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D R A F T

UNIDO'S TECHNICAL ASSISTANCE IN THE FIELD OF PACKAGING

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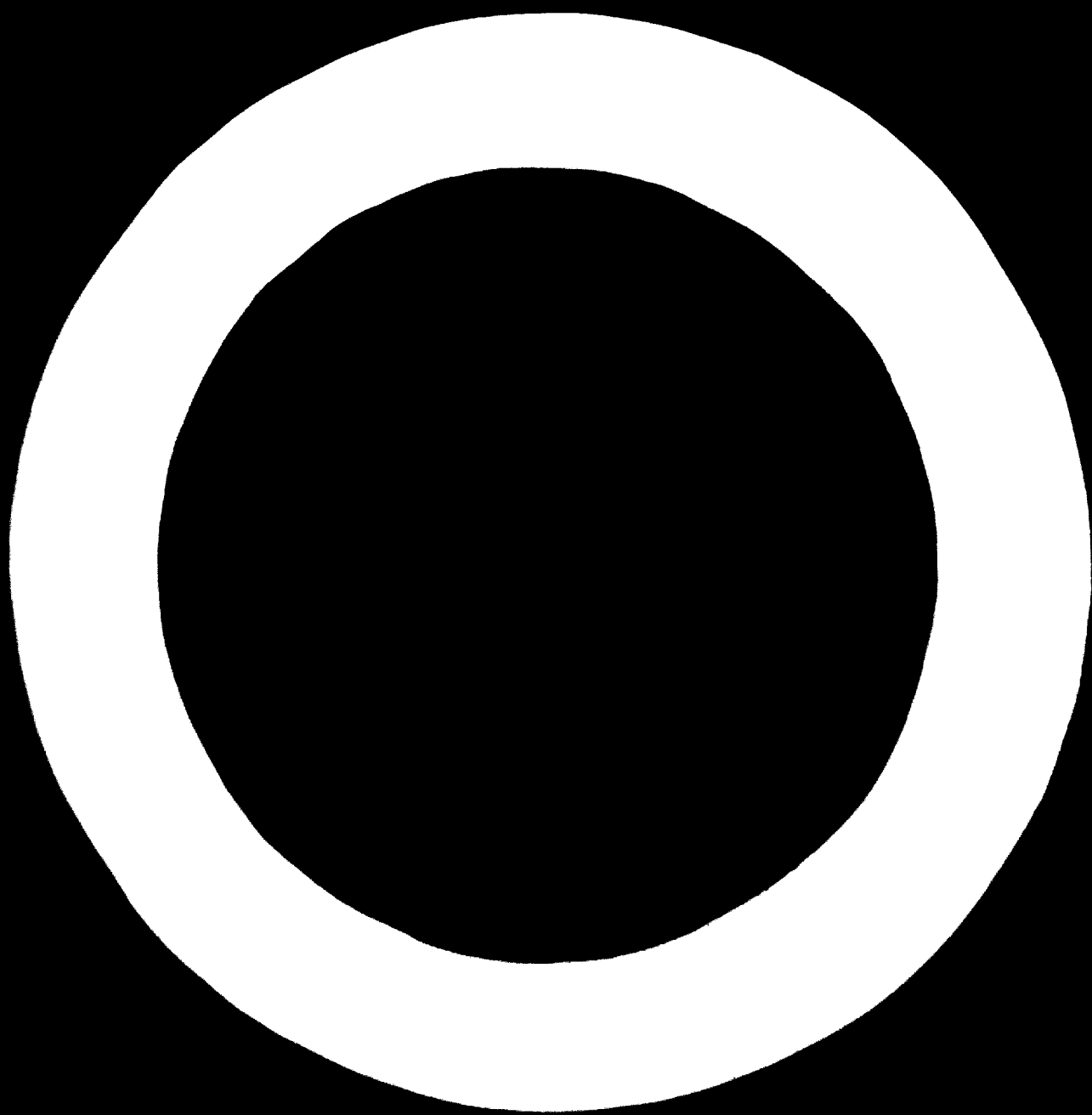
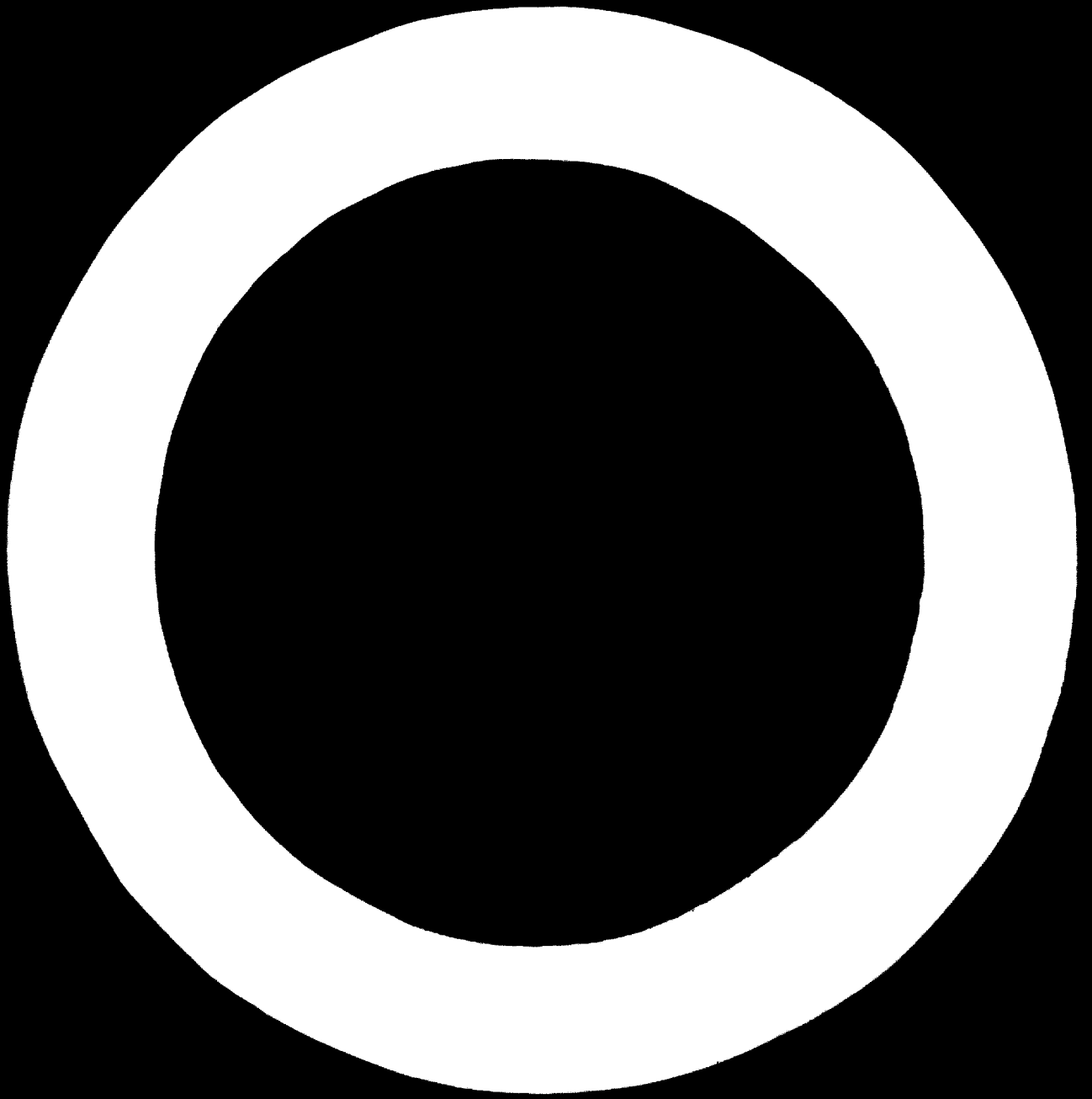


