE WATER TREATMENT IN THE DAIRY INDUSTRY (KAZAKHSTAN)

Waste water of dairy plants has a high content level of proteins, fat and biogenic organic components. Traditional biological water treatment requires large sites and significant capital outlays. It is also necessary to have expensive equipment to maintain living conditions of the micro-organisms, to control the process of the biological carbon oxidation and to control a variety of operating parameters of the equipment. In addition, such an equipment has high energy consumption and maintenance cost and requires attendance by skilled personnel. This company has developed a new technology for treatment of dairy waste waters through transformation of major organic contaminants into soluble forms followed by their separation from waste water. The biological contaminants destruction by electric current in some solutions is used as primary technological process followed by chemical treatment and sterilization of the purified water. Advantages: the solid precipitates produced by the process can be used as protein food additives for livestock; the degree of water purification from organic components is 90 to 99.5%. And energy efficient technology requiring: for 20 cu m/g plant; land - 5,600 sq m, power - 6 kW/h, manpower total - 2 per shift.

Stage of Development: Commercialized

Type of Cooperation: Turnkey

Ref.No. 241 Asian and Pacific Centre for
Transfer of Technology

**INNOVATIVE TECHNOLOGY FOR
PURIFICATION OF WASTE WATERS
CONTAMINATED BY VEGETABLE OILS
(RUSSIA)**

Vegetable oils released by factories into the waterways, lakes, rivers etc spread over the water surface as very stable thin layers impenetrable for atmospheric oxygen. That may cause an inhibition of the vital activity in the water reservoir through the anaerobic processes or even its death. Water and oil emulsion is a stable physico-chemical system that is difficult to destroy by generally used methods. Coagulation by reagent processing does not give satisfactory results. The results of the chemical oxidation are better, but techniques such as ozone treatment are too expensive and cause some secondary pollution problems. Using high scientific potential of its professionals, this company has found an original solution of the problem which is distinguished by its simplicity, reliability and low operational expenditures compared with the processes it substitutes. The degree of waste water purification achieved by the process is 98-99.5%. Reduction of the contaminant concentration (mg/l) in the waste waters before and after treatment is shown below: oils - from 917 to 5.1 (99.5%); suspensions - from 117 to 4.2 (96.5%); COD - from 215 to 15.0 (93%). Technological parameters of the purification complex: performance of a single unit - 20 cub m/hour; site area - 40-60 sq m; electricity consumption - 4.5 - 8 kWt/cub m; manpower - 1. The unified scheme of the installation of the necessary number of units ensures any necessary performance of the complex from 20 up to 200 cub m/hour.

Stage of Development: Commercialized

Type of Cooperation: Turnkey; joint venture

Ref.No. 242 Asian and Pacific Centre for
Transfer of Technology

**WASTE WATER PURIFICATION
TECHNOLOGY FOR LEATHER
PROCESSING, FUR AND SHEEP-SKIN
PROCESSING FACTORIES (RUSSIA)**

Waste waters from leather processing and fur factories are highly contaminated. These factories require a lot of fresh water for their operation and their waste waters contain chromium, a large amount of fat,

suspensions, surface active reagents, sulphides etc. These waste waters are very contaminated and contain toxic substances. This technology permits purification of waste water contaminated by such components as chromium, dyes, suspensions and reagents soluble in ether. The scheme involves preliminary separation of the coarse and fine suspensions and stirring of the waste water, destruction of the organic reagents, chromium residual removal. Waste water is treated with two or more reagents depending on the concentration of contaminants. It takes place simultaneously with air bubbling. The separation of water and agglomerated contaminants is performed in the fourth contour. These technologies are based on the compact units easily installable into existing technological schemes. Maintenance expenditures are minimized. The above scheme allows purification of waste water to the level suitable for filtering fields or for waste water disposal system. Full purification includes the following stages: separation of the coarse parts and suspensions, fat and suspension flotation; destruction of organic contaminants; final clearing in special units. The table below shows the reduction in the contaminant concentration (mg/litre) after treatment of the sheep-skin waste water. Surface active chemicals: from 10.3 to 0.1 - BOD(5) - from 600 to 10; COD - from 2,470 to 30; ammonium ions - from 52.6 to 1.0; soluble in ether - from 140.0 to zero. The resulting water is suitable for fish farming. Pay back period: 1 year. Inputs required: building - 70 sq m for capacity of 20 cub m/h. Manpower required: total - 1-2 (unskilled). Production capacity: 5 to 500 cub m/h. Economic data: total project cost: US\$ 60,000 to 200,000, training fee US\$ 5,000. *Stage of Development:* Commercialized *Type of Cooperation:* Turnkey; joint venture; consultancy; licence; equipment supply, technical assistance, training

Ref.No. 243 B & C Engineering
WATER PUMPS AND TANKS Various technologies offered for Afridev hand pumps and water tanks.

Ref.No. 244 Extrade Ltd
DEEPWELL AND BOREHOLE PUMPS
 Technology offered for deepwell and borehole pumps, particularly India Mk 4 & 5 and Afridev pumps suitable for 30 - 100 metre depths.
Stage of Development: Commercialized
Type of Cooperation: Licensing

Ref.No. 245 Garfield Smith & Associates
PURIFICATION AND TREATMENT OF WATER AND EFFLUENT BY ELECTRO-CHEMICAL ACTIVATION Revolutionary method which provides clean potable water from a contaminated source; destroys all bacterial and viruses in seconds to European safety standards; unit sizes 45 litres per hour to 350 litres/hour. A similar system uses same type of cell but produces a powerful cocktail of sterilisation chemicals including chlorine dioxide, ozone and hydrogen peroxide (in solution) with a biocidal activity of 100 to 300 times greater than conventional hypochlorite solutions therefore much more economical. Ideal for food sterilization/processing and agricultural use.
Stage of Development: Production
Type of Cooperation: Technical assistance

Ref.No. 246 Garfield Smith & Associates
INCINERATOR FOR VOLATILE ORGANIC COMPOUNDS with provision for heat recovery from the products of combustion. Conforms to current European Standards.
Stage of Development: Production
Type of Cooperation: Turnkey; joint venture

Ref.No. 247 Garfield Smith & Associates
INCINERATOR FOR PATHOLOGICAL WASTE AND CREMATORIA Fully automatic operation and conforms to current European emission standards. Maximum throughput 2.5 tonnes per hour.
Stage of Development: Production
Type of Cooperation: Turnkey; joint venture

Ref.No. 248 Neale Consulting Engineers Ltd
POLDAW 3.5 METRE WINDPUMP Low cost water pumping windmill, available for manufacture under licence. Rotor diameter 3.5 metres, tower height 9 metres. Capable of pumping from depths

as great as 90 metres (300 feet). Typical output 15,000 litres per day at 20 metres head. Advantages: local manufacture, with no specially imported materials or components, avoiding imports of alternative pumping devices. Uses no fuel or electricity in service, thus saving costs and benefitting the environment. Application areas: human water supply (villages, schools, clinics etc) animal water supply, small scale irrigation etc. Environmental aspects: uses no fuel or electricity, benefitting environment and economy. Can operate in remote areas as self contained unit, with no infrastructure (roads, electricity lines etc) required. Production capacity: recommended economic scale - 100 to 500 units per year; unit market price - US\$ 3,500 in UK, US\$ 2,000 in Zimbabwe, (projected US\$ 1,200 in India). Inputs: landing/building (sq m) indoor - 200 - 500, outdoors - 0; manpower (number): skilled - 10, unskilled - 10. Fees for technical know-how/training - US\$ 16,000.
Stage of Development: Commercialized
Type of Cooperation: Licensing

Ref.No. 249 Technology Exchange Ltd
POLLUTION CONTROL PRODUCTS IN GLASS REINFORCED PLASTICS The company manufacture components for sewage treatment plants, tank covers, odour control systems, oil/petrol interceptors, cesspools and underground storage tanks in a variety of glass reinforced plastics (GRP). They currently export mainly to countries outside of the EEC including the Middle East, the United States and the Far East including Hong Kong and Taiwan. They are now looking for penetration into the markets of developing countries. The company's interest is to establish effective agents/distributors in various countries. Suitable companies would be ideally fairly small, run by the proprietor and be involved in providing equipment or services to the effluent and water treatment industries. Once a good relationship was established, the company would consider moving some manufacturing to their partners. (Our ref: TO 275).
Stage of Development: Commercialized
Type of Cooperation: Technical assistance; joint venture; licensing

Ref.No. 250 Technology Exchange Ltd
MOBILE INCINERATOR FOR HAZARDOUS TOXIC WASTES INCLUDING PCB'S IN LIQUID, SOLID OR SLUDGE FORM Handles 0.5 to 4 tonnes of waste per hour to highest environmental standards. These trailer portable thermal destruction units incorporate a rotary kiln incinerator and new, compact, efficient and reliable scrubber technology. They are designed to achieve the 99.9999% destruction removal efficiency required by the Toxic Substances Control Act. (Our ref: TO 178).

Stage of Development: Commercialized

Type of Cooperation: Joint venture

Ref.No. 251 Technology Exchange Ltd
HYPOBROMINATION FOR STERILISATION OF WATER A process for the efficient on-site electrolytic generation of hypobromous acid from either sodium chloride/sodium bromide mixed brines or sea water dosed with sodium bromide. Applications: sterilisation particularly for cooling water and used in cooling towers and air conditioning systems. (Our ref: TO 176).

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 252 Technology Exchange Ltd
WELL JETTING RIG This rig is designed to jet wells down to 12 metres and install a lining of corrugated drainage pipe. The hole is backfilled with gravel to act as a filter and the plastic pipe can be sleeved with polythene to stop surface water contamination. Operated by two people, the rig works best on alluvial soils. (Our ref: TO 155).

Stage of Development: Prototype

Type of Cooperation: Licensing

Ref.No. 253 Technology Exchange Ltd
COMPLETE TURNKEY WATER PURIFICATION AND PRODUCT RECOVERY PLANTS FOR TRADE EFFLUENTS, PRIMARILY FOR THE FOOD INDUSTRY The licence is available for the manufacture, sale and installation of water purification plants which recover useful products such as protein and oils from the effluent of the food industry, eg meat, fish, bone and fat, starch, dairy,

poultry, canneries, distilleries and breweries. The system is also effective for pulp and paper, mineral oil, metal plating and tanning industries and can be developed to deal with most domestic and industrial effluents. In the food industry the recovered products can pay for the running costs of the process, which consumes only one-tenth of the electrical power of an equivalent biotechnology process. The chemicals and flocculants used in the process do not reduce the value of recovered products which are used for animal feed. Over 90 turnkey systems sold in over 30 countries. (Our ref: TO 100).

Stage of Development: Commercialized

Type of Cooperation: Licensing; turnkey

Ref.No. 254 Walcon Industries
DIESEL AND ELECTRIC MOTOR PUMP SETS 5-15 HP diesel pump sets and 1-5 HP electric motor pump sets are offered for local manufacture and assembly.

Type of Cooperation: Investment; turnkey

Ref.No. 255 Active Pottery
POTTERY PRODUCTS The project is offering processes for the manufacture of pottery products. The project wishes to transfer this technology through either joint venture or sub-contracting terms.

Stage of Development: Commercialized
Type of Cooperation: Joint venture; sub-contracting

Ref.No. 256 Aude Investments (Pvt) Ltd
PLASTIC STORAGE TANKS Storage tanks fabricated in plastic (polyethylene) for use with water, chemicals and food as storage or transportation vessels.

Stage of Development: Commercialized

Ref.No. 257 B & C Engineering
CONVEYORS, PENDULUM SAW AND CHIP WATER HEATER Various technologies offered for conveyors, a pendulum saw and a chip water heater.

Ref.No. 258 Columbia Engineering (Pvt) Ltd
MECHANICAL PRESSES, MIXERS AND SEED SHELLERS Joint venture and sub-contracting offer for the manufacture of the following equipment: block presses to manufacture stabilised soil blocks for use on farm buildings and houses; mud mixers for use in construction; sunflower shellers to remove the husk from sunflower prior to oil extraction (275 kg/hour); and hand-operated ram presses. Unit market prices as follows: block press US\$ 2,000; mud mixer US\$ 5,600; sunflower shellers US\$ 2,300; and ram presses US\$ 3,200.

Stage of Development: Commercialized
Type of Cooperation: Sub-contracting; joint venture

Ref.No. 259 Kalimba General Maintenance Ltd
WELDING MACHINES Technology in the manufacture of welding machines (220V/380V), battery chargers (220V) and electrical panels (220V/380V) is offered by the project. The company would like to enter into joint venture with an interested entrepreneur.

Stage of Development: Commercialized
Type of Cooperation: Joint venture

Ref.No. 260 National Council for Scientific Research (NCSR)

LIQUID NITROGEN PUMP An electronic product that is used in artificial insemination. Intellectual property registration procedures are underway.

Ref.No. 261 National Small Industries Corporation Ltd, India

TOILET SOAP MANUFACTURE Process involves mixing, milling, extruding, cutting and stamping to produce soap cake from soap noodles for personal hygiene. Equipment involved includes an amalgamator, miller and a plodder and produces 150 kg/day of toilet soap from soap noodles, colour and perfume. A normal supply of water and 10 kW of electrical power will be required. Total area of 100 sq metres, including 80 sq metres of building. Project cost US\$ 11,000, employs 1 skilled and 5 unskilled workers.

Stage of Development: Commercialized
Type of Cooperation: Turnkey

Ref.No. 262 National Small Industries Corporation Ltd, India

TOILET SOAP MANUFACTURE Process involves blending, mixing, moulding and chip forming from raw materials of oils, caustic soda, perfumes and colour. Equipment includes tanks, soap pan, chip forming, amalgamator and milling etc and utilises 2,000 litres/day of water and 150 kW of electrical power. Total land area required is 2,000 sq metres of which 1,600 sq metres should be under cover. Project cost US\$ 105,000, employs 15 skilled and 15 unskilled workers.

Stage of Development: Commercialized
Type of Cooperation: Turnkey

Ref.No. 263 Sugar & Integrated Industries Company

PERFUMES Technology, plant and machinery for the production of perfumes.