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CHAPTER 1

INTRODUCTION

One of the phenomena associated with industrial development is the growing importance of packaging in the production and marketing of commodities.

Packaging has long been regarded only as part of the production process; an unavoidable nuisance which adds to the cost of production. Today technology shows the way to greater productivity and packaging is transforming into a marketing function, becoming involved in the production, protection, transportation, distribution, advertising and selling of the product. In this complex, packaging has a part to play in every stage.

Development of packaging industry is accelerating, and revolutionary changes in package materials, the containers made from those materials, and the equipment used to form, fill and close them, are being closely scrutinised.

Safe delivery of a well-protected product which can meet heavy sales competition demands scientifically-produced packaging which is economical, attractive and has true durability. To achieve the high standards required today, detailed knowledge of the principles of packaging and their application to an ever-widening range of machinery and materials, is needed.

Packaging has become big business and, in a sophisticated supermarket age, very heavy capital expenditure may be necessary to ensure that products reach the consumer in perfect condition and with maximum economy. There are no accurate statistics available from official, or any other sources, concerning the output of the industry as a whole. Detailed statistics on some sections of the industry are available, but in many cases they are not as reliable as information existing on more clearly defined industries. In some sectors, the only quantitative measurement

of output available is the amount of raw material consumed, which ignores improvements achieved in the yield from these raw materials.

It has been estimated, however, that in 1969 the turnover of the packaging industry reached the sum of U.S. \$60,000 million and at the present rate, this will double by 1980.

Packaging plays a significant role in the process of industrialization of developing countries: it helps in the struggle against hunger and diseases by protecting food against spoilage and contamination; rationalizes production; economizes distribution; and stimulates exports. Appreciating the importance of packaging for the industrial development of these developing countries, UNIDO has incorporated this field in the scope of its activities.

CHAPTER 2

MAIN FIELDS FOR TECHNICAL ASSISTANCE IN PACKAGING

For the purpose of the United Nations technical assistance programme, the following fields can be identified in the general sector of packaging:

1. Packaging planning and development;
2. Packaging materials;
3. Packaging containers;
4. Accessories for packaging;
5. Mechanisation of packaging processes;
6. Packaging institutions and services.

A more detailed breakdown of the main headings is given in Attachment 1.^{1/}

Packaging Planning and Development

The manufacturer or distributor who wishes to create and develop effective packaging must devote the same considerations to packaging as to any other function within his enterprise. In other words, the packaging function must have organisation, skills, facilities and directions. The company that packs goods for distribution and sales must handle the whole problem of packaging, while a supplier of packaging materials or a packaging service, for instance, need be concerned only with one contributing factor or part.

The first primary requirement is to manage the packaging function. Small companies, or those with a very short product life, or those who pack industrial products only, often stop right there.

A packaging manager is appointed, who, as an individual, has learned or can learn the necessary skills. If he is given little decision-making power, naturally his role is limited, his function then is basically that of a packaging coordinator, proposing actions for others to take and

^{1/} Attachment 1 appears at the end of this document.

recommending solutions to given problems. On the other hand, if his responsibilities are broader, he must plan and direct activities, make conclusions and approve designs and specifications; then he is not so much a manager as the head of a large department.

In a large company, or one with many product lines, the packaging organization tends to be more complex, even though the basic nature of the function is not different from that of a small company.

Packaging is a unique profession in that it calls for a very diverse set of skills: management, marketing, design engineering and laboratory sciences, with a sensitivity for economics, legal matters and broad social issues. These requirements make it immediately clear that effective packaging depends on a team effort.

In order for a packaging function to be in control of its operation, a company should be able to plan its programs at least two years ahead. Each project must go through several steps. Definition of objectives, identification of possible packaging concepts, designing and models, tentative specifications, cost estimates and timetables, sample tooling and sample fabrication, sample evaluation approvals and clearances, final specifications and production tooling, quality control programme development, production start-up assistance and technical service are all part of this process. And the materials' supply aspect should also be taken into account.

The company wishing to develop packaging techniques effective in all their diverse functions has both a business opportunity and a management challenge.

Packaging Materials and Containers

Packaging is a major consumer of certain materials. In highly industrialized countries, it uses about 50% of the paper and paperboard production, approximately 20% of aluminium foil, almost all production of cellophane, over 90% of glass (excluding flat glass), approximately 20% of plastic resins, and is one of the major consumers of steel.

Except for plastics, the relative positions of the various materials in packaging have not changed significantly during recent years.

Currently, plastics are contributing to a number of the most promising developments in packaging, including shrink wrapping, multipacks, thermoformed packages and components, plastics bottles, foamed trays and, cushioning materials, and film pouches for liquids. Plastics are growing because of their technical superiority, consumer appeal, manifold uses and applications and increasingly attractive economics.

There is also a growing demand for "complex" packaging materials made by lamination or coating of different conventional materials, for example, aluminium foil/polyethylene, paper/aluminium foil, jute/polyethylene, or cellophane/polyester. These materials are notable for their improved technical characteristics. Cheap materials can be upgraded technically and visually by combining them with expensive materials. Gradually traditional packaging materials like wood, paper, jute, are being replaced by newer ones, more adapted to the changing demands of converters, transporters and consumers.

Packaging containers made out of these materials should not only protect the product, but also sell it and help the consumer in its usage. They are being improved functionally, while their surface decoration is being studied with taste as well as scientifically, in order that they meet more effectively the varied and often conflicting requirements of the packer, distributor and the ultimate consumer.

The production of packages is becoming more and more automated to reduce the cost factor, and outputs of the machines are increasing. Consequently, the manufacturing processes need highly qualified personnel and modern labour organization.

The packaging industry is waging a constant battle against its own rising costs, and there is intensive competition among the various types of containers for the same purpose.

Plastics crates are gradually eliminating wood and metal ones in transport of bottled products; blow-moulded plastics bottles replace glass containers being traditionally used for milk, oils, soft drinks, etc. The higher initial cost of plastic containers is compensated for, in internal use, by their longer life and the fact that they require no repair. The manufacture of moulded plastic containers, however, requires considerable investment and little labour and the cost of the raw material is high.

When a careful study has been made of the economic factors, technical factors and of the competing materials, it is possible to forecast the general line of development of the main types of transport packages in relation to the development of the standard living of a country.

It must be kept in mind that the orientation of production towards industry or agriculture, and orientation towards the internal market or the export market, will have a considerable influence on the nature of packaging development. The following seven stages of development have been identified:

First stage: In a developing country with a comparatively low standard of living, reusable sawn wood cases and baskets made of wicker or other woven materials account for most of the containers used for transport.

Second stage: As the standard of living rises and the consumption and export of agricultural goods increases, strong, reusable light cases begin to be used. Palletisation is introduced, but sawn wood cases continue to be widely used for industrial products.

Third stage: Wired cases and cardboard boxes are used in the domestic market; while plywood packing cases are used for export. The use of pallets is extended, and sawn wood cases gradually begin to lose their importance.

Fourth stage: One-way packing cases begin to gain a foothold on the domestic market, and cardboard boxes take over the market for industrial goods and begin to be used experimentally for export, although export cases are still essentially wooden, particularly plywood cases and wired cases. Agricultural products continue to be transported in light wooden cases, but these are considerably lightened. While such cases are still reusable, they can be used for only a few journeys and only for one long-distance transport, with subsequent use for short distances. Sophisticated wrapping materials such as plastics, paper, and compound materials make their appearance, and because of this the percentage of wooden cases used diminishes considerably.

Fifth stage: One-way cases for transport come into general use and cardboard boxes take over almost the entire market for transporting industrial products and common foodstuffs; however, they share this market with plastic packaging made from shrinkable plastics or expanded polystyrene. Some wood cases are no longer mass-produced, but are used only for made-to-measure packages. By this time plywood cases have come into extensive use for the export of industrial products, together with wired cases, which are also used for the transport of perishable goods. Light wooden cases are lightened still further and dominate the market for the transport of perishable goods. Palletisation becomes general, and containers made of plastics replace those made of wood for internal handling operations.

Sixth stage: Having reached a high standard of living, the country makes the final transition from reusable packing cases for transport to one-way cases. Paper and cardboard account for half the total value of packing containers, metal for 20 per cent, and plastics, glass and wood for 10 per cent each.

The use of some wood cases diminishes still further the use of plywood, and wired cases probably reach a ceiling because of the improvement in the quality of cardboard cases.

Light wooden cases lose some of their markets (fish and poultry) to plastic and cardboard, which also begin to make considerable inroads for transporting fruit and vegetables.

Palletization is developing considerably, and the production of pallets makes up for some of the losses of other outlets suffered by the wood industry.

One-way pallets, which come into general use for export, make their appearance on the domestic market.

Seventh stage: Shipping containers make their appearance on the domestic market and one-way cases are almost the general rule for transport. The wooden case industry loses still more outlets and accounts for only about five per cent of the total value of the packaging industry. Wood is used only for making made-to-measure cases for certain industrial products (especially heavy machines) and for transporting certain fruits and vegetables. Wood continues to dominate the market for pallets, however, even if some one-way pallets are made of other materials.

The above analysis may serve as a sample of what kind of considerations should be applied for planning the production and use of packaging materials and containers.

Accessories for packaging

More emphasis than ever is being placed on the role of auxiliary materials such as cushionings, adhesives, tapes, closures, etc., and the contribution they make to the use of new materials and constructions.

Mechanical hazards occurring during the transportation and handling of packed goods can be substantially reduced by the proper use of cushioning materials, i.e., plastic foams, moulded pulp, bonded hair, etc.

Adhesives enter almost every section of packaging industry and are a specialized facet of the chemicals and plastics industry. Modern adhesive is a scientific product, matched to the operational requirement and which, when used scientifically, leads to increased productivity. Major adhesive development in recent years represent hot melts and synthetic resin emulsion adhesives, and these are superseding the

traditional dextrans and starch-based adhesives which are often incapable of bonding modern materials. It is through its scientific approach to packaging, that the adhesives industry is making a continuous contribution towards improving the quality of the finished pack, reducing costs and facilitating the introduction of new packaging materials.

Tapes are becoming an inevitable element of packaging technology. They are made of different materials, such as cellophane, polyethylene, paper or textiles, coated with adhesives. Application of tapes results in rationalisation of package construction and packing techniques. They are no longer used merely to label, bundle and seal. New tapes must be versatile enough to serve as handles, to be air tight, yet easy to open, to reinforce and cushion and to stick to all varieties of packaging materials. Pressure-sensitive tapes are the most frequently used. Hundreds of varieties are available for labelling, decorating, combining, reinforcing, protecting, unitising and palletising. They perform effectively on bags, boxes, cartons, bottles, cans, tubes and many other containers.