Stage of Development: Commercialized
Type of Cooperation: Turnkey plant

Ref.No. 264 Sugar & Integrated Industries Company

DESIGN AND MANUFACTURE OF MACHINERY AND EQUIPMENT Offer of a design and manufacture of machinery to customers requirements. Equipment and machinery previously designed relates to following fields: heat exchangers; water tube boilers; mill systems; water treatment stations; storage tanks; handling equipment (locomotives, railway wagons, trailers, barges etc); conveyors (belt, screw, bucket, chain); and valves (butterfly, gate).

Ref.No. 265 Technology Exchange Ltd
INNOVATIVE LOW SHEAR MIXER A major independent UK research, development and consultancy company has developed and patented a unique mixing technology which can operate within a fully sealed mixing vessel avoiding product loss from evaporation of the liquid medium. The development is of particular interest to the surface coating industry where it eliminates solvent loss due to evaporation thereby significantly increasing product recovery and eliminating environmental contamination. Customers to date include Dow Corning, BASF, Ford Motor Co Ltd, International Paint, Kvaerner Govan etc. Since no mixing paddles are involved, cleaning problems associated with change of product are reduced. The technology ensures complete and continuous mixing throughout the complete chamber volume giving short mixing times and offering a major reduction in energy consumption for the mixing process. The operating principle ensures low shear mixing which is especially important when dealing with shear sensitive products. Liquid to liquid blending is achieved quickly even where there is a large density difference between the liquids. Solid to liquid suspensions, such as heavy zirconium based silica sol slurries with a specific gravity of 3.0 for the investment casting industry, NC lacquers, thermoplastic acrylics and metallic paints without damage to the solids. They have also been proved in use with highly non Newtonian, thixotropic materials, such as water borne paints, which are mixed with little or not viscosity drop and with no dead areas within the mixing vessel. (Our ref: TO 322).

Stage of Development: Commercialized

Type of Cooperation: Distribution agreement; licensing

Ref.No. 266 Technology Exchange Ltd

BOTTOM FILLING BUCKET A simple modification to a standard bucket which will enable it to fill from the base to seal and be lifted when full to ease the emptying of garden ponds, baling out boats, emptying water filled excavations, extracting water from boreholes, wells, rivers and streams by a simple vertical movement. The technique enables liquids to be lifted whilst minimising the inclusion of solid materials eg stones, plant, fish etc and can also avoid the entrapment of surface films and pollutants. The market for this bucket would be Garden Centres, Pet Stores, shiphandlers, farmers and building contractors in addition to outlets in the domestic and leisure markets. (Our ref: TO 319).

Stage of Development: Prototype

Type of Cooperation: Licensing

Ref.No. 267 Technology Exchange Ltd

DIY GARDEN CONTAINERS AND STATUARY The invention relates to the manufacture of moulds for the making of garden and domestic containers and statuary. These moulds are for use in a DIY capacity being 'light', transportable and easily utilised. At present containers and statuary are available ready made for purchase and are manufactured via re-usable rubber moulds. This method is labour intensive, heavy, bulky to transport and thus expensive. DIY containers and statuary utilise disposable moulds made from a rigid, lightweight, waterproof material, such as plastic, polystyrene, cardboard, paper mache etc. A specific mix of sand, cement and water, or other similar materials can be poured into the moulds for hardening. The moulds can be made in such a way as to allow the user easy removal of the mould, which would be done after the required setting time, leaving a faithful copy of the mould. The manufacture of these moulds lends itself to an infinite number of designs for both the containers and statuary, for use in the home, garden or office. Potential manufacturers and distributors of these moulds are sought by the inventor for licensing.

Stage of Development: Prototype

Type of Cooperation: Licensing

Ref.No. 268 Tinytech Plants
CEMENT PLANT Portland cement as per Indian or British standard can be manufactured. Capacity 20 tonnes per day. Capital investment per tonne of installed capacity only 50% of big cement plants. Saves transport cost. Requires very small limestone reserve. Ideally suitable as captive unit for builders, contractors.

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 269 Tinytech Plants
ROOFING TILE PROJECT Burnt clay roofing tiles of size 420 mm x 250 mm with weight of 2 kg per tile can be manufactured from clay only. So free raw material available in every country. Capacity 2 million tiles per annum. Employs 60 unskilled workers. Import component only 20% of project cost. Bright prospects in every developing country.

Stage of Development: Commercialized

Type of Cooperation: Licensing

Ref.No. 270 University of Luton
COMPUTER AIDED DESIGN AND MANUFACTURING Education, training and technical know-how offered for rapid prototyping and 3-D modelling using computer aided design and manufacturing systems

Stage of Development: Commercialized

Type of Cooperation: Education and training

Ref.No. 271 URAL Impex
METAL FABRICATION TECHNOLOGY A general purpose workshop having various metal working and shaping machines such as lathe, drilling, boring, milling, shaping powershear and welding machine. Is an ideal workshop for fabrication of small items such as frames for doors and windows, gates etc. Fabrication and machining of gears, shaft and other industrial parts.

Type of Cooperation: Know-how; technical assistance; production equipment

Ref.No. 271(b) Protech Systems Pvt Ltd
INCENSESTICKS A manufacturing unit capable of producing 200 kgs/day of incense sticks from incense paste. The market price of incense sticks is US\$ 50 per kg. The plant comprises a 12 inch pulverizer driven by a 5 HP electric motor, a mixer with a 2 HP motor, a plodder with a 3 HP motor, a drying oven with trays, plus spares to cover 2 years of operation. The capital investment required is US\$ 15,000 plus US\$ 5,000 for know-how and training.

Stage of Development: Commercialized

Type of Cooperation: Turnkey

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Ref.No. 272 ARIST Alsace
SUGAR CANE A French company is seeking a joint venture with a partner operating a sugar cane plant to supply sugar for importation.

Type of Cooperation: Joint venture; equipment supply

Ref.No. 273 Barandiguel
CATTLE FEED Industrial technology required to upgrade the processing of cattle feed, in quantities of 4 tonnes per day, from locally available materials and for the local market, where annual demand growth is 25% at a unit price of US\$ 6 per kg.

Ref.No. 274 E M Enterprise
AGRICULTURAL EQUIPMENT The company is engaged in the manufacture of various agricultural implements such as animal drawn ploughs and hammer mill housings. The project would like to modernise its manufacturing operations through joint venture or technology licensing agreements with a foreign partner.

Type of Cooperation: Joint venture; licensing

Ref.No. 275 Elitem Enterprises Ltd
ANIMAL FOODSTUFFS The project intends to venture into the manufacture of stock feed. Technology is sought for the production of high grade stock feed from soy beans, sunflower and maize bran. The project is looking for either cash investment or sub-contracting or equipment supply type of cooperation with foreign partners. The local market is expected to grow at about 30% per year in the next few years. Pre-feasibility studies have been performed by SIDO.

Type of Cooperation: Investment; sub-contracting; equipment supply

Ref.No. 276 Fredo Enterprises
CASTOR SEED OIL The company wants to go into the manufacture of castor seed oil and storage of farm produce. Technology is therefore being sought in farm storage and castor seed processing. From a foreign partner, the project requires cash investment or equipment supply.

Type of Cooperation: Investment; equipment supply

Ref.No. 277 Kanash (K) Ltd
TISSUE CULTURE LAB EQUIPMENT A new project to produce plants and bulbs for local planting and cut flowers for European market by tissue culture in Limuru, Kiambu District of Central Province Kenya. Local investment of US\$ 10,000 available plus 20 hectares land and 1,000 sq m building.

Type of Cooperation: Joint venture; equipment supply

Ref.No. 278 Merit Engineering Services Ltd
WINDOWS, DOORS, AGRICULTURAL EQUIPMENT A new project to venture into the manufacture of steel window and door frames, gate valves, brass bends, water boilers and agricultural equipment. The project expects joint venture or technology licensing agreements with a foreign partner.

Type of Cooperation: Joint venture; licensing

Ref.No. 279 Mushuwa Technical Services Ltd
AGRICULTURAL EQUIPMENT This is a new project planning to manufacture agricultural equipment. The product range includes animal drawn ploughs, manually operated oil presses, maize shellers, hand pumps and rice threshers. The project is seeking foreign cooperation for the supply of equipment to manufacture the above named products.

Type of Cooperation: Equipment supply

Ref.No. 280 Namibia Development Corporation
CHICKEN FARMING A new project to set up a 540 metric tonnes per annum chicken broiler and abattoir in Omaruru, Windhoek, Namibia. Project cost US\$ 1.5 million, 10% local investment. Land and buildings (6,600 sq m) available. The processes required include broiler production, abattoir, packaging, freezing and transport.

Type of Cooperation: Investment; joint venture

Ref.No. 281 Namibia Development Corporation

SEAWEED HARVESTING AND PROCESSING A new US\$ 0.6 million project to cultivate, collect and process 300-500 metric tonnes of seaweed to provide raw material for Agar production (50 metric tonnes pa) in Luderitz. Local investment 10%, 8 hectares of land and buildings, feasibility study available. The project includes seaweed cultivation in sheltered water, collection, sun drying, cleaning, sorting and baling.
Type of Cooperation: Investment; joint venture

Ref.No. 282 Namibia National Farmers Union
TRAINING OF COMMUNAL FARMERS A new project to train 50 farmers from Namibia per course of 12 months in cattle, crops and poultry farming. Total project cost estimated at US\$ 150,000, of which US\$ 14,000 available locally. Feasibility study and government reports available.
Type of Cooperation: Investment; joint venture

Ref.No. 283 Namibia National Farmers Union
LIVESTOCK MARKETING A new project to purchase, fatten and slaughter 15,000 cattle carcasses per annum in Northern Namibia. Project cost is estimated at US\$ 2 million, of which 10% available locally, plus 500 million sq metres of land.
Type of Cooperation: Equipment supply; cash investment

Ref.No. 284 Sola Youth Club
VEGETABLE CULTIVATION AND IRRIGATION This project is involved in vegetable (potatoes, onions, beans and sweet corn) cultivation and would like to expand by investing in irrigation equipment. Cooperation is thus being sought in form of cash investment or equipment supply.
Type of Cooperation: Investment; equipment supply

Ref.No. 285 Tony Katongo
AGRICULTURAL EQUIPMENT, WINDOWS AND DOORS The company is engaged in the manufacture of various agricultural implements such as animal drawn carts, ploughs and hammer mills. The project is also engaged in light engineering operations such as steel window and door frame manufacture. The project would like to modernise its manufacturing operations through equipment

supply agreements with a foreign partner.
Type of Cooperation: Equipment supply

Ref.No. 286 Village Industry Service
ESSENTIAL OILS Essential oil extraction from local raw materials.
Type of Cooperation: Licence; joint venture

Ref.No. 287 Village Industry Service
AGRICULTURAL STORAGE AND REFRIGERATION SYSTEMS Storage and refrigeration systems for rural areas, allowing freezing and storage of raw materials as well as finished products, is required.
Type of Cooperation: Joint venture; licensing

Ref.No. 288 Viphya Corporation Limited
ORGANIC FERTILIZER A new joint venture project to produce 30,000 tons of organic fertilizer per annum. The process will involve the fermentation of a mixture of woodwaste, pinebark and tobacco waste in bins under controlled temperature, by introducing bacterial strains. After the fermentation process, the ripe product contains a high humus content and microbial charge and is ready for use. The resultant product contains a well balanced content of macro and trace elements, humic acids and organic substances. The total estimated project cost is US\$ 500,000.
Type of Cooperation: Joint venture

Ref.No. 289 Viphya Corporation Limited
LIVESTOCK PRODUCTION A new joint venture project to rear 5,000 animals for eventual sale live for cold storage. The project entails the rearing of cattle, sheep and pigs with the forests of the Viphya by utilizing the firebreaks. The project would provide beef to the resident population, adjacent farms and urban centres as well as sale to slaughter houses for cold storage. Total estimated cost US\$ 1.5 million.
Type of Cooperation: Joint venture

Ref.No. 290 **Votex Tropical**
RICE THRESHER The company is seeking joint venture cooperation in the manufacture of a rice thresher. This thresher is already on the Zambian market.

Stage of Development: Commercialized

Type of Cooperation: Joint venture

Ref.No. 291 **Walcon Industries**
ANIMAL FOODSTUFFS, ENGINES AND PUMPING SETS The company is interested in setting up a joint venture or complete turnkey project for the production of the following products: cattle feed; poultry feed and medicines; poultry farm/hatchery; diesel engines and diesel pumping set; motor pumping set 1-5 HP and agricultural implements.

Type of Cooperation: Joint venture; turnkey

Ref.No. 292 Alingu Enterprises
MILLING OF MAIZE FLOUR This is a project seeking milling technology for the production stock feed and maize flour. A pre-feasibility study report exists. The project would like to enter into joint venture agreements with a foreign partner.
Type of Cooperation: Joint venture

Ref.No. 293 APIBU & CIFA
HONEY AND BEESWAX PROCESSING Technology and equipment required for the processing of pure honey and the beeswax from the hives. Planned output of 7 tonnes of honey per year. Local investment capacity: cash - US\$ 115,000; land - 25,000 sq m; building - 500 sq m.
Type of Cooperation: Investment; equipment supply

Ref.No. 294 Aromes de l'Océan Indien Ltd
COCONUT DAIRY PRODUCTS Dairy technology is required for the expansion of an existing facility producing 65 tonnes of UHT coconut cream per month to produce milk, yoghurt and ice cream from coconuts in quantities of 30 - 40 tons per month. Estimated project cost US\$ 1,800,000.

Ref.No. 295 B B C Syndicate
MILK AND EDIBLE OIL PRODUCTION This small scale firm produces pasteurised milk and edible oil. Currently 18,250 litres of milk and 6,240 litres of oil are produced annually. The enterprise is looking for a foreign partner to enter into a joint venture, preferably covering equipment supply to expand both milk and edible oil production.
Type of Cooperation: Joint venture; equipment supply

Ref.No. 296 Bakanibona Athanase
FRUIT JUICE PRODUCTION Cash investment required to provide the technology required to export banana and process 1,000 litres/day mango, orange and pineapple juice for the export market. Estimated project cost is US\$ 35,000. Local investment capacity US\$ 15 - 25,000 and land area 10,000 sq m. In Burundi only one type of juice is processed industrially.
Type of Cooperation: Investment

Ref.No. 297 Beacone Engineering (Pvt) Ltd
WHEAT FLOUR MILLING A new project to establish a small scale wheat flour milling plant capable of producing 5 tonnes/day.
Type of Cooperation: Joint venture

Ref.No. 298 BECIDO SPRL
TOMATO PULP FABRICATION Turnkey plant sought for the production of tomato pulp to meet the growing needs (20% per annum) of a market currently supplied entirely via import, which attract a 15% import duty. The planned capacity for the plant is 500 kg/day, 60% of which would be used for the home market.
Stage of Development: Turnkey plant

Ref.No. 299 Blueband Milling Ltd
MAIZE FLOUR AND STOCK FEED The company would like to enter into the production of maize flour and stock feed. A market study has been performed. The company is seeking technology on turnkey or equipment supply basis.
Type of Cooperation: Turnkey; equipment supply

Ref.No. 300 Buka Women's Club
SOYABEAN AND GROUNDNUIT FLOUR This is a new company with plans to process soyabeans and groundnuts into flour. Furthermore, the project would like to process fruits into juices as well as pre-processing of vegetables. Foreign cooperation is sought in respect of cash investment, technology licensing and equipment supply.
Type of Cooperation: Investment; licensing; equipment supply

Ref.No. 301 Chingola Meat Suppliers Ltd
SAUSAGES AND SAUSAGE CASINGS Chingola Meat Suppliers is an existing company producing (apart from fresh meat and pork sales), 80 tonnes of smoked sausages, 24 tonnes of salami, 20 tonnes of fresh sausages and 4 tonnes of pressed beef and ham per year. The company would like to expand its production of these meat products. The firm would also like to start the production of assorted (French, hank hog etc) sausage casings. The importation of sausage casings is currently

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costing the firm about K200 million annually. The type of foreign cooperation that the company is looking for is joint venture. A detailed project description exists.

Type of Cooperation: Joint venture

**Ref.No. 302 CNTA
CASSAVA STARCH PRODUCTION**

Technology required to produce 10 tonnes of amidon starch from cassava per day. A strong local market currently supplied entirely through import (duty 15%). Local investment capacity for entire project cost.

Type of Cooperation: Licensing; equipment supply

**Ref.No. 303 CNTA
PALM OIL EXTRACTION**

Turnkey project to extract oil from palm nuts for local market to meet demand growth of 20% of which 30% imported or US\$ 6/litre and duty 15%. Planned capacity is 500 litres per day. Estimated project cost is US\$ 10,000 of which 60% can be met through local investment. Land 8,000 sq m, building 3,000 sq m.

Type of Cooperation: Turnkey

**Ref.No. 304 Coffee Processing and Warehouse
Enterprise**

COFFEE PROCESSING USING GRAVITY TABLES An expansion project is required to introduce new technology utilizing gravity tables to enhance the output of cleaned sundried coffee. The existing sundried coffee has many impurities and the existing production process for washed coffee has proved to be inefficient. Total project cost is estimated at US\$ 3,000,000 which is available locally. Planned production capacity 12 tons/hour.

Type of Cooperation: Equipment supply

**Ref.No. 305 Comet Enterprises Ltd
FRUIT JUICE AND CARBONATED FRUIT
DRINKS**

A new project to start the production of fruit juice and carbonated fruit drinks and castor oil products. Technology is being sought to manufacture the above named products. Cash investment or equipment supply type of arrangements with a foreign partner are sought.

Type of Cooperation: Investment; equipment supply

**Ref.No. 306 Dairy Development Enterprise
REHABILITATION OF COMPRESSOR UNIT,
BUTTER CHURNER, MILK PACKAGING
AND YOGHURT FILLING LINES**

Expansion project to rehabilitate existing milk packaging and yoghurt filling lines and associated equipment to increase capacity to 120,000 litres per shift. The processes involve clarification, cream separation, short term pasteurisation at high temperature, homogenization and packing. 100% of output is consumed locally with a modest annual market growth rate of 2%. The estimated total project cost is US\$ 3,000,000. Study is available.

Type of Cooperation: Joint venture; equipment supply

**Ref.No. 307 Enviro Oils and Colourants
MARIGOLD AND PAPRIKA**

This is a solvent extraction processing company with a capacity to process 20 tonnes of marigold and 10 tonnes of paprika per 24 hrs. The company is seeking technology or processes for enhanced growth of the raw materials (marigold and paprika) so as to meet the requirements of the plant.

Type of Cooperation: Joint venture; licensing

**Ref.No. 308 Ethiopian Meat Concentrate
SLAUGHTER LINE, FILLING MACHINE
AND REFRIGERATING COMPRESSORS**

An upgrading project requires the addition of a slaughter line, filling machine with dosing equipment and cold storage facilities utilizing refrigerating compressors. A study has been carried out and the emphasis is for the export market with a desired share of that market at 30%. The estimated total project cost is US\$ 300,000 with local investment available up to US\$ 100,000.

Type of Cooperation: Joint venture

**Ref.No. 309 Ethiopian Spice Extraction
Factory**

ESSENTIAL OILS A new project for the production of essential oils with the focus on the export market. Production process will be: raw material, cooking, distillation and fractionation. A feasibility study has been undertaken and shows that a planned output capacity of 25 tons/year currently requires investment of US\$ 471,698, all of which will be met locally.

Type of Cooperation: Equipment supply

**Ref.No. 310 Faffa Food Factory
EXTRUSION AND MICRO MILLING OF
CORN AND SOYA BLEND (CSB)**

Semi-computerised milling, mixing, extrusion, toasting and packing technology sought for the production of products such as extruded CSB cornflakes and soya milk. Planned production capacity: extruded CSB-10,000 T/year; others - 1,800 T/year. The project is an expansion of an existing process and a feasibility study has been completed. Currently local supply of these products can meet only 50% of the demand, 50% is imported with a duty of 25%. The total estimated project cost is US\$ 220,000 with local investment available of US\$ 78,600.

Type of Cooperation: Investment; equipment supply

**Ref.No. 311 Farmers Agricultural Marketing
and Development**

MILK, CHEESE AND BUTTER PROCESSING

The company is at present processing milk and making cheese and butter. It also sells beef. Technology is being sought to expand the milk processing and cheese and butter making operations. Meat processing technologies are also being sought. No feasibility or market studies exist. The firm wants cooperation with foreign firms either through cash investment, equipment supply or technology licensing.

Type of Cooperation: Investment; equipment supply; licensing

Ref.No. 312 Fisaka Estates Company

BANANA AND FRUIT DRINKS The company processes bananas into paste and drink. Bananas are first dried then made into powder and then into paste or drink. The company would like to improve and expand its business through cooperation with a foreign partner by way of technology licensing, joint venture or equipment supply.

Type of Cooperation: Licensing; joint venture; equipment supply

**Ref.No. 313 Food Express Ltd
AVOCADO OIL EXTRACTION/
PURIFICATION EQUIPMENT**

A new product to produce pure avocado oil and later cosmetics from locally grown avocados in quantities of 10 metric tonnes refined oil and cosmetics per month. Estimated project cost US\$ 70 - 80,000; 4,000 sq metres land available. Processes required include extraction, separation, purification, bulk packaging, cosmetic manufacture.

Type of Cooperation: Equipment supply

Ref.No. 314 Food Pack Ltd

FOOD PACKAGING MATERIALS Packaging material technology is sought for plastic cups and sachets suitable for fruit juice, jam, groundnut products and cookies. The market growth potential in this area is considerable (75% pa).

Type of Cooperation: Investment; licensing; equipment supply

Ref.No. 315 Gomani, J.F.

**ROASTED GROUNDNUTS, DEHYDRATED
VEGETABLES, FRUIT JUICE AND SPICE
PRODUCTION**

The latest technologies are sought on a joint venture and turnkey basis, for the production of roasted nuts, dehydrated vegetables, fruit juices and spice. Locally available raw materials include: groundnuts, tomatoes, cabbages, oranges, lemons, mangoes, chillies, coriander, ginger, turmeric and garlic. A large local market exists and the long term plan is for export. The project cost is dependent upon the technology. Local investment of US\$ 35,000 is available.

Type of Cooperation: Joint venture; turnkey

**Ref.No. 316 Greywood Enterprises Ltd
INDUSTRIAL ALCOHOL (ETHANOL)**

The project is new and is seeking technology to start production of industrial alcohol (ethanol). Cooperation with foreign partners could either be in form of cash investment, joint venture or equipment supply.

Type of Cooperation: Investment; joint venture; equipment supply

Ref.No. 317 Grown Brand Tea Ltd
TEA BAG PRODUCTION AND BEAN AND PEA PROCESSING Equipment and know-how required to manufacture tea bags for black and lemon tea, as well as for the processing of beans and peas. This is a new project with an estimated cost of US\$ 1,000,000 with locally available funds of US\$ 500,000. Desired production capacity for tea bags 120 - 160 per minute, eight hours per day.
Type of Cooperation: Licensing; investment; joint venture; equipment supply; technical assistance

Ref.No. 318 Gwembe Breweries
OPAQUE BEER BREWING This is a new project seeking technology in opaque beer brewing. The company expects to enter into joint venture agreements with foreign partners. Pre-feasibility and technical studies have been conducted.
Type of Cooperation: Joint venture

Ref.No. 319 Industrial Development Organisation - Zimbabwe
FRUIT AND VEGETABLE PROCESSING PLANT A new joint venture project to establish a plant for the processing of fruit and vegetables to produce fruit juices and pulps, tomato juice and paste and frozen vegetables. Planned output capacities: tomato juice 3,500 tonnes pa; fruit juice 2,500 tonnes pa; frozen vegetables 700 - 1,000 tonnes pa. Exact technological requirements are the subject of an existing feasibility study. Local investment capacity - US\$ 2 million.
Type of Cooperation: Joint venture

Ref.No. 320 Interface Packaging (Pvt) Ltd
ESSENTIAL OIL PROCESSING Technology sought for the processing of essential oils from various plant species. Expected annual production capacity of 50 litres.
Type of Cooperation: Investment; joint venture; equipment supply

Ref.No. 321 Interface Packaging (Pvt) Ltd
EXTRUSION AND EXPELLING OF SOYABEANS Technology and equipment sought for the extrusion and expelling of soyabeans for the manufacture of weaning foods and soya flour preparations. Planned capacity of 1,000 tonnes per year. Currently 30% of local demand is met via

imports with an import duty of 20%.
Type of Cooperation: Joint venture; licensing; equipment supply

Ref.No. 322 Interface Packaging (Pvt) Ltd
BEE SWAX PURIFICATION TECHNOLOGY Technology sought for the purification of beeswax with an annual production capability of 10 tonnes.
Type of Cooperation: Investment; joint venture; equipment supply

Ref.No. 323 Interstate Business Agencies Ltd
FOOD AND FRUIT PROCESSING Equipment is required for food and fruit processing for a new project in the form of a joint venture collaboration with a partner firm.

Ref.No. 324 Kaliti Food Factory
FULLY AUTOMATED FOOD PACKING EQUIPMENT Equipment is sought for a fully automated packing line for biscuits and wheat flour to avoid any contact between operator and product. Planned capacity: 35 tons/shift biscuits and 85 tons/shift wheat flour. This is a technology upgrading project with an estimated cost of US\$ 150,000 which is available from local investment.
Type of Cooperation: Equipment supply

Ref.No. 325 Kangwenya Ltd
TANNIN POWDER AND NITRO-CHALK The firm has a patented process for the extraction of tannin from vegetables. The product is obtained in liquid form. The project wishes to have the tannin produced in powder form thus the need for leaching and pulverising equipment. The project also intends to produce nitro-chalk and requires equipment for processing nitro-chalk. The company seeks joint venture collaboration with a foreign partner. The company has pre-feasibility study and market study reports. It is estimated that 80% of the tannin in use in Zambia is imported. The local market for tannin is expected to grow by about 15% over the next few years.

Type of Cooperation: Joint venture

Ref.No. 326 Katjivena Dairies
ORUMBA TRADITIONAL BUTTER A new project to make 50,000 litres per annum of Orumba traditional butter from local milk. The local price is US\$ 1.70 for 300 ml and project cost is estimated at US\$ 40,000, land and building available.
Type of Cooperation: Cash investment

Ref.No. 327 Kennex Ltd
VEGETABLE OIL PROCESSING Investment partner sought for expansion project for the processing of vegetable oil and production of seed cake from the waste. Planned output: oil 480 metric tonnes; cake 720 metric tonnes per annum. Currently 80% of demand is met through import attracting a 10% duty. Annual demand growth rate is 16%. Local investment capacity: cash - US\$ 170,000 for machinery; building - 70,000 sq m. The following would be required to start operation: working capital US\$ 50,000; 100 kVA stand-by diesel generator (US\$ 20,000); 10 ton truck (US\$ 50,000); a store (US\$ 30,000).
Type of Cooperation: Investment; joint venture

Ref.No. 228 Kenya Cold Storage (Foods) Ltd
FROZEN FISH FILLET Expansion of an existing project to handle a planned output of 3,000 tons/annum of whole fish (nile perch). A total project cost of US\$ 300,000 is envisaged.
Type of Cooperation: Cash investment; equipment supply

Ref.No. 329 Lubwe Milling Ltd
MAIZE, FLOUR, STOCK FEED AND VEGETABLE OILS The company is producing maize flour using 2 hammer mills. Expansion and modernisation is required to a capacity of up to 20 tonnes. The project would like to add new products such as maize bran, stock feed and vegetable edible oil. Turnkey or equipment supply arrangements with a foreign partner are being sought.
Type of Cooperation: Turnkey; equipment supply

Ref.No. 330 Lumbadzi General Trading
MANGO ACHALE, PFRI-PERI SAUCE AND FRUIT JAM A new project requiring equipment to process mangoes to produce achale (pickle), chillies to produce peri-peri sauce and local fruits for jam. The market demand is good and indigenous supply is currently low.
Type of Cooperation: Equipment supply

Ref.No. 331 M A Culture
PAPAYA LIQUOR Turnkey plant required to process papaya into a liquor for the local market to meet 40% pa demand growth. Planned production capacity is 15,000 litres per year.
Type of Cooperation: Turnkey

Ref.No. 332 M A Culture
MANGO JAM PRODUCTION Technology required for upgrading the processing of mango fruits into jam for the local market. Planned output capacity of 500 kg per day. Demand growth 30% pa.