There is available specially designed dispersive equipment which can be smoothly blended into conveying lines, thus becoming an integral part of a plant's operation.

The modern trend to convenience packaging is bringing continuous change in what is one of the largest and most important aspects of packaging - the closing and sealing of containers and providing means for their easy opening and reclosure. Effective closure must fulfill the following requirements: a) the seal has to prevent the contents from escaping and allows no outside substances to enter the container, and b) the user must be able to open the seal easily - and then reclose the container often during product use. The many solutions to this problem for low-cost, mass production containers are remarkable, considering the variety of products packed in glass, metal, plastics and paper-board containers. Most closures now are made of metal or plastic, though cork, paper and rubber also have important uses.

Mechanization of packaging processes

In the course of some decades, packaging of goods has evolved from the manual stage through a period of partial mechanization to become a mainly mechanized process.

The continually increasing competition in world markets has resulted in manufacturing industry recognising that packaging must today be treated as part of the production process. Efficiency has become the keynote for packaging operations.

The need for optimum efficiency has provided the impetus for many recent developments in packaging machinery and methods. With the increasing cost of labour, the mechanization of packaging processes is paying huge dividends. In many cases, apparently expensive plant has paid for itself within a year of purchase.

Today high speed machines are available for filling all types of product, from powders to liquids, into a wide range of containers. High rates of output can be obtained from 'form-fill-seal' machines, which, as their name implies, automatically form, fill and seal flexible packages.

Other machines erect, fill and close cartons also at speed, and weighers and check weighers capable of the highest degree of accuracy keep product 'give-away' to the minimum, while providing safety from infringement of weights and measures legislation.

In addition, there are capping, labelling, batching, counting, collating, carton-sealing and case-making machines.

In recent years, fast expansion has been reported, particularly in the fields of can-loading and sealing, shrink-wrapping, thermoforming, plastic bottle-making and labelling.

Saving of labour is still a prime factor upon which also the development of the first mechanical packaging devices has been based. Connected with labour saving there is nearly always a saving of floor space, and this usually is appreciated in view of improved routing by linking production processes, packaging operations and shipping. In addition, the use of packaging machinery offers better possibilities of control from a hygienic point of view in food factories, as well as improved contamination control in other industries. There is also less dependency on human labour, and as a matter of fact, using machinery will be a must in areas where there is a tight labour market.

It does not necessarily mean, however, that this approach will be always acceptable to the developing countries. In fact, the approach may be much different in case to case. Though highly efficient mechanical packing systems can be most worthwhile from an investment point of view, it also may have certain disadvantages, especially when the different circumstances in a given country are taken into account. Although mechanization will save unskilled labour, it can require some skilled labour and it often may be found easier to attract unskilled people than it is to find just one or two highly-skilled packaging specialists. Moreover, mechanical packaging can involve more expensive packaging materials and it can result in damaged products. The output of the machines should be also carefully considered according to the market's demand.

Packaging institutions and services

In every industrial sector there are development centres whose primary role is to catalize technical and economic processes of that sector.

For the packaging sector this role is played in most cases by packaging centres and institutes.

All branches of national economy whose functions include the manufacture and distribution of goods are interested in the increase of the production of packaging media. Diversified needs for packaging and various factors which determine these needs, call for an integrated approach to packaging problems.

The absence of a separate packaging industrial branch on the one hand and the dynamic development of new packaging materials and techniques on the other, necessitate co-ordination of packaging activities on the national scale, based on long-term forecasts of social needs, expansion of different economy sectors as industry, commerce, communication and services. This co-ordination shall result in the creation of favourable conditions for the uniform and proportional development of the production of packaging media, as well as in providing package makers and users with the independent expertise based on scientific and research work and up to date information on the new achievements elsewhere.

To fulfil its tasks, a packaging centre should provide a common platform to all interested in packaging, including manufacturers and users of packaging media, advertisers and carriers, governmental and research institutions, etc.

The following main activities of a packaging centre can be identified:

- planning and economic research
- research and testing
- standardisation
- training
- information and documentation
- promotion

The organisational structure and the emphasis put on each of the above activities differ according to the specificity of a given country.

One feature is however common to every packaging centre: it is a indispensable instrument for the development of the packaging sector, providing to all concerned valuable technical expertise and promotional services.

Only through the establishment of such institutions, can developing countries become gradually self-supporting in the field of packaging.

CHAPTER 3

UNIDO'S ACTIVITIES IN THE FIELD OF PACKAGING

UNIDO started technical assistance in packaging in 1969, following recommendations of the Third Session of the Industrial Development Board.

There are two main forms of UNIDO's activities in this field:

- a) Operational
- b) Supporting

Operational activities involve direct assistance to developing countries and include:

- exploratory missions, geared to survey the industrial branches which are manufacturers and users of packaging media, investigate the existing packaging operations, and quality of packages and materials used. In the light of the above, specific objectives for UNIDO's technical assistance are identified. Usually a team of experts is involved in this type of activity;
- short term assignments of experts to advise the government of a country on specific problems concerning packaging;
- long term projects, aiming at establishment of research and development institutions, industrial estates, pilot plants, etc.

This usually involves assistance in carrying out feasibility pre-investment studies, offering experts and fellowships and financing necessary equipment. These types of "institutional" projects are normally developed over a period of several years and at a cost of several hundred thousand dollars.

Supporting activities are arranged with a view to providing means for acceleration of the flow of technical know-how and skills in the field of packaging from industrialized countries to developing countries.

They are in the form of:

- international meetings, (seminars, workshops, symposia, expert group meetings) to permit an exchange of views on various issues and problems connected with packaging development;

- in-plant training programmes, at which professionals from developing countries are given practical training on a selected subject.
- United Nations fellowships offered to developing countries to upgrade the skill of their packaging specialists in the industrial enterprises of developed countries.

UNIDO provides technical assistance to both packaging manufacturers and packaging users.