Ref.No. 333 Masami Farms' Produce
CHEESE MANUFACTURE The company is involved in cheese manufacture and would like to expand and improve on the quality of its products. Technology is thus sought in the area of cheese making, more specifically feta, halloumi, mozzarella and anari types of cheese. The company is looking for foreign partners to collaborate through cash investment, equipment supply or joint venture. A market study for cheese products has been done by the company.
Type of Cooperation: Investment; equipment supply; joint venture

Ref.No. 334 Mukwano Industries (U) Ltd
PRODUCTION OF COSMETICS AND ESSENTIAL OILS Manufacturer of soaps, cooking oil, plastics, detergents and miscellaneous powders and liquids is seeking technology for the production of cosmetics and for the extraction of essential oils.
Type of Cooperation: Investment; equipment supply

Ref.No. 335 Mwanamwene Agency
RICE AND MAIZE PRODUCTS A new joint venture, turnkey project to process a minimum of 20 tonnes per day of maize and rice to produce stalk feed, maize flour, baby food, rice and cornflakes. A strong market exists with inadequate indigenous supply. Estimated project cost is US\$ 3.5 million with approximately 25% being available locally plus 4.6 hectares land.
Type of Cooperation: Cash investment; joint venture; turnkey project

Ref.No. 336 N M C
SOYA MILK PRODUCTION Turnkey plant required for the production of 1,000 litres per day of soya milk to satisfy local demand growing at 20% pa. All investment locally available.
Type of Cooperation: Turnkey

Ref.No. 337 Namibia Development Corporation
OYSTER FARMING AND PROCESSING A new project proposed for Luderitz, Namibia to handle 210 metric tonnes of oysters per annum. A feasibility study is available and estimated project US\$ 0.9 million, of which 10% is available locally plus land and buildings. The process includes spat growth, oyster growth, cleaning, weighing, sorting and holding tank.
Type of Cooperation: Investment; joint venture

Ref.No. 338 Namibia Development Corporation
OSTRICH ABATTOIR AND TANNERY A new project to handle 26,400 birds per annum producing eggs, meat, hides and feathers in Mariental, Namibia. A feasibility study is available. The total project cost is estimated to be US\$ 1.6 million. Land (10,000 sq metres) and US\$ 100,000 local investment available. The processes required include: Abattoir: veterinary inspection, slaughter, cut and chill. Tannery: weighing, grading, soaking, washing, liming, dehairing, defleshing, delimiting, shaving and dyeing.
Type of Cooperation: Investment; joint venture

Ref.No. 339 Namibia Development Corporation
SEAL PRODUCTS An expansion to an existing project in Luderitz, Namibia to produce fur, leather, carcass meal and seal oil from 25,000 pups and 5,000 bulls per annum. A feasibility study is available and the project cost is estimated at US\$ 0.3 million of which 10% is locally available plus 1,600 sq metres land and 800 sq metres buildings.
Type of Cooperation: Investment; joint venture

Ref.No. 340 Namibia Mills
WHEATEN FLOUR A new project for Windhoek/Walvisbay to produce 200 metric tonnes of ready mix wheaten flour for breadmaking in a rural area. Project cost US\$ 2.5 million of which 10% available locally plus land and buildings and a feasibility study for grain silos is available.
Type of Cooperation: Investment; technology licence

Ref.No. 341 Namibia National Chamber of Commerce and Industry
FRUIT JUICE PRODUCTION A new project to produce 3.85 million litres of fruit juice per annum from concentrate in .25, .15 and 1 litre bottles in Katima, Mulilo, Namibia. The project cost is estimated at US\$ 42,000, of which US\$ 9,000 is available locally. Process includes dilution of concentrate, filling and foil capping bottles, sealing, packaging and distribution.
Type of Cooperation: Equipment supply; investment

Ref.No. 342 Namibia National Chamber of Commerce and Industry
BEVERAGE PRODUCTION A new project to produce 2 million litres per annum of Oshikundu or millet soft drinks, both carbonated and uncarbonated. Project cost estimated at US\$ 1.3 million, of which US\$ 0.1 million available locally.
Type of Cooperation: Equipment supply; investment

Ref.No. 343 National Tobacco Enterprise
CIGARETTE MANUFACTURING TECHNOLOGY New, capital intensive manufacturing technology is required for the expansion and modernization of an existing facility. The new technology will include: a threshing and re-drying

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Cont...

plant; a tobacco cutting and blending plant; cigarette manufacturing plant; packaging, boxing and parcelling plant; latin packlines; and a workshop, laboratory and associated quality control equipment. The planned capacity is for 6 billion cigarettes annually. Currently 57% of local demand is met via imports attracting a duty of 150%. The local market is growing at 8% per annum. The total estimated project cost is US\$ 100 million with locally available investment of US\$ 25.8 million.
Type of Cooperation: Joint venture; licensing; turnkey; equipment supply

Ref.No. 344 Nkwashi Enterprises
JAM AND CONCENTRATED FRUIT JUICES
The company is currently producing baby wear. The company would like to expand its business to also include the manufacturing of jam and concentrated juices from fruits such as oranges. The assessment of the project is that 50% of the demand for jam and juices is met locally while the other 50% is met through imports. For baby wear, imports account for over 85%. From a foreign partner, the firm is looking for either joint venture or technology licensing type of cooperation.
Type of Cooperation: Licence; joint venture

Ref.No. 345 Northern Uganda Manufacturers Association
BREWERY Joint venture project to purchase the equipment from a fully working brewery (probably in South Africa) and to transfer the whole plant to Uganda. A full feasibility study has been completed and has shown an annual demand growth of 40% in this industry. Local investment capacity US\$ 3 million.
Type of Cooperation: Joint venture

Ref.No. 346 North-Western Bee Products Ltd
WAX EXTRACTION, CANDLE MANUFACTURE AND SOLAR DRYING OF SPICES
The company currently processes honey and wax. The company has need for modernisation of wax extraction and candle making operations. Furthermore, technology is being sought for solar drying of spices and fruits. Technology licensing and equipment supply kind of cooperation is preferred.

Type of Cooperation: Licensing; equipment supply

Ref.No. 347 Panamo Scientific Ltd
PROCESSED MEAT PRODUCTS This is a small scale meat processing firm that would like to expand and include new products on the market. The project is seeking a turnkey kind of cooperation with a foreign partner for technology for the production of various meat processed products. The company has both technical and market study reports.

Type of Cooperation: Turnkey plant

Ref.No. 348 Pemba Womens' Manufacturing Enterprise
EDIBLE OIL PRODUCTION An existing enterprise requires food processing technologies in terms of supply of equipment to expand its edible oil production. A pre-feasibility study was conducted in 1993 and the report is available.

Ref.No. 349 Rasma Engineering
BAKERY EQUIPMENT AND OVENS Rasma Engineering manufactures industrial ovens and other bakery equipment. The company seeks technology to improve the quality of its products and increase the range. Preference is made for cash investment or joint venture cooperation with foreign partners.
Type of Cooperation: Investment; joint venture

Ref.No. 350 Red Spark Electrical
FOOD WARMERS This is a modernisation project for the assembly of food warmers. A pre-feasibility study has been conducted. Cooperation is sought for the assembly of food warming equipment. Cash investment or equipment supply is sought from a foreign partner.
Type of Cooperation: Investment; equipment supply

Ref.No. 351 Renox Private Limited
OIL EXTRACTION Technology required for oil expelling in Harare, Zimbabwe, 1,000 sq ft land and buildings and steel and plastic piping available. Moderate labour costs.
Type of Cooperation: Investment; joint venture; licensing

Ref.No. 352 Salila Transport
DAIRY MILK, CHEESE AND BUTTER Cash investment and equipment is required to establish a new venture to produce dairy milk, cheese and butter from fresh cattle milk. Estimated project cost is US\$ 3,000.

Type of Cooperation: Investment; equipment supply

Ref.No. 353 Selected Fruit Processors
FRUIT PROCESSING & PACKAGING MACHINERY A new project to produce in Kisumu, West Kenya juices, marmalade, ketchup, sauces, concentrates and jams from local pineapples, passion fruit, tomatoes and oranges in quantities of 15,360 litres = 15,360,000 metric tons p/a. Project cost envisaged US\$ 1.1 million.

Type of Cooperation: Joint venture; turnkey

Ref.No. 354 Sweet Inspiration
SOYA MILK PRODUCTION PLANT A new project requiring a joint venture partner and equipment to process soya beans into soya milk with an operating capacity of 30,000 litres per month. A good market potential exists and the project is envisaged to cost US\$ 33,000. Local investment is available to a total of US\$ 10,000. Land (3 acres) available and buildings are to be constructed.

Type of Cooperation: Joint venture; equipment supply

Ref.No. 355 Tankor Milling Company Ltd
WHEAT AND MAIZE FLOUR This is a new project whose products would be maize flour (roller and breakfast types), maize bran and wheat flour. A pre-feasibility study has been executed and the planned capacity is put at 11,700 tonnes of each of the mentioned products per year. Apart from the local market, export of maize flour to Zaire is envisaged.

Type of Cooperation: The firm is seeking joint venture participation by a foreign company.

Ref.No. 356 Tanroy Engineering (Pvt) Ltd
MANUFACTURE OF AGRO AND FOOD PROCESSING EQUIPMENT Joint venture project desired to expand existing production of agro and food processing equipment and to modernize the manufacturing processes currently

used. The annual growth rate for this equipment is high at 25%. The total estimated project cost will be US\$ 195,000 with local investment capacity at US\$ 33,000.

Type of Cooperation: Joint venture; equipment supply

Ref.No. 357 Tea Production and Marketing Enterprise
TEA BAG PACKAGING EQUIPMENT An additional tea bag packing machine is required for an expansion project. The packing machine should be simple to operate, should have a low down-time and maintenance cost and be highly efficient. Planned capacity is 20 tons per year. Local investment available is US\$ 78,000. (Current machinery in use is a C21 IMA machine packing 2 gramme bags and a FAWEMA machine packing 100 gramme packets).

Type of Cooperation: Equipment supply

Ref.No. 358 Triad Investment Group
SHRIMPS A new shrimp fishing, processing, cold storage, packaging and distribution project of estimated cost US\$ 1.5 million in Luderitz, Namibia to handle 10 metric tonnes per annum. Local investment of US\$ 250,000 and feasibility study available.

Type of Cooperation: Joint venture; investment

Ref.No. 359 Universal Industries Ltd
MANUFACTURE OF LIQUID GLUCOSE A turnkey project required to establish a factory to produce liquid glucose from locally available agricultural produce such as cassava. A good market exists which currently relies entirely upon imports. The required capital can be raised locally.

Type of Cooperation: Turnkey; equipment supply

Ref.No. 360 Village Industry Service
SAUSAGE FACTORY Transfer of production know-how, design and delivery of a turnkey modular sausage factory to produce frozen and vacuum packed sausages from various meats (beef, mutton, goat, chicken and fish).

Type of Cooperation: Turnkey; joint venture; licensing

Ref.No. 361 Yewo Hot Gossip Enterprises
BABY AND BREAKFAST CEREALS A new project seeking cash investment to establish a plant to process soyabeans and maize into baby cereal and breakfast cereals. A good market exists for these products. The estimated project cost is US\$ 5,500 with a local investment of US\$ 2,000 available plus land of 7 hectares.

Type of Cooperation: Investment; equipment supply

Ref.No. 362 Zagwazatha Agricultural Limited
MUSHROOM SOUP AND SOYA BEAN FLOUR Joint venture and equipment required to process mushrooms for soup and to mill soya beans into flour. A good market exists for both products.

Type of Cooperation: Joint venture; equipment supply

Ref.No. 363 C N Chilumba Construction
WOODEN FURNITURE The firm intends to go into the manufacture of wooden furniture, cupboards and other wood products. Technology is being sought for the manufacture of the afore-mentioned products. Joint venture, sub-contracting or equipment supply agreements with a foreign partner are preferred.

Type of Cooperation: Joint venture; sub-contracting; equipment supply

Ref.No. 364 Kabwe Carpentry Products Ltd
TECHNOLOGY FOR JIG MANUFACTURE This is a carpentry workshop seeking technology for the manufacture of jigs and templates for wood product operations. Technology licensing or equipment supply cooperation is expected from a foreign partner.

Type of Cooperation: Licensing; equipment supply

Ref.No. 365 Kabwe Central Electrics Ltd
ELECTRIC MOTORS AND TRANSFORMERS This firm is engaged in the manufacture and rehabilitation of electric solenoids/coils/ballasts, electric motors, transformers and starter motor panels. The project needs to expand through cash investment, equipment supply or technology licensing from a foreign company.

Type of Cooperation: Investment; equipment supply; licensing

Ref.No. 366 Kaseloki Enterprises
FURNITURE MANUFACTURE This is a household and office furniture manufacturing company. The firm would like to improve the quality of its products and is therefore seeking foreign cooperation in form of cash investment or equipment supply. Pre-feasibility studies have been done.

Type of Cooperation: Investment; equipment supply

Ref.No. 367 Mapopa Enterprises
TIMBER PROCESSING The project seeks technology for semi processing of timber to internationally acceptable standards. Cooperation with foreign organisation is sought in respect of equipment supply.

Type of Cooperation: Equipment supply

Ref.No. 368 Masinga Enterprises Ltd
TIMBER PROCESSING The project intends to expand operations in timber and wood processing. The project is seeking technology for mechanised production of timber and wood processing. Equipment supply is the type of foreign cooperation being sought by the firm. Technical, pre-feasibility and market studies have been conducted.

Type of Cooperation: Equipment supply

Ref.No. 369 Renox Private Limited
WIND ENERGY Technology required for the manufacture of wind generators, steel and some electrical components available. Land and buildings 800 sq ft. available. Moderate labour costs.

Type of Cooperation: Investment; joint venture; licensing

Ref.No. 370 Village Industry Service
MINI HYDRO-ELECTRIC GENERATING PLANT Assistance required with a mini hydro-electric scheme to produce and supply electricity to an area covering 600 sq hectares of production land.

Type of Cooperation: Joint venture; licensing

Ref.No. 371 Viphya Corporation Limited
PARTICLE AND FIBRE BOARD A new project to manufacture ceiling boards and chip boards (hard and soft), require a joint venture partner. The boards will utilize waste wood in various forms which will be processed into fibre form and pressed into various thicknesses to form ceiling boards and chipboards. The boards will be panelled to produce various products to be used in radios, televisions and kitchen and office furniture. The planned output is 10,000 cu m (270,000 boards of 8' x 4', 10 mm thick). The total estimated project cost is up to US\$ 1 million.

Type of Cooperation: Joint venture

Ref.No. 372 Viphya Corporation Limited
PULP AND PAPER TECHNOLOGY This joint venture project involves the establishment of an integrated mill for the production of bleached and unbleached kraft pulp and a variety of papers and paperboard products. The mill will draw on the 53,500 hectares of woodland in the local area. The planned output is 100,000 tonnes per annum and the total estimated project cost is US\$ 243 million.
Type of Cooperation: Joint venture

Ref.No. 373 Viphya Corporation Limited
IMPROVED CHARCOAL AND CHARCOAL BRIQUETTES New joint venture project to produce improved charcoal and charcoal briquettes from woodwaste. The project will utilize retort technology to provide high quality charcoal for domestic and industrial users. The surplus fines will be converted to charcoal briquettes. The required technology should include equipment suitable for use in Mitawi and provide an affordable end product of good calorific value. Planned output is 10,000 tons per annum. The total estimated project cost is up to US\$ 1 million.
Type of Cooperation: Joint venture

Ref.No. 373(b) Village Industry Service
PAPER AND PULPING UNITS Mini hand-made paper and pulping units capable of an output of 2 tons per day, are required.

Ref. No. 374 Alice Boutique
KNITWEAR The firm is producing ready-made garments for both adults and children. The project is seeking cash investment or equipment supply from a foreign partner.

Type of Cooperation: Investment; equipment supply

Ref. No. 375 Alsasi Ltd
KNITWEAR The firm is producing knitted wear for both adults and children. The project estimates that 90% of the local market for knitted wear is met through importation. The growth rate of this market is estimated at 30% per year. The project is seeking cash investment as well as equipment supply from a foreign partner.

Type of Cooperation: Investment; equipment supply

Ref. No. 376 Chrome Leather Co Ltd
TANNERY MODERNIZATION A large tannery propose to modernise their equipment and production line and to diversify into the manufacture of leather products. The company request a partner to aid this process.

Type of Cooperation: Joint venture; investment; technology; marketing

Ref. No. 377 Impapa Workshop Ltd
TANNERY EQUIPMENT Impapa workshop is a small scale business tanning hides and skins into leather and producing leather goods. The project would like to modernise its operations. Impapa workshop has a detailed project description and is looking for a foreign partner to supply the following equipment: manually driven tanning drums; shaving machine with a 600 mm. working table, manual or electric; heavy duty hand operated sewing machine; leather press cutter (press knife machine), manually operated; sole leather compactor (hand/hydraulic); pattern press (roller) and buckle making technology.

Type of Cooperation: Equipment supply; know-how

Ref. No. 378 Lady Mellisah Enterprise
READY-MADE GARMENTS The company is currently producing ready-made garments and is seeking cash investment to improve and expand operations.

Type of Cooperation: Investment

Ref. No. 379 Lulu Leather Centre Ltd
LEATHER GOODS The project is a new one with plans to produce leather bags, leather shoes and leather imitation products. The project is seeking technology in leather goods and leather imitations manufacture. From a foreign partner, the project is expecting to enter cash investment or joint venture or equipment supply kind of arrangements.

Type of Cooperation: Investment; joint venture; equipment supply

Ref. No. 380 Meher Fibre Products
REHABILITATION AND REPLACEMENT OF JUTE AND SISAL PROCESSING MACHINERY An expansion project requires new and highly efficient equipment to replace jute and sisal drawing, spinning and weaving machinery. Currently, highly labour intensive machinery is used to carry out the following processes: selection, softening, carding, drawing, spinning, winding, beaming, weaving, cutting, sewing and packaging. Currently, only 40% of market needs can be met locally and exports incur a 32% duty. A study has estimated a total project cost of US\$ 3,610,000 which is available locally.

Type of Cooperation: Investment; equipment supply

Ref. No. 381 Namibia Development Corporation

SEAL PRODUCTS An expansion to an existing project in Luderitz, Namibia to produce fur, leather, carcass meal and seal oil from 25,000 pups and 5,000 bulls per annum. A feasibility study is available and the project cost is estimated at US\$ 0.3 million of which 10% is locally available plus 1,600 sq metres land and 800 sq metres buildings.

Type of Cooperation: Investment; joint venture

Ref. No. 382 Sable Tannery
TANNERY EFFLUENT TREATMENT This is a new project, seeking cash investment or joint venture agreements from a foreign partner for technology in tannery effluent treatment. The project intends to go into the processing of leather into wet blue and finished leather. The cooperation being sought should also cover tannery equipment supply. A pre-feasibility study of the project exists.

Type of Cooperation: Investment; joint venture

Ref.No. 383 Small Industries Development Organisation (SIDO)

LEATHER GOODS MANUFACTURING EQUIPMENT

SIDO is an organisation that promotes small scale industries in Zambia. The organisation is seeking, on behalf of some of its clients the following technologies and processes for the leather and leather goods sub sector: splitting machines; medium scale spraying machines; tensile and abrasion testing equipment for leather; component manufacture eg dee-rings, buckles, snap buttons, zippers; protectors; manufacture of pre-cut knits for assembly; belt forming equipment; press stud machines; gluing machines; hand tools eg engraving, embossing, tooling etc; sole leather injection machines; shoe lasts, toe-puffs, insoles, counters and bridles and saddlery accessories.

Ref.No. 384 Tika Marketing Corporation Ltd
GARMENT TOOL AND TEMPLATE MACHINING

A joint venture expansion project is required to provide machinery capable of manufacturing jigs, templates and aids suitable for the garment industry and for training purposes. (The training component is in place). The machinery parts and tools are urgently required for a rapidly growing market. The total project cost will be dependent upon the technology suppliers, but local investment is available up to US\$ 100,000. Feasibility study available November 1994.

Type of Cooperation: Joint venture; equipment supply

Ref.No. 385 V and H Enterprise

CLOTHES MANUFACTURE. This is a textile firm seeking foreign cooperation in order to produce competitive products while expanding the range. Products include raincoats, T-shirts and ladies and gents wear. The company is looking for either cash investment, technology licensing, joint venture or equipment supply agreements from a foreign partner.

Type of Cooperation: Investment; licensing; joint venture; equipment supply

Ref.No. 386 Village Industry Service

MENS WORK SHIRTS Production of work shirts for export and domestic markets.

Type of Cooperation: Licence; joint venture

Ref.No. 387 Wonderland Investments

LEATHER GOODS This small scale firm manufactures assorted leather goods such as shoes, sandals, handbags, wallets and belts. The company is seeking cash investment and equipment supply from a foreign partner to increase production and improve on quality. A report on the market study is available.

Type of Cooperation: Investment; equipment supply

Ref.No. 388 Yawo Enterprises

SANITARY TOWELS AND BABY DIAPERS

Joint venture and equipment required to establish a small scale manufacturing plant for the production of sanitary towels and baby diapers. Planned output of 400 sanitary towels per minute and 300 baby diapers per minute. Estimated total cost is DM 943,520.

Type of Cooperation: Joint venture; equipment supply

Ref.No. 389 Yoya Development Company

LEATHER FOOTWEAR The company is currently engaged in footwear manufacture but would like to improve the quality of the footwear produced. In addition, the firm would like to expand to include tanning of goat skin and cattle hides. Technology in footwear manufacture and skin and hide tanning is being requested from a foreign partner by way of equipment supply.

Type of Cooperation: Equipment supply

Ref. No. 390 Azurite Mining and Water Resources Ltd

LOW COST WATER BOREHOLE DRILLING

The firm is involved in borehole siting and would like to expand operations to include low cost water borehole drilling (minimum drilling depth 60 metres). The project is seeking foreign cooperation through joint venture or equipment supply. Currently 80% of the demand for borehole drilling is currently being satisfied through foreign companies. The company has a technical study report.

Type of Cooperation: Joint venture; equipment supply

Ref. No. 391 Dectrade Industrial Distributors

DRAINAGE AND SEWERAGE SYSTEMS

The company is in construction and is seeking improved technology in the construction of soak away and related sewerage systems. Cooperation on sub-contracting basis is sought from foreign companies.

Type of Cooperation: Sub-contracting

Ref. No. 392 Renox Private Limited

WATER PUMPING Technology required for manufacture of water pumps, steel, plastic piping, wind and 800 sq ft building in Harare available. Moderate labour costs.

Type of Cooperation: Investment; joint venture; licensing

Ref. No. 393 Active Pottery CERAMICS AND POTTERY The firm is seeking technology in ceramic and pottery ware design so as to enhance the competitiveness of its products. The project also wants to venture into the manufacture of floor tiles. In both cases, the project is looking for foreign collaboration on the basis of technology licensing, sub-contracting or turnkey project. A report of a pre-feasibility study is available.

Type of Cooperation: Licensing; sub-contracting; turnkey

Ref. No. 394 Chemtech Processes Ltd GUMS AND ADHESIVES The firm is seeking technology in the production of gums and adhesives to expand operations, either by technology licensing, sub-contracting or turnkey project basis. The company possesses a detailed project description.

Type of Cooperation: Licensing; sub-contracting; turnkey

Ref. No. 395 Chibile General Contractors STEEL FURNITURE AND SECURITY BARS This is an expansion project for the fabrication of steel furniture, burglar bars and motor vehicle panel beating. The project is looking for joint venture or equipment supply cooperation with a foreign firm.

Type of Cooperation: Joint venture; equipment supply

Ref. No. 396 Eastern Gemstone Cooperative Society Ltd CUTTING AND POLISHING OF GEMSTONES The firm is involved in gemstone mining and would like to expand by including cutting and polishing gemstones. Foreign participation is expected in form of cash investment, technology licensing, joint venture or equipment supply. Pre-feasibility studies have been conducted.

Type of Cooperation: Licensing; joint venture; equipment supply

Ref. No. 397 Mukisa Engineering Services MANUFACTURING TECHNOLOGY Manufacturing technology required to improve current manufacturing processes related to the production of oil presses, hullers, millers and packing machines.

Ref. No. 398 Patulani Enterprise HANDICRAFTS The project would like to expand and improve its handicraft manufacture. Foreign cooperation in form of joint venture is being sought.

Type of Cooperation: Joint venture

Ref. No. 399 Salunda Ltd AUTOMOTIVE RADIATORS The firm is seeking technology for the manufacture of automotive radiators. Foreign cooperation in this area is sought in form of joint venture, turnkey or equipment supply.

Type of Cooperation: Joint venture; turnkey; equipment supply

Ref. No. 400 Star Engineering Pvt Ltd CUPULA FURNACE AND INDUCTION FURNACE An organisation involved in foundry and light engineering work for agricultural and industrial equipment, building equipment, school furniture and carts with locally available cast iron, scrap, steel and non-ferrous material with available foundry equipment, blowers and green sand are seeking to install a cupula furnace and an induction furnace to expand their production facility. Total project cost is estimated at US\$ 50,000 and land of 2,500 sq metres is available in Rusape.

Type of Cooperation: Investment; joint venture

Ref. No. 401 Tagle Motors VEHICLE ENGINE RECONDITIONING The firm carries out motor vehicle engine reconditioning, repair and maintenance. The project has embarked on an expansion programme in which foreign participation in joint venture or equipment supply cooperation agreements are sought.

Type of Cooperation: Joint venture; equipment supply

Ref. No. 402 Teska Investments REPAIR AND MAINTENANCE OF ELECTRONIC EQUIPMENT The firm is involved in the repair and maintenance of electronics equipment but would like to go into assembling of computers. The project is thus seeking foreign cooperation in form of technology licensing, joint venture or equipment supply.

Type of Cooperation: Licensing; joint venture; equipment supply

Ref.No. 403 Tomack Musical Instruments
MUSICAL INSTRUMENTS The firm currently manufactures musical instruments such as guitars, drums and amplifiers. Technology is sought to improve and expand operation in the manufacture of these products. Foreign participation in joint venture or equipment supply cooperation agreements is sought.

Type of Cooperation: Joint venture; equipment supply

Ref.No. 405 Village Industry Service
PRECIOUS STONES AND COSTUME JEWELERY Technology required for the cutting and polishing of semi-precious stones and the fabrication of costume jewelry.

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School of Mines (University of Zambia)	34
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Active Pottery
 P.O. Box 81213
 Kabwe
 ZAMBIA
 Tel: +260-5-221515
 Contact: Lackson Mwangi
 Established: 1985

**African Regional Centre for
 Technology (ARCT)**
 Immeuble Fadh Ben Abdel
 Aziz
 Ave. Djily Mbaye
 B.P. 2435
 Dakar
 SENEGAL
 Tel: +221-237-712
 Fax: +221-237-713
 Tlx: 61282 CRATEC SG
 Contact: Ousmane Kane
 Position: Deputy Executive
 Director
 Established: 1977
 Markets: Ghana, Nigeria,
 Senegal, Ethiopia, Guinea-
 Bissau, Liberia, Morocco,
 Mauritania, Sierra Leone,
 Tanzania and Togo.

**Afro General Engineers &
 Contractors (AGECO) Ltd**
 Plot 107
 Old Market Street
 P.O. Box 181
 Iganga
 UGANDA
 Tel: +256-495-2144/2449
 Fax: +256-495-2345
 Contact: Mubarak A. Bachu
 No. of Employees: 12
 Markets: Uganda, Kenya,
 South Sudan and Zaire.

Agri Contact
 Torupvejen 97
 3390 Hundested
 DENMARK
 Tel: +45-47-92-48-48
 Fax: +45-47-92-38-00
 Contact: Arne Moller

Agricura (Pvt) Ltd
 P.O. Box 2742
 Harare
 ZIMBABWE
 Tel: +263-4-662571
 Fax: +263-4-668779
 Contact: B.G. Chisnall
 No. of Employees: 150
 Markets: Zimbabwe,
 Botswana.