Packaging manufacturers in developing countries need to improve production technology, quality control and product design. Packaging users seek new and more efficient packing systems adapted to its particular commodities and markets. Both the manufacturers and the users need guidelines for future development.

Thus the conceived programme of technical assistance in packaging allows urgent requests for help with specific items to be fulfilled. At the same time, it allows countries to build up their own means to develop and co-ordinate their packaging industry. In this context, new forms of technical assistance are now being considered which place special emphasis on an integrated approach to the development of the packaging industry, considering its relationship with the other sectors of the economy.

Through the exploratory missions and other actions undertaken by UNIDO in the last two years, over 60 projects have been identified. Out of this figure, 20 requests were officially submitted to UNIDO, 5 have been already completed and 5 are in the course of implementation. They are principally concerned with the improvement of packaging systems for food and industrial products and establishing or expanding the activities of national packaging institutions.

Among the active field projects it is worthwhile to mention the following:

- Techno-economic and marketing study of packaging and distribution of dates, requested by the Government of Iraq.

Dates are the second most important Iraqi produce (after petroleum). Annual production of this fruit amounts to 350,000 tons of which 250,000 tons are exported.

In connexion with the increasing competition on the foreign markets, as well as growing local market demands for suitably packed dates, there is an urgent need for the improvement of packaging and distribution of this produce. For that purpose many different aspects such as technology, design, equipment, mode of transport, climate, etc., will have to be considered.

Under this project, a team of three experts left for Baghdad to find the solution to this complex problem.

Modernisation of packaging and distribution of dates will enable the Government to clear away the main stumbling block to their expansion to foreign markets, and will improve the sanitary conditions by which dates are sold on the local market.

- Improvement of production of plastics bags and wrappings in Bulgaria

Rapid development of the plastics industry made a variety of new packaging materials available, successfully replacing the conventional ones, especially paper-based materials.

In their efforts to introduce new, more efficient packages, the Government of Bulgaria requested UNIDO expertise for selecting the most suitable types of plastics films to be manufactured

locally as well as for production technology, and design and application of bags and wrappings made of these materials.

The project was implemented in the first half of 1971.

Expert's recommendations will serve the Bulgarian plastics industry as a basis for the proper investment decisions in this field, will help the Bulgarian Institute of Packaging in establishing modern research and testing unit for plastics films, and will give guidance for local designers regarding construction and proper use of the plastics bags and wrappings. Substantial savings are expected through the substitution of expensive and deficient paper based materials by the plastic ones.

- Establishment of a National Packaging Centre in Thailand

One of the characteristic attributes of national economies in developing countries is the growing importance of the packaging industry. This very resilient industrial sector is extremely diversified and needs systematic assistance in developing and modernizing its production processes and packing techniques. Development of standardization, education and techno-economic information activities is also necessary.

In the light of the above Thailand industrial and economic authorities are considering the possibility of establishing a National Packaging Centre, and are awaiting recommendations. They requested UNIDO's assistance in elaborating terms of reference, organisational structure, specification of testing equipment, etc.

- Programme for development of the packaging industry in Tunisia

In order to improve the quality and presentation of locally manufactured goods the Tunisian Government intends to develop the packaging industry and modernise packaging technology. For this purpose the Government requests UNIDO's assistance in working out a programme for the development of the Tunisian packaging industry.

A team of three experts will be sent to the country and will be assigned to the Ministry of National Economy to investigate the present situation and future needs in packaging and to select branches for further development.

The experts will be expected to:

- a. survey the industrial branches which are consumers of packaging media and assess their current and future needs for packaging materials and containers;
- b. investigate the existing packaging manufacturing processes and assess the possibilities of their modernisation;
- c. analyse the type and quality of packaging materials required by the home and foreign markets.
- d. in the light of the above, to recommend a complex programme for development of these branches of the packaging industry which appear technically and economically justified.

- Expansion of the research and training activities of the Indian Institute of Packaging

Realizing the important role of packaging, the industries of India together with the Central Government established the Indian Institute of Packaging in 1966 with the objective of improving the packaging technology in the country. The

Institute was expected to achieve this objective through the offer of applied research training and technical consultancy service to the industry. This will be achieved through substantial expansion of research and testing as well as training facilities available in the Indian Packaging Institute with the assistance of UNIDO.

In the framework of this project the Institute will receive UN Experts and Fellowships amounting to 180 man months and will be furnished with modern package testing and training equipment for the amount of over US\$ 270,000.

It is expected that this project will enable the Indian Institute of Packaging to offer full-scale services to the local packaging industry for the improvement of packaging media production, modernisation of packaging methods (especially for export goods), and bring the Indian packaging standard in line with international levels. This will have a substantial influence on export growth as well as on better preservation and protection of locally produced foodstuffs thus reducing food loss.

Other field projects concern application of paper and cardboard in packaging, packaging of furniture, food packaging, establishment of quality control and promotion activities, improvement of packaging for export, etc.

The themes of these projects define the main areas of the requested technical assistance, which are: survey of packaging industry sector and recommendations for its development; improvement of a specific packaging manufacturing process or packing system for a given product; establishment of national packaging research and promotion centres.

Among supporting activities, special emphasis should be put to the In-plant Training Programme in Packaging for the Spanish speaking participants to be arranged with the support of the Government of Spain in Madrid in 1972. The purpose of this project is to train specialists from the Spanish speaking countries in the modern technologies of packaging for different export goods, where each participant would have an opportunity to study the specific problems in which he has a practical interest. The programme will include theoretical lectures, practical work in packaging laboratories and factories, study tours to plants in the host and neighbouring countries, as well as training and practice on specific subjects. About 20 participants will be trained for a period of three months.

Other in-plant training programmes, as well as seminars and symposia on different packaging problems, are planned for 1972 and 1973.

In considering long-range perspectives for UNIDO's technical assistance in the field of packaging, it is anticipated that the following main factors will govern these activities:

- increasing output of manufactured goods;
- changes in the distribution systems towards self-service, pre-selection, etc.
- further mechanisation and acceleration of transportation;
- consumer's convenience in opening the package and using the product.

Consequently, new, more sophisticated packaging materials and techniques will have to be developed and further progress in the automation of packaging processes and package design will have to match growing consumers' requirements. In addition, developing countries will have to become more and more self-sufficient in dealing with packaging problems.

The above gives some indications as to UNIDO's future programme in the field of packaging:

1. Provide more technical assistance for setting up and improving existing local industries in manufacturing packaging materials and containers;
2. Provide help in establishing local research and development centres and in training of packaging specialists;
3. Provide additional assistance in processing and dissemination of information on a national and regional basis;
4. Provide additional assistance in choosing and adapting modern packaging systems inter alia by setting up demonstration plants;
5. Convene international meetings for the purpose of discussing the guidelines for development of selected packaging sections;
6. Organise management clinics at the company level to aid local packaging manufacturers and users.

The attached sample Job Descriptions^{1/} are designed to cover possibly the whole general packaging sector and to help developing countries in identifying their needs and formulating requests for UNIDO's technical assistance.

^{1/} Attachment 2 appears at the end of this document

ATTACHMENT 1

CLASSIFICATION OF AREAS FOR TECHNICAL ASSISTANCE
IN PACKAGING

I.

PACKAGE PLANNING AND DEVELOPMENT

1. Packaging management on enterprise level
 - (a) Co-ordination of packaging function among different departments;
 - (b) Identification of tasks and distribution of work;
 - (c) Appraisal of designs and specifications.
2. Planning long-term packaging programme for an enterprise
 - (a) Definition of objectives through marketing and economic research;
 - (b) Identification of possible packaging concepts.
3. Package design
 - (a) Preparation of designs and models;
 - (b) Elaboration of specifications;
 - (c) Sample tooling and fabrication;
 - (d) Evaluation approvals and clearance.
4. Application of new package
 - (a) Set up of new packing line;
 - (b) Development of quality control programme.
5. Materials supply
 - (a) Forecast of demand for packaging materials;
 - (b) Supply sources;
 - (c) Quality control.

II

PACKAGING MATERIALS

- (a) Wood
- (b) Paper and Board
- (c) Plastics, rubbers and other polymers
- (d) Laminates
- (e) Glass and ceramics
- (f) Metals (including foils)
- (g) Textiles

III

PACKAGING CONTAINERS

1. Retail Unit Containers

- (a) Flexible packaging **
- (b) Metal cans and boxes
- (c) Collapsible metal tubes
- (d) Folding and rigid paperboard boxes
- (e) Canisters and composite containers
- (f) Moulded pulp containers
- (g) Moulded plastics containers
- (h) Glass and ceramic containers
- (i) Aerosol containers

- ** (i) Bags and sachets
- (ii) Wrappings
- (iii) Blister and skin packaging
- (iv) Shrink packaging
- (v) Vacuum and gas packaging

2. Transport Containers

- (a) Wooden containers
- (b) Metal containers
- (c) Fibreboard containers
- (d) Sacks
- (e) Plastics and rubber containers
(other than plastic sacks)
- (f) Bales

IV

ACCESSORIES FOR PACKAGING

(a) Cushioning Materials

Cork, cellulose, moulded pulp, foams, bonded hair, etc.

(b) Reinforcement Materials

Wires, straps, stitches

(c) Adhesives, waxes and coatings

(d) Sealing tapes

(e) Closures and valves

V

MECHANIZATION OF PACKING PROCESSES

- (a) Planning packing operations and equipment
- (b) Packing processes and machinery
 - (i) Organization of packing lines
 - (ii) Counting
 - (iii) Weighing
 - (iv) Erecting (forming) packs
 - (v) Filling (loading)
 - (vi) Closing
 - (vii) Fastening the contents inside the package
 - (viii) Labelling (printing)
 - (ix) Wrapping and bundling
 - (x) Collating
- (c) Adaptation and design of packaging machinery

VI

PACKAGING INSTITUTIONS AND SERVICES

- (a) Research
- (b) Testing
- (c) Consultancy
- (d) Information and documentation
- (e) Training
- (f) Promotion
- (g) Industrial associations

ATTACHMENT 2

- 29 -

UNITED NATIONS

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO

JOB DESCRIPTION (General)

UNIDO/PCKG/GEN.1 *

POST TITLE Programme for development of the packaging industry

DURATION One to four months

DATE REQUIRED 1972/1974

DUTY STATION A developing country with possibility of travel within the country

DUTIES A team of experts will be sent to a developing country and will investigate the present situation and future needs in packaging and to recommend branches for further development.

The experts will be expected to:

- a. survey the industrial branches which are consumers of packaging media and assess their current and future needs for packaging materials and containers;
- b. investigate the existing packaging manufacturing processes and assess the possibilities of their modernisation;
- c. analyse the type and quality of packaging materials required by the home and foreign markets;
- d. in the light of the above, to recommend a complex programme for development of those branches of the packaging industry which appear technically and economically justified, and
- e. recommend any other technical assistance measures needed in the above field.

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PLEASE SUBMIT CANDIDATES AS SOON AS POSSIBLE

Personnel Services, UNIDO, P.O. Box 707, A-1010 Vienna, Austria

QUALIFICATIONS

Packaging technologists and/or industrial economists with ample experience in manufacture and use of packaging media for industrial and food products, as well as in carrying out industrial surveys. Knowledge of marketing essential.

LANGUAGE

English, French and/or Spanish, depending on the country.

**BACKGROUND
INFORMATION**

The increase in agricultural and industrial production, especially in such branches as canned foods, detergents, confectionery and chemicals, results in a growing demand for adequate packaging to protect the product and withstand foreign market competition. Most of these materials are imported in their original form, as well as ready-made packages.

Modern packaging technology makes more and more use of sophisticated materials, as well as package constructions adapted to mechanized packaging methods.

On the other hand, sales promotion functions of packaging should be developed, especially in view of growing competition from foreign markets. Modernization of the packaging industry can only be effective when based on a carefully prepared programme, which would take into account:

- a. consumption growth of the packed goods;
- b. new trends in packaging technology;
- c. development of research and testing.

Being aware of the importance of packaging for the economic development of developing countries, and following requests from many developing countries for technical assistance for improving their packaging techniques, UNIDO has launched a world-wide programme in this field. The necessary technical assistance plans are already formulated for some countries and it is expected that these will be extended to many other countries.