**Akaki Spare Parts and Hand
 Tools Factory**
 P.O. Box 7334
 Akaki
 Addis Ababa
 ETHIOPIA
 Tel: +251-34-0412
 Fax: +251-34-1426
 Tlx: 21862
 Contact: Gebrekiros Habtu
 Established: 1990
 No. of Employees: 551
 Markets: Local.

Alice Boutique
 C/o Mr J.C. Ngulube
 ZANACO, Kwacha Branch
 P.O. Box 31767
 Lusaka
 ZAMBIA
 Contact: Alice Mulenga
 Ngulube
 Markets:

Alingu Enterprises
 P.O. Box 80876
 Kabwe
 ZAMBIA
 Contact: A. Nguni

Alsasi Ltd
 P.O. Box 51006
 Lusaka
 ZAMBIA
 Tel: +260-1-220385
 Fax: +260-1-223881
 Contact: Alfred Mulenga
 Established: 1992
 Markets: Local market.

**Alvan Blanch Development
 Company Limited**
 Chelworth
 Malmesbury
 Wiltshire
 SN16 9SG
 ENGLAND
 Tel: +44-1666-577333
 Fax: +44-1666-577339
 Tlx: 44304 ALVANB G
 Contact: Simon M.B. Shaw
 Established: 1952
 No. of Employees: 65
 Markets: 140 countries.
 African and Middle Eastern
 Countries.

APIBU & CIFA
 B.P. 3183
 Bujumbura
 BURUNDI
 Tel: +257-2-16142
 Contact: Fabien Nkurunziza
 Established: 1994
 No. of Employees: 20
 Markets: Germany and USA.

ARIST Alsace
 Agence Regionale
 d'Information Scientifique
 Chambre Regionale de
 Commerce
 42, rue Schweighaeuser
 67000 STRASBOURG
 FRANCE
 Tel: +33-88-60-74-75
 Fax: +33-88-61-53-54
 Contact: Marie-Paule Bernhart

Aromes de L'Océan Indien
 Ltd
 Anse Royale
 P.O.Box 407
 Mahe
 SEYCHELLES
 Contact: Danny Elizabeth
 No. of Employees: 25

**Asian and Pacific Centre for
 Transfer of Technology**
 Adjoining Technology Bhawan
 Off New Mehrauli Road
 P.O. Box 4575
 New Delhi - 110 016
 INDIA
 Tel: +91-11-685-6276
 Fax: +91-11-685-6274
 Tlx: 31-73271 APCT IN
 Contact: Vadim Y. Kotelnikov
 Position: Consultant

Aude Investment (Pvt) Ltd
 P.O. Box 2893
 Harare
 ZIMBABWE
 Tel: +263-4-753069
 Fax: +263-4-753069
 Contact: Rheiner

Avee Industries
 Maharani Jhansi Marg
 Ambala Cantt
 133 001
 INDIA
 Tel: +91-171-643343/642343
 Fax: +91-171-20343/643343
 Contact: Ashok Jain
 Established: 1973
 No. of Employees: 42
 Markets: India, Germany,
 USA, Australia and U.A.E.

**Azurite Mining and Water
 Resources Ltd**
 Stand 337/338
 Lunsemfwa RD
 P.O. Box 34933
 Lusaka
 ZAMBIA
 Tel: +260-1-290207
 Contact: Chisengu Mudala
 Established: 1986
 Markets:

B B C Syndicate
 P.O. Box 640175
 Pemba
 ZAMBIA
 Tel: +260-32-42015
 Contact: Brian Chatembwa
 Established: 1990

B & C Engineering
 P.O.Box 1582
 Blantyre
 MALAWI
 Tel: +265-670-877/601
 Fax: +265-670-442
 Tlx: 44748
 Contact: Winter M. Chinamale

Bakanibona Athanase
 MDN/D.P.D
 B.P. 20
 Bujumbura
 BURUNDI
 Tel: +257-2-15260/22914
 Fax: +257-2-23959
 Contact: Bakanibona Athanase

Barandiguza V.
 B.P. 2890
 Bujumbura
 BURUNDI
 Tel: +257-2-32155
 Tlx: 5061 BDI
 Contact: Barandiguza, V.

Beacone Engineering Pvt Ltd
 P.O. Box CY 3493
 Causeway
 Harare
 ZIMBABWE
 Tel: +263-4-754184/5
 Contact: Santah Chiwuta
 Established: 1993
 No. of Employees: 17
 Markets: Local

Becido S.P.R.L.
 Avenue
 La Ruyvironza
 BURUNDI
 Tel: +257-2-26517
 Fax: +257-2-21924

Bentall Rowlands Texas Ltd
 Industrial Estate
 Dunkirk
 Aylsham
 Norfolk NR11 6SY
 ENGLAND
 Tel: +44-1263-733811
 Fax: +44-1263-734845
 Tlx: 975149
 Contact: Mark Temple
 Position: Export Sales
 Manager
 Department: Export Division

Beyen (Thailand) Co Ltd
1296/49 Grungthep-Nonthaburi
Road
Bangsue
Bangkok
10800
THAILAND
Tel: +66-2-911-5241-2
Fax: +66-2-911-5240
Contact: David G. Kessel
Position: International
Marketing Manager

Biomachinostrone Ltd
5 Nicola Delev Street
4003 Plovdiv
BULGARIA
Tel: +359-32-552-334
Fax: +359-32-552-334
Contact: Angel Djumetrov
Position: General Manager

Blueband Milling Ltd
P.O. Box 31365
Lusaka
ZAMBIA
Contact: K. E. Sinyangwe
Established: 1995

Buka Women's Club
P.O. Box 620291
Kalomo
ZAMBIA
Tel: +260-0-65060
Contact: Rosemary Mwaala
Established: 1994

C N Chilumba Construction
P/Bag RW 240X
Lusaka
ZAMBIA
Tel: +260-1-288150
Contact: Nyambe Namushi
Established: New

**Central Food Technological
Research Institute**
Mysore
570 013
INDIA
Tel: +91-821-22304
Fax: +91-821-37453
Tlx: 846-241 FTRI IN
Contact: S.P. Pillai
Position: Head
Department: Technology
Transfer & Marketing

**Cheil Foods & Chemicals,
Inc.**
PO Box 100-716, 16 Flow
Samsung Insurance Building
2-GA 150 Taepyung Road,
Chung-Ku
Seoul
KOREA
Tel: +82-2-726-8370-8
Fax: +82-2-726-8379/8389
Contact: Jae Sung, Jyun
Department: Foreign Business
Department
Markets: China, South-East
Asia and other developing
countries.

Chemtech Processes Ltd
P.O. Box 22136
Kitwe
ZAMBIA
Tel: +260-2-228007
Fax: +260-2-228980
Contact: Richard Nshimbi
Established: 1992

Chibile General Contractors
P.O. Box 80115
Kahwe
ZAMBIA
Contact: Alfred Katongo
Established: 1990

Chingola Meat Suppliers Ltd
P.O. Box 11299
Chingola
ZAMBIA
Tel: +260-2-33283
Contact: C.A. Lwanga
Established: 1992

Chrome Leather Co Ltd
29, Thilak Street
T'Nagar
Madras
600 017
INDIA
Tel: +91-44-825-1865
Fax: +91-44-434-7959
Contact: S. Jagathrakshakan
Position: Chairman
No. of Employees: 250

Clearinghouse Network
367 Keumak-Ri
Bang San-Myun
Yangku-Kun
Kangwon-Do
KOREA
Tel: +82-364-481-6126
Fax: +82-364-481-6126
Contact: Kio Min, Chung
Position: Co-ordinator

CNTA
B.P. 557
Bujumbura
BURUNDI
Tel: +257-2-22585
Fax: +257-2-22445
Contact: Ven'ste Gikota

Coffee Processing & Warehouse Enterprise

P.O. Box 12653

Addis Ababa

ETHIOPIA

Tel: +251-1-653722

Fax: +251-1-21174

Contact: Tesfaw Fiseha

Established: 1990

No. of Employees: 389

Markets: Japan, Middle East, Europe, USA, Eastern Europe

Coffee Technology and Engineering Enterprise

P.O. Box 5898

Addis Ababa

ETHIOPIA

Tel: +251-1-155921

Contact: Ato Alemu Ashengo

Established: 1971

No. of Employees: 45

Markets: Ethiopia.

Columbia Engineering

P.O. Box 493

Kopje

Harare

ZIMBABWE

Contact: C. Ndongwe

Established: 1990

No. of Employees: 12

Markets: Zimbabwe.

Comet Enterprises Ltd

P.O. Box 320153

Lusaka

ZAMBIA

Tel: +260-1-264621

Fax: +260-1-264621

Co. xct: Y. Goma

Established: New

Cundall, D.J. (Farms)

Hawthorne House Farm

High Levels, Thorne

Nr. Doncaster

South Yorkshire DN8 4SW

ENGLAND

Tel: +44-1724-711658

Fax: +44-1427-874872

Contact: David J. Cundall

Position: Sole Proprietor

Dairy Development Enterprise

P.O. Box 2002

Addis Ababa

ETHIOPIA

Tel: +251-1-611444

Contact: Mesfin Mebratu

Established: 1946

No. of Employees: 1019

Markets: Local, especially in Addis Ababa and its vicinity.

Dectrade Industrial Distributors

P.O. Box 310061

Lusaka

ZAMBIA

Tel: +260-1-243155

Contact: E.M. Chambula

E M Enterprise

P.O. Box 550100

Katete

ZAMBIA

Contact: Ezra Mvula

Established: 1993

Eastern Gemstone

Cooperative Society Ltd

P.O. Box 510499

Chipata

ZAMBIA

Tel: +260-62-22706

Fax: +260-62-22706

Contact: P.M. kaonga

Ecoelectric Ltd

P.O. Box 574

Blantyre

MALAWI

Tel: +265-624-471/806/819

Fax: +265-633-496

Tlx: 45366 ELTRIC MI

Contact: Bruno A. Kloser

EDEM Ltd

20-1-99 Vvedenskogo St.

Moscow

117 279

RUSSIA

Tel: +7-095-333-4885

Fax: +7-095-339-1266

Contact: V.F. Pomitkin

Position: Director General

Established: 1992

Markets: Russia

Elitem Enterprises Ltd

P.O. Box 37665

Lusaka

ZAMBIA

Tel: +260-1-223085

Contact: Elina Joyce Tembo

Established: New

Markets: Zambia

Emmanuel Jera Dustbin

Makers & Co.

P.O. Box 30043

Mengo

Kisenyi

Kampala

UGANDA

Tel: +256-41-259429

Contact: Emmanuel Jera

No. of Employees: 4

Engineering and Foundry Company

P.O. Box 30600

Blantyre 3

MALAWI

Tel: +265-672028/67241

Contact: Faruk Raider

Enviro Oils and Colourants
 Airport Area
 Lusaka
ZAMBIA
Contact: C. Mwanamwambwa

Ethiopian Meat Concentrate
 P.O. Box 5562
 Addis Ababa
ETHIOPIA
Tel: +251-1-164945
Tlx: 55-30-04
Contact: Melaku Berihun
Established: 1970
No. of Employees: 328
Markets: Saudi Arabia, United Arab Emirates.

Ethiopian Spice Extraction Factory
 P.O. Box 5699
 Addis Ababa
ETHIOPIA
Tel: +251-1-65330G
Fax: +251-1-21359
Tlx: 65-36-33
Contact: Mekbib Aderaye
Established: 1969
No. of Employees: 113
Markets: Germany, Spain and Japan.

Extrade Limited
 4th Floor
 27 Fast Street
 Leicester
 LE1 6NB
ENGLAND
Tel: +44-116-247-0500
Fax: +44-116-247-0015
Tlx: 342227 EXTRAD G
Contact: M.M. Patel
Established: 1977
No. of Employees: 7
Markets: Malawi, Zambia, Tanzania, Uganda, Mozambique, Kenya, Ghana.

Faffa Food Factory
 P.O. Box 5688
 Addis Ababa
ETHIOPIA
Tel: +251-1-162736
Tlx: 21763
Contact: Tadesse Araya
Established: 1968
No. of Employees: 320
Markets: All Ethiopia.

Farmers Agricultural Marketing and Development
 P.O. Box 620041
 Kalomo
ZAMBIA
Tel: +260-0-65398
Contact: P.M. Shimbwe
Established: 1994

Fisaka Estates Company
 P.O. Box 760041
 Mwense
ZAMBIA
Contact: Joseph Chisakula
Established: 1972

Food Canners Ltd
 P.O. Box 879
 Plaine Lauzun
 Port Louis
MAURITIUS
Tel: +230-211-0321
Tlx: 208-5289
Established: 1978
No. of Employees: 175
Markets: Mauritius, Comores, Seychelles.

Food Express Ltd
 P.O. Box 22048
 Nairobi
KENYA
Tel: +254-2-336146
Fax: +254-2-335438
Contact: Patrick Muraguri
Established: 1985
No. of Employees: 10
Markets: Kenya

Food Pack Ltd
 P.O. Box 4851
 Kampala
UGANDA
Tel: +256-41-259636
Fax: +256-41-243380
Contact: Silver J. Ocitti
Established: 1984
Markets: Uganda, Kenya.

Foxwell, Charles E.
 18 Lancot Drive
 Dunstable
 Bedfordshire
 LU6 2AP
ENGLAND
Tel: +44-1582-662729
Fax: +44-1582-662364
Contact: C.E. Foxwell
Position: Proprietor
Established: 1994

Fredo Enterprises
 P.O. Box 850245
 Serenje
ZAMBIA
Tel: +260-5-382213
Fax: +260-5-382165
Contact: F.C. Chama

Garfield Smith & Associates

Ferry Quay
Woodbridge
Suffolk
IP12 1BW
ENGLAND
Tel: +44-1394-380019
Fax: +44-1394-380608
Contact: Don Smith
Position: Partner

Gomani, J.F.

P.O. Box 1133
Blantyre
MALAWI
Tel: +265-670-890/814
Fax: +265-670-607
Contact: J.F. Gomani
Established: 1978
No. of Employees: 20
Markets: Malawi

Greywood Enterprises Ltd

P.O. Box 29126
Kitwe
ZAMBIA
Tel: +260-2-221966
Fax: +260-2-228980
Contact: George Kateketa
Established: New

Grown Brand Tea Limited

P.O. Box 746
Kampala
UGANDA
Tel: +256-41-245835
Fax: +256-41-245580/258571
Contact: A.K. Mpanga
Position: Managing Director
No. of Employees: 20
Markets: Local.

Gwembe Breweries

P.O. Box 73
Gwembe
ZAMBIA
Contact: Reuben Siachele
Established: New

Heat Systems

61, Second Cross
Domlur Layout
Bangalore
560 071
INDIA
Tel: +91-80-557-6471
Fax: +91-80-554-3369
Contact: K.
Sankarasubramanian
Established: 1982
No. of Employees: 40
Markets: South Africa,
CHOGRM countries, domestic
market.

Hitech Instruments Ltd

15 Ribocon Way
Progress Park
Luton
Beds. LU4 9UR
ENGLAND
Tel: +44-1582-597478
Fax: +44-1582-503369
Contact: K.M. Atkinson
Position: Managing Director
Established: 1980
No. of Employees: 15

Impapa Workshop Ltd

P.O. Box 240547
Ndola
ZAMBIA
Contact: Julia R. Brown
Established: 1979

**Industrial Development
Corporation - Zimbabwe**

93 Park Lane
Harare
ZIMBABWE
Tel: +263-4-706971
Fax: +263-4-796028
Tlx: 24409 IDC
Contact: Charles Chitsora
Position: Projects Manager
Department: Bioprocessing and
Chemical Industry
No. of Employees: 12000
Markets: Zambia, Botswana,
Malawi, South Africa,
Mozambique and Zimbabwe.

**Institute of Production
Innovation**

University of Dar-es-Salaam
Box 350 75
Dar-es-Salaam
TANZANIA
Tel: +255-51-43376/7
Fax: +255-51-43376
Tlx: 41561 UNIVIPT
Contact: J.S. Mshana
Position: Director, IPI
No. of Employees: 75

**Interface Packaging (Pvt)
Ltd**

40 Charter Road
Harare
ZIMBABWE
Tel: +263-4-729453/752946
Fax: +263-4-752946
Contact: T.C. Murove
Established: 1991
No. of Employees: 7

Interstate Business Agencies Ltd

P.O. Box 4729
 Dar-es-Salaam
 TANZANIA
 Tel: +255-51-67112
 Fax: +255-51-37029
 Contact: S.H. Mwamkoa
 Established: 1972

JNP Agro-Systems Pvt. Ltd

No.15 Poes Road
 IIIrd Street
 Teynampet
 Madras 600 018
 INDIA
 Tel: +91-44-4347985/453286
 Fax: +91-44-8284482
 Tlx: 041-23072 JNP IN
 Contact: N.K. Gopinath
 Position: Managing Director
 Established: 1994
 No. of Employees: 25

Kabwe Carpentry Products Ltd

P.O. Box 80883
 Kabwe
 ZAMBIA
 Tel: +260-5-221487
 Contact: G.N. Kabanga

Kabwe Central Electrics Ltd

P.O. Box 80330
 Kabwe
 ZAMBIA
 Tel: +260-5-223413/224526
 Position: The Director
 Established: 1994

Kalimba General

Maintenance Ltd
 P.O. Box 80115
 Kitwe
 ZAMBIA
 Tel: +260-2-221487
 Contact: Simon Kasenge
 Established: 1987

Kalita Food Factory

P.O. Box 1819
 Addis Ababa
 ETHIOPIA
 Tel: +251-1-344-0144
 Tlx: 22502
 Contact: Woldetensai W.
 Giorgis
 Established: 1946
 No. of Employees: 570
 Markets: Local.

Kanash (K) Ltd

P.O. Box 34857
 Nairobi
 KENYA
 Tel: +254-154-51065
 Contact: Muthande
 No. of Employees: 60

Kangwenya Ltd

P.O. Box 8021
 Kitwe
 ZAMBIA
 Tel: +260-2-223480
 Contact: Stan Mtamira
 Established: New

Kaseloki Enterprises

P.O. Box 37807
 Lusaka
 ZAMBIA
 Tel: +260-1-273376
 Contact: Charles Kadochi

Katapola Agricultural Engineering Services

P.O. Box 51032
 Chipata
 ZAMBIA
 Tel: +260-62-21357
 Fax: +260-62-21630
 Contact: Paschal Chimba
 Established: 1976

Katjivena Dairies

P.O. Box 1435
 Windhoek
 NAMIBIA
 Tel: +264-61-215505
 Fax: +264-61-216570
 Contact: Katjivena
 No. of Employees: 20
 Markets: Namibia.

Kennex Ltd

P.O. Box 4851
 Kampala
 UGANDA
 Tel: +256-41-232069
 Fax: +256-41-530412
 Contact: Kenneth L. Okello
 Established: 1985
 No. of Employees: 17
 Markets: Uganda and COMESA countries i.e Rwanda, Zaire, Sudan, Burundi.

Kenya Cold Storage (Foods) Ltd

P.O. Box 41229
 Nairobi
 KENYA
 Tel: +254-2-222-242/243
 Fax: +254-2-331819/225732
 Contact: Ajay K. Deshpande
 Established: 1964
 No. of Employees: 100
 Markets: Europe, Japan, U.S.A., Israel, Australia.

Kerala Agro Machinery Corporation Ltd

Athani
 683 585 Ernakulam Dist.
 Kerala State
 INDIA
 Tel: +91-485-4742-11 to 15
 Fax: +91-485-474189
 Tlx: 382-202 KAMC IN
 Contact: Ravi Kumar

**Korea Advanced Food
Research Institute**
1002-6 Bangbee-Dong
Seocho-Ku
Seoul
KOREA
Tel: +82-2-586-0692
Fax: +82-2-588-8704

Contact: Young Chan, Kim
Position: Senior Researcher
Department: Research
Department

Lady Mellisah Enterprise
Pemba Basic School
P.O. Box 640059
Pemba
ZAMBIA
Tel: +260-32-42172
Contact: Mellisah Mufwaafwi
Established: 1992

Leicester Southfields College
School of Footwear
Aylestone Road
Leicester
LE2 7LW
ENGLAND
Tel: +44-116-253-6901
Fax: +44-116-265-3147
Contact: Roger T. Beeby
Position: Head of School of
Footwear
Department: Faculty of Art,
Design & Technology
Established: 1897
No. of Employees: 500
Markets: Over 60 countries
including: Taiwan, Korea,
Phillipines, Japan, India,
Pakistan, Zimbabwe, South
Africa, Mexico and Spain.

Lubwe Milling Ltd
P/Bag 10
Kapiri Mposhi
ZAMBIA
Tel: +260-5-271092
Contact: Isaac Mumba
Established: 1983

Lulu Leather Centre Ltd
P.O. Box 33325
Lusaka
ZAMBIA
Tel: +260-1-220304
Fax: +260-1-224290
Contact: D. Kasempa
Established: New

Lumbadzi General Trading
P.O. Box 1169
Lilongwe
MALAWI

MA Culture
B.P. 248
Bujumbura
BURUNDI
Tel: +257-2-23856
Fax: +257-2-27632
Tlx: BDI 5143
Contact: Muque Kigoma
Established: 1987
No. of Employees: 40
Markets: Europe.

**Malawi Industrial Research
& Technology Development
Centre**
P.O. Box 357
Blantyre
MALAWI
Tel: +265-623-805
Fax: +265-623-831
Contact: C.W. Guta

Mapopa Enterprises
P.O. Box 81435
Kabwe
ZAMBIA
Tel: +260-5-223705
Contact: James Kumwenda
Established: 1990

Martin Davoz Trading Ltd
Kollarova 73
036 01 Martin
SLOVAK REPUBLIC
Tel: +42-842-33548
Fax: +42-842-33548
Contact: Martin Cvangros
Established: 1993

Masaini Farms' Produce
P.O. Box 840014
Mkushi
ZAMBIA
Tel: +260-5-362132
Contact: George Michalakis
Established: 1993

Masinga Enterprises Ltd
Independence Avenue
P.O. Box 910444
Mongu
ZAMBIA
Contact: F.S. Malala

Mather & Platt (I) Ltd
805 Ansal Bhawan
!6-K.G. Marg.
New Delhi 110 001
INDIA
Tel: +91-11-371-3059
Fax: +91-11-371-5237
Contact: Harbans Lal
Position: Senior Manager -
International Sales
Department: Food Machinery
Division
Established: 1953
No. of Employees: 1500
Markets: Middles East, Far
East, Europe, C.I.S., Russia,
Africa(East, West & South).

Mauritius Biscuit Making Co. Ltd
 Bell Village
 MAURITIUS
Tel: +230-212-4135/2121276
Fax: +230-212-1576
Contact: Noopnarain Sukai
Established: 1970
No. of Employees: 217
Markets: Local market, Reunion, Seychelles.

Meher Fibre Products
 P.O. Box 81
 Addis Ababa
 ETHIOPIA
Tel: +251-1-340311
Fax: +251-1-21586
Contact: Tefera Ababe
Established: 1959
No. of Employees: 1600
Markets: Local.

Merit Engineering Services Ltd
 P.O. Box 50545
 Lusaka
 ZAMBIA
Tel: +260-1-273376
Fax: +260-1-232294
Contact: John C. Musonda
Established: 1990

Mihwa Chemical Co. Ltd
 444 Muchon-Ri
 Buhai-Eup
 Ichon-Kun
 Keongki-Do
 KOREA
Tel: +82-336-34-6131
Fax: +82-336-32-5147
Contact: Yoo Sang, Jyung
Department: Quality Control
 Part

Milklink Limited
 13 Rax Lane
 Bridport
 Dorset
 DT6 3JN
 ENGLAND
Tel: +44-1308-421032
Fax: +44-1308-421034
Contact: Harold G. Poole
Position: Director

Mukisa Engineering Service
 P.O. Box 100
 Wobulenzi
 UGANDA
Tel: 221785
Fax: 221038
Contact: Haji Sirage
 Mugwanya
Established: 1973
No. of Employees: 6
Markets: Uganda.

Mukwano Industries (U) Ltd
 P.O. Box 2671
 Kampala
 UGANDA
Tel: +256-235-701/6
Fax: +256-235-704
Tlx: 62112 ALY UG
No. of Employees: 550
Markets: Uganda, Zaire, Tanzania, Rwanda, Burundi, Sudan and Kenya

Mushuwa Technical Services Ltd
 P.O. Box 30028
 Lusaka
 ZAMBIA
Tel: +260-1-228005
Contact: N. Nyumbu
Established: New

Mwaamwene Agency
 P.O. Box 997
 Mzuzu
 MALAWI
Contact: M.G. Nyirenda

N M C
 B.P. 2273
 Bujum'ura
 BURUNDI
Tel: +257-2-26050
Fax: +257-2-28497
Contact: M. Nkuzimana

Namibia Development Corporation
 Private Bag 13252
 Windhoek
 NAMIBIA
Tel: +264-61-306
Fax: +264-61-223854
Contact: D. Nuyoma
Established: 1993

Namibia Mills (PTY) Ltd
 P.O. Box 20276
 Windhoek
 NAMIBIA
Tel: +264-61-217001
Fax: +264-61-262678
Contact: Frans Meyer
Established: 1981
No. of Employees: 300
Markets: Namibia

Namibia National Chamber of Commerce & Industry
 P.O. Box 9355
 Windhoek
 NAMIBIA
Tel: +264-61-228809
Fax: +264-61-228009
Contact: H. Nghinamwaami
Established: 1990

Namibia National Farmers Union

P.O. Box 3117
Windhoek
NAMIBIA
Tel: +264-61-271117
Fax: +264-61-271155
Contact: S. Namucongo
Established: 1992

National Council for Scientific Research (NCSR)

Lusaka
ZAMBIA
Tel: +260-1-281081
Position: The Secretary
General
Markets: The lead institution in matters of scientific and technological R&D activity in Zambia.

National Small Industries Corporation Ltd

NSIC Bhavan
Okhla Industrial Estate
New Delhi 110 020
INDIA
Tel: +91-11-6830390/6845815
Fax: +91-11-6840901
Tlx: NSIC 031-75131 & 75415
Contact: J.S. Juneja
Markets: India.

National Tobacco Enterprise

Zone 2, Wereda 22
Kebele 07
P.O. Box 5658
Addis Ababa
ETHIOPIA
Tel: +251-1-513763
Fax: +251-1-517846
Tlx: 21332
Contact: Gebre Medhin Wolday
No. of Employees: 969
Markets: Ethiopia.

Natural Fibres Organisation

Wrest Park
Silsoe
Bedford
MK45 4HS
ENGLAND
Tel: +44-1525-862095
Fax: +44-1525-862095
Contact: Harry Gilbertson
Position: Marketing Manager

Neale Consulting Engineers Ltd

43 Downing Street
Farnham
Surrey
GU9 7PH
ENGLAND
Tel: +44-1252-722255
Fax: +44-1252-737106
Contact: T.A. Polak
Position: Director
Established: 1962
No. of Employees: 7
Markets: Worldwide.

Nkwashi Enterprises

Private Bag E216
Lusaka
ZAMBIA
Tel: +260-1-290731
Contact: Juliet Chilengi
Established: 1990

Northern Uganda

Manufacturers Association
P.O. Box 296
Lira
UGANDA
Tel: +256-41-230-728
Fax: +256-41-230-697
Contact: Felix Odur
No. of Employees: 100
Markets: Southern Sudan,
Eastern Zaire, Rwanda,
Burundi & Uganda.