UNITED NATIONS

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO

JOB DESCRIPTION (General)

UNIDO/PCKG/CFN.2 *

POST TITLE Establishment of Packaging Research and Promotion Centre

DURATION Two to Five years

DATE REQUIRED 1972/1974

DUTY STATION A developing country with possibility of travel within the country

DUTIES In order to provide a developing country with an instrument of development and promotion of packaging science and techniques, establishment of a packaging centre is considered.

The centre should aim at taking all measures to develop the modern packaging production and to introduce the new packing materials and techniques. To achieve this, it must be active in packaging promotion, advise on packaging design, standards and planning, render consultative services to industry and commerce, and serve as technical literature documentation centre. In order to do this, it may have the following departments:

a. Packaging Promotion Department with the following scope of activities:

- consultative and advisory services to industry and commerce on the subject of recent developments in equipment, technology and materials used in the production of packaging containers and in the packing systems, as well as on packaging design;

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DUTIES (cont.)

- analysis of the packaging methods actually used in different industrial enterprises and working out the recommendations regarding their improvement and modernization;
 - gathering, compiling and dissemination of technical and economic information in forms of periodically-issued abstracts, bulletins and newsletters;
 - carrying out of market surveys concerning packaging requirements for specific products;
 - initiation and organization of lectures, seminars and other forms of packaging education;
 - organization of periodic exhibitions and competitions.
- b. Packaging Research and Testing Department in charge of:
- testing of packaging materials;
 - testing and development of retail and transport packages;
 - development of testing methods and instruments;
 - carrying out applied research in the field of packaging;
 - expertise and arbitration services to the industry.
- c. Packaging Standardization and Quality Control Department responsible for:
- elaboration of packaging standards;
 - elaboration of packaging requirements for exported goods;
 - assessment of quality of packaging materials and containers;
 - delivering of "quality" labels for manufactured packaging. In introducing such a quality mark, conforming with international rules, and controlling its use by the local producers, the Centre would contribute to export promotion and make it possible to obtain substantial railway freight discounts abroad.
 - establishment of a quality control system (especially for export packaging) and the training of inspectors in this respect.
- d. Packaging Economics Department whose functions should be the following:
- planning of the country's package and packaging materials demand in the light of the state investments and imports policy;

DUTIES (cont.)

- evaluation of packaging costs as part of the overall production cost and improvement of costing methods.
- examination of packaging economy in various currently used retail and shipping containers and substitution possibilities;
- collection and analysis of statistical data.

QUALIFICATION

Packaging technologist or industrial economist with ample practical experience in managing a packaging centre

LANGUAGE

English, French and/or Spanish, depending on the country

**BACKGROUND
INFORMATION**

The proper growth of the industrial production and exports in any country is conditioned by the development of packaging. Packaging enters into almost all types of products that are distributed to the public or need protection during transport; it also makes products competitive on the foreign markets.

The Packaging Centre establishment should be considered by a developing country in order to:

- a. achieve the fullest utilisation of its own packaging materials resources and packaging industry capabilities;
- b. co-ordinate packaging production and imports with the growing demands for packaging materials and containers;
- c. provide the systematic quality control in packaging production, thus contributing to increase the exports of commodities;
- d. improve the existing technologies by applied research activities;
- e. ensure the constant inflow of packaging knowledge to packers and pack producers.

This Centre would serve as a focal point for packaging users and manufacturers and would help to improve the existing technologies and systems, as well as to introduce new ones. The Centre would also serve in the diffusion of technical know-how through organising training courses, exhibitions and competitions, in the compilation and distribution of technical documentation, in the elaboration of packaging standards, and in the carrying out of quality control testing of packages and packaging materials. Once established, the impact of such a centre would be felt on this whole sector of industry and would help upgrade packaging to the level of international standards. Assistance would also be given to exporters through market surveys.

**BACKGROUND
INFORMATION
(cont.)**

Being aware of the importance of packaging for the economic development of developing countries, and following requests from many developing countries for technical assistance for improving their packaging techniques, UNIDO has launched a world-wide programme in this field. The necessary technical assistance plans are already formulated for some countries and it is expected that these will be extended to many other countries.

**PROJECT
COMPONENTS**

a. UNDP contributions:

- imported equipment;
- foreign experts;
- UN fellowships.

b. Country contributions:

- land, buildings, furniture;
- local staff, training and other administrative expenses;
- indigenous equipment.

UNITED NATIONS

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO

JOB DESCRIPTION (General)

UNIDO/PCKU/GEN.3 *

POST TITLE Assistance in setting up (or improving) the production of packaging material and/or containers

DURATION Two to four months

DATE REQUIRED 1972/1974

DUTY STATION A developing country with possibility of travel within the country

DUTIES The expert will advise on the steps to be taken by the Government to develop local production of packaging media. Specifically he will:

Variants 1: establishment of new productions:

1. study the requirements of the local industries in packaging containers;
2. advise on the establishment of a packaging pilot plant to make containers for national fruit, fish, meat and milk producers;
3. assist in the preparations of the specification for the pilot plant as well as in estimates of the expenses.

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DUTIES (cont.)

Variant 2 : improvement of existing production:

1. survey the existing equipment, production methods, and quality control in the factory;
2. recommend modifications in the technological regime, additional equipment needed for improvement of quality and enlargement of the range of products, as well as advise on the appropriate quality of imported materials;
3. make recommendations necessary for establishing a suitable quality control policy, and establish the inspection procedure for the finished products;
4. recommend the necessary training needs for the technical personnel of the plant.

QUALIFICATIONS

Engineer with extensive practical experience in establishing and running packaging plants. Knowledge of marketing essential.

LANGUAGE

English, French and/or Spanish, depending on the country

**BACKGROUND
INFORMATION**

Variant 1: establishment of new production:

The growing role of packaging, particularly in improving the marketing of locally produced goods, at home and abroad, has been recognized and appreciated by the Government. It is felt that particularly processing industries might strongly increase sales of their products through use of the appropriate packaging system and application of modern containers for preserving and dispatching goods. It seems to be useful therefore to set up, with UN technical assistance a packaging pilot plant for making packaging containers to supply processing industries after studying through contacts with the country's authorities and industrialists, the available requirements for the packaging containers. It is also expected that the expert will assist the Government in the preparation of the request for UN technical assistance to set up a packaging pilot plant for making containers and help with the estimates of the expenses to implement the project.