North, G. and Son (Pvt) Ltd

P.O. Box St 111
Southerton
Harare
ZIMBABWE
Tel: +263-4-6637179
Fax: +263-4-666414
Tlx: 22562 ZW
Contact: D. Mitchell
Position: General Manager
Established: 1928
No. of Employees: 43

North-Western Bee Products Ltd

P.O. Box 140096
Kabompo
ZAMBIA
Tel: +260-8-375085
Fax: +260-8-375085
Contact: Bob Malichi

Orient Syntex Ltd

606 Maker Chamber V
221 Nariman Point
Bombay
400 021
INDIA
Tel: +91-22-2040700/
2843767/91
Fax: +91-22-204-0699
Tlx: 11-86164 OSIB IN
Contact: Umesh Sharma
Position: Vice President
(Projects)

Panamo Scientific Ltd

Private Bag 507X
Lusaka
ZAMBIA
Tel: +260-1-241767
Fax: +260-1-241767
Contact: P.N. Mweene
Established: 1989
Markets:

Patulani Enterprise
P.O. Box 60067
Kalomo
ZAMBIA
Contact: Eunice Znawa
Established: 1991

**Pemba Womens'
Manufacturing Enterprise**
P.O. Box 640175
Pemba
ZAMBIA
Tel: +260-32-42015
Contact: Harriet M.
Chatembwa
Established: 1989

Poshan Agrovet
F-52, Panki Site-II
Jdyog Nagar
Kanpur
208 022
INDIA
Tel: +91-512-211357
Fax: +91-512-297236
Tlx: 280822
Contact: A. Tripathi
No. of Employees: 54
Markets: South African and
Middle East countries.

Protech Food Systems Ltd
Unit 6, Manton Lane
Bedford
MK41 7PB
ENGLAND
Tel: +44-1234-342321
Fax: +44-1234-346267
Contact: Colin Thompson
Position: Sales Director
Established: 1983
No. of Employees: 50
Markets: UK, Northern Ireland

**Protech Systems Private
Limited**
13/18 D.D.A. Business Centre
Nangal Raya
New Delhi
110 046
INDIA
Tel: +91-11-553-3807
Fax: +91-11-550-6349
Contact: Atul Bal
Position: Director
Markets:

Rainbow Lace:
C75, Sector 4
NOIDA
201 301
U.P.
INDIA
Tel: +91-89-29070/55268
Contact: Sanjay Sethi
Position: Director

Rasma Engineering
P/Bag RW 134X
Lusaka
ZAMBIA
Tel: +260-1-220346
Fax: +260-1-220346
Contact: Rashid Phiri
Established: 1989

**Rau, John and Company
(Pvt) Ltd**
P.O. Box 2893
Harare
ZIMBABWE
Tel: +263-4-753069
Fax: +263-4-753069
Contact: Rau
Established: 1950
No. of Employees: 18

Reaseheath College
Reaseheath
Nantwich
Cheshire
CW5 6DF
ENGLAND
Tel: +44-1270-625131
Fax: +44-1270-625665
Contact: Dennis Prew
Position: Business
Development Manager
No. of Employees: 230
Markets: UK, Europe, Africa,
Asia, South America.

Red Spark Electrical
P.O. Box 36505
Lusaka
ZAMBIA
Contact: Henry M. Nachinzulu

Renox Private Limited
P.O. Box BW765
Harare
ZIMBABWE
Tel: +263-4-885931
Fax: +263-4-885931/882032
Contact: J. Kalisky
Established: 1992
No. of Employees: 7

Sable Tannery
P.O. Box 22295
Kitwe
ZAMBIA
Contact: H. Raven

Saini Leather Co.
M 9 E 1295 Bhadurgarh
PIN 124507
Haryana
INDIA
Tel: +91-11-831-2898/0184
Fax: +91-11-547-3663
Contact: Mahabir Saini
Position: Chairman

Salila Transport

P.O. Box 844
Blantyre
MALAWI
Contact: Hellen Chasowa
Established: 1994
No. of Employees: 4
Markets: Malawi

Sakunda Ltd

P.O. Box 37442
Lusaka
ZAMBIA
Contact: Nyambe Namushi
Established: 1994

School of Mines, University of Zambia

P.O. Box 32379
Lusaka
ZAMBIA
Tel: +260-1-292884
Fax: +260-1-253952
Contact: S. Simukanga

Selected Fruit Processors

P.O. Box 54609
Nairobi
KENYA
Tel: +254-2-722541/2/4
Fax: +254-2-213876
Contact: Elijah O. Ombongi
Established: 1995

Seskel Foods Ltd

Block 1 A 7
DBM Industrial Zone
Coromandel
MAURITIUS
Tel: +230-233-5310/13
Fax: +230-233-4072
Tlx: 4691 SESKEL
Contact: J.C. Eric Germain
Position: Promoter & Executive Director
Established: 1991
No. of Employees: 220
Markets: UK, France, Kenya.

Shiphandler & Co./Shipco Foods

6-3-352, Road No. 1
Banjara Hills
Hyderabad
500 034
INDIA
Tel: +91-40-393018/228252
Fax: +91-40-228252
Tlx: 420-6215 PCO IN
Contact: S.M. Shiphandler
Established: 1975
No. of Employees: 5
Markets: All India.

Silsoe Research Institute

Wrest Park
Silsoe
Bedford
MK45 4HS
ENGLAND
Tel: +44-1525-860000
Fax: +44-1525-860156
Tlx: 825808 SILSOE G
Contact: Paul Miller

Small Industries Development Organisation (SIDO)

P.O. Box 35373
Lusaka
ZAMBIA
Fax: +260-1-224284
Position: The Director
Established: 1982
Markets: SIDO is an organisation that promotes small scale industries in Zambia.

Sola Youth Club

P.O. Box 620264
Kalomo
ZAMBIA
Contact: Alfred Habanyama

Star Engineering (Pvt) Ltd.

P.O. Box 188
Rusape
ZIMBABWE
Tel: +263-125-2405
Fax: +263-125-2391
Contact: M.M.P. Pswarayi
No. of Employees: 12

STC Corporation

32, 3-Ka
Mullae-Dong
Youngdungpo-Ku
Seoul
KOREA
Tel: +82-2-675-0621
Fax: +82-2-675-1597
Contact: Dae Bok, Bang
Position: General Manager
Department: Marketing Research Team

Sugar & Integrated Industries Company (S.I.I.C.)

P.O. Box 763
12 Gawad Hosni St.
Cairo
EGYPT
Tel: +20-18-304-617/257
Fax: +20-18-304-193/305548
Tlx: 21193 SIIC UN / 20908
SIIC UN
Contact: Samir A.K. Hassan
Position: Engineer
Department: Project Eng. & Management

Sweet Inspiration

P.O. Box 5133
Limbe
MALAWI
Tel: +265-640-311
Fax: +265-640-750
Tlx: 99144790
Contact: G.A. Chingota
Established: 1995
No. of Employees: 10
Markets: COMESA

Tagle Motors
 P.O. Box 80115
 Kabwe
 ZAMBIA
Contact: Daniel Chilufya
Established: 1991

Tankor Milling Company Ltd
 P.O. Box 810052
 Kapiri Mposhi
 ZAMBIA
Tel: +260-5-342233
Fax: +260-5-362077
Contact: Z.Z. Armatovic
Established: New
Markets: Local market and Zaire.

Tanroy Engineering (Pvt) Ltd
 P.O. Box AY 382
 Amby
 Harare
 ZIMBABWE
Tel: 263-4-487791-3
Fax: 263-4-487794
Contact: Matthew Mubvereke
Established: 1992
No. of Employees: 36
Markets: Local market, Mozambique, Zambia and Malawi.

Tanzania Engineering & Manufacturing Design Organisation (TEMDO)
 P.O. Box 6111
 Arusha
 TANZANIA
Tel: +255-57-6220/8058
Fax: +255-57-8318
Tlx: 42134
Contact: G. Msolla
Position: Director General
Established: 1982
No. of Employees: 68
Markets: Tanzania.

TCO International Inc.
 3202 Mix Drive
 Westminster
 MD 21157
 USA
Tel: +1-410-876-9297
Fax: +1-410-848-7561
Tlx: 7403247 TASH UC
Contact: Paul A. Tashner
Position: President

Tea Production & Marketing Enterprise
 Addis Ababa
 P.O. Box 2520
 ETHIOPIA
Tel: 202393/200465
Fax: 251-1-712229
Tlx: 21130 ETHCOF
Contact: Derese Kasso
Position: General Manager
Established: 1980
No. of Employees: 166
Markets: Domestic market, England, Pakistan, USA and Canada.

Teacraft
 P.O. Box 190
 Kempston
 Bedford
 MK42 8DQ
 ENGLAND
Tel: +44-1234-852121
Fax: +44-1234-853232
Tlx: 317210 BUREAU G
Contact: Nigel Melican
Established: 1991
No. of Employees: 3
Markets: Worldwide

Technology Exchange Limited
 Wrest Park
 Silsoe
 Bedford
 MK45 4HS
 ENGLAND
Tel: +44-1525-860333
Fax: +44-1525-860664
Tlx: 825808 SILSOE G
Contact: Brian Padgett
Position: Managing Director
Established: 1985
No. of Employees: 5
Markets: Worldwide.

Teska Investments
 P.O. Box 50863
 Lusaka
 ZAMBIA
Tel: +260-1-252075
Contact: Kawandami

Tika Marketing Corporation Ltd
 P.O. Box 2968
 Blantyre
 MALAWI
Tel: +265-624-972
Fax: +265-623-831
Contact: Catherine M. Mwasi
Established: 1995
No. of Employees: 40
Markets: Rural Malawi

Tinytech Plants
 Tangore Road
 Rajkot 360 002
 INDIA
Tel: +91-281-48466/51086
Fax: +91-281-40552/53231
Contact: V.K. Desai
Position: Managing Director

ALPHABETICAL DIRECTORY OF CONTACT ADDRESSES

Tomack Musical Instruments

P.O. Box 36307

Lusaka

ZAMBIA

Contact: Thomson Mwale*Established:* 1988**Tony Katongo**

SIDO Workshops

P.O. Box 80115

Kabwe

ZAMBIA

Contact: Tony Katongo*Established:* 1990**Triad Investment Group**

(PTY) Ltd

P.O. Box 23531

Windhoek

NAMIBIA

Tel: +264-61-224214*Fax:* +264-61-228618*Contact:* M. Keriss*Established:* 1992**Tropical Foods International**

P.O. Box 60764

Fort Myers

FL 33906-0764

USA

Tel: +1-813-278-0034*Fax:* +1-813-278-3408*Contact:* R. Govin*Position:* Director*Established:* 1979*Markets:* Worldwide.**T&T International Foods Ltd**

P.O. Box 1037

Port Louis Centre

Port Louis

MAURITIUS

Tel: +230-34-654*Tlx:* 4429 SPEED IW*Established:* 1980**United Technology Engineers**

Pvt Ltd

P.O. Box 4253

Greater Kailash Enclave One

New Delhi

110 048

INDIA

Tel: +91-11-6416009/6422265*Fax:* +91-11-6444169/

6473018

Tlx: 031-70020/71335 COMD

IN

Contact: D.V. Gupta*Position:* Managing Director*Established:* 1984**Universal Industries Ltd**

P.O. Box 507

Blantyre

MALAWI

Tel: +265-670-055*Fax:* +265-677-408*Tlx:* 44402 MI*Contact:* D.K. Amin*Established:* 1958*No. of Employees:* 600*Markets:* Malawi, RSA,

Zambia, etc.

University of Luton

Faculty of Design &

Technology

Park Square

Luton

Beds. LU1 3JU

ENGLAND

Tel: +44-1582-489229*Fax:* +44-1582-489224*Contact:* Stephen Mortimer*Established:* 1993**University of Malawi**

Chancellor College

Box 280

Zomba

MALAWI

Tel: +265-522-222*Fax:* +265-523021/522916*Contact:* J. Mumba**University of Zambia**

Technology Development &

Advisory Unit (TDAU)

P.O. Box 32379

Lusaka

ZAMBIA

Tel: +260-1-292884*Fax:* +260-1-253952*Position:* The Manager*Established:* 1975**Urai Impex**

53 Apollo Industrial Estate

off Mahakali Caves Road

Andheri

Bombay 400 093

INDIA

Tel: +91-22-834-4371*Fax:* +91-22-836-1354*Contact:* A.B. Amin*Position:* President*Established:* 1974*No. of Employees:* 50**V and H Enterprise**

2 Kochia Street

Luangwa Township

Kabwe

ZAMBIA

Contact: Hope Pulumaka*Established:* 1995*Markets:*

Village Industry Service

P.O. Box 35500

Lusaka

ZAMBIA

Tel: +260-1-225303

Fax: +260-1-225303

Position: The Chairman

Established: 1976

Vipha Corporation Limited

P.O. Box 1252

Blantyre

MALAWI

Tel: +265-620-600

Fax: +265-633-097

Contact: Luke A. Jumbe

Established: 1973

No. of Employees: 28

Votex Tropical

Wageningsstraat 52

6673 DD Andelst

THE NETHERLANDS

Tel: +31-8880-69500

Fax: +31-8880-54041

Tlx: 48229 Votex NL

Contact: A.H. Provoost

Established: 1922

No. of Employees: 90

Markets: World wide
(approximately 60 countries).**Walcon Industries**

E-45

South Extension Part 1

New Delhi 110 049

INDIA

Tel: +91-11-463-3696

Fax: +91-11-462-6064

Contact: Ashok Trehan

Established: 1970

No. of Employees: 60

Markets: India, Dubai,
Pakistan and Singapore.**Wonderland Investments**

P.O. Box 37603

Lusaka

ZAMBIA

Contact: Paul Zulu

Established: 1992

Yawo Enterprises

P.O. Box 57735

Limbe

MALAWI

Tel: +265-622-300 (Mr

Ndovie)

Fax: via Chamber +265-671-
147

Contact: B. Emily Ndovie

Established: 1991

No. of Employees: 6

Markets: Malawi

Yewo Hot Gossip Enterprises

P.O. Box 1288

Blantyre

MALAWI

Tel: +265-676-065

Fax: +265-671-147

Contact: Bernadetta Ndovi

No. of Employees: 8

Markets: Malawi

Yoya Development Company

SIDO Industrial Complex

Makeni

P.O. Box 34409

Lusaka

ZAMBIA

Tel: +260-1-273377 ext.25

Contact: Preston Viswamo

Established: 1994

Zagwazatha Agricultural

Limited

P.O. Box 728

Lilongwe

MALAWI

ZTS TEES s.p. Martin

plant Trstena

028 01 Trstena

SLOVAKIA

Tel: +42-847-921794

Fax: +42-847-921405

Tlx: 075 239

Contact: Milan Schifferdecker

Position: Chief of Technical

Department