Variant 2: improvement of the existing production:

The growing competition on the foreign market and changing demands of local consumers call for modernization of actually manufactured packaging media, by increasing their quality and sales appeal, reducing production costs, and enlarging the assortment of packages..

**BACKGROUND
INFORMATION
(cont.)**

Being aware of the importance of packaging for the economic development of developing countries, and following requests from many developing countries for technical assistance for improving their packaging techniques, UNIDO has launched a world-wide programme in this field. The necessary technical assistance plans are already formulated for some countries and it is expected that these will be extended to many other countries.

UNITED NATIONS

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO

JOB DESCRIPTION (General)

UNIDO/PCKG/GEN.4 *

POST TITLE Improvement of packaging for an industrial or food product

DURATION One to six months

DATE REQUIRED 1972/1974

DUTY STATION A developing country with possibility of travel within the country

DUTIES The expert will be expected to advise a developing country on packaging of a product for export. Specifically the expert will:

- a. survey briefly the present status and trends in the local production of the product;
- b. examine the methods currently in use for packaging the product for export and ascertain the specific export market requirements;
- c. recommend most efficient and economical packaging materials construction, as well as packaging techniques, giving detailed technical descriptions and specifying equipment to be installed;
- d. recommend any other measures of technical assistance needed in the above field.

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QUALIFICATIONS

Packaging technologist with ample practical experience in packaging of that product. Familiarity with marketing essential.

LANGUAGE

English, French and/or Spanish, depending on the country

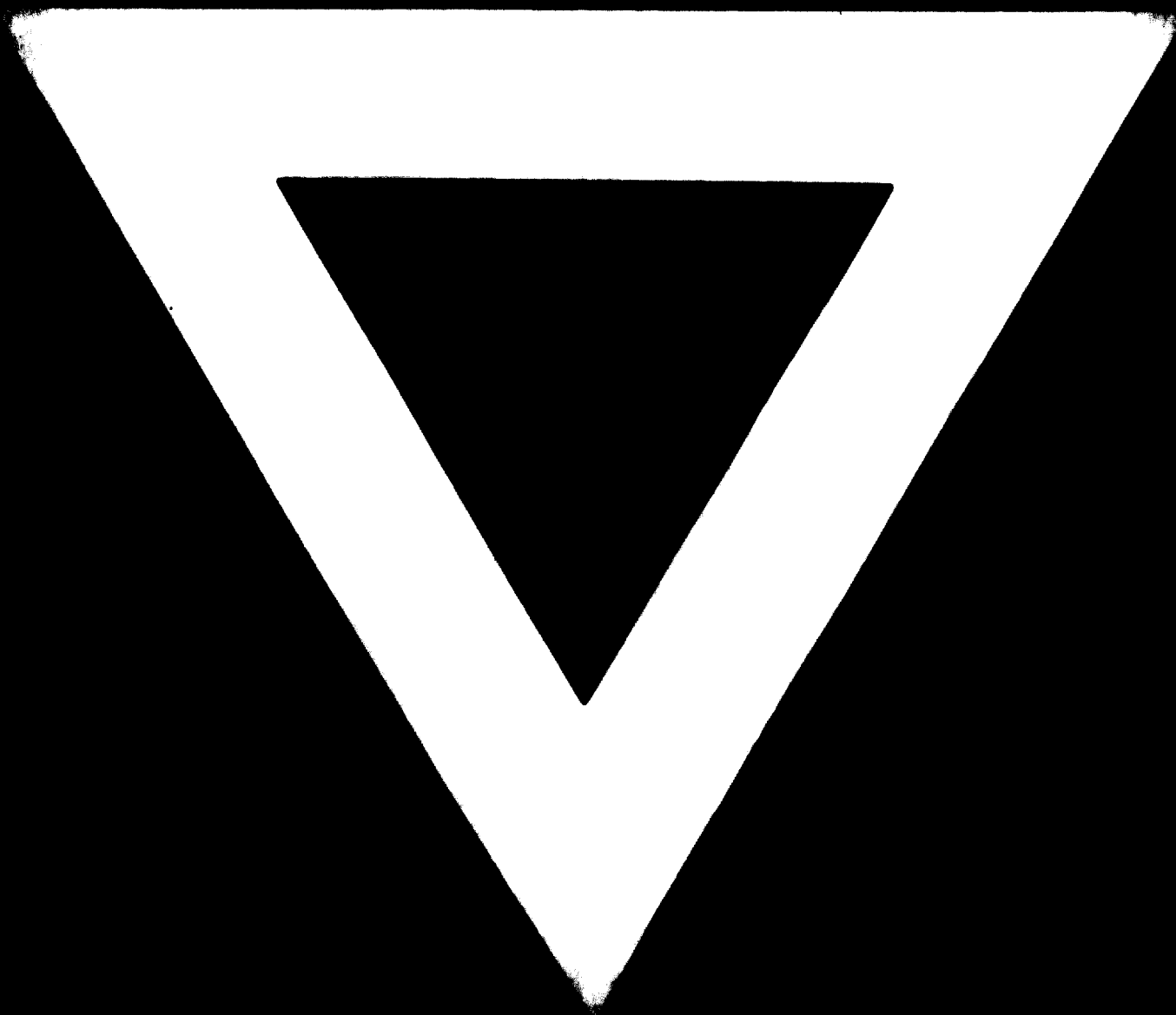
**BACKGROUND
INFORMATION**

Manufacture of the product in the country, as well as their quality, are substantially increasing. Importers show growing interest and marketing analysis of neighbouring countries indicates that there is considerable absorptive power on their markets for this commodity.

It is the intention of the country to develop export-oriented industry. The main stumbling block, however, is the inferior packaging; the cost of which considerably reduces export profitability.

Being aware of the importance of packaging for the economic development of developing countries, and following requests from many developing countries for technical assistance for improving their packaging techniques, UNIDO has launched a world-wide programme in this field. The necessary technical assistance plans are already formulated for some countries and it is expected that these will be extended to many other countries.





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