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REQUIREMENTS OF PACKAGING INDUSTRIES IN DEVELOPING COUNTRIES 1/

by

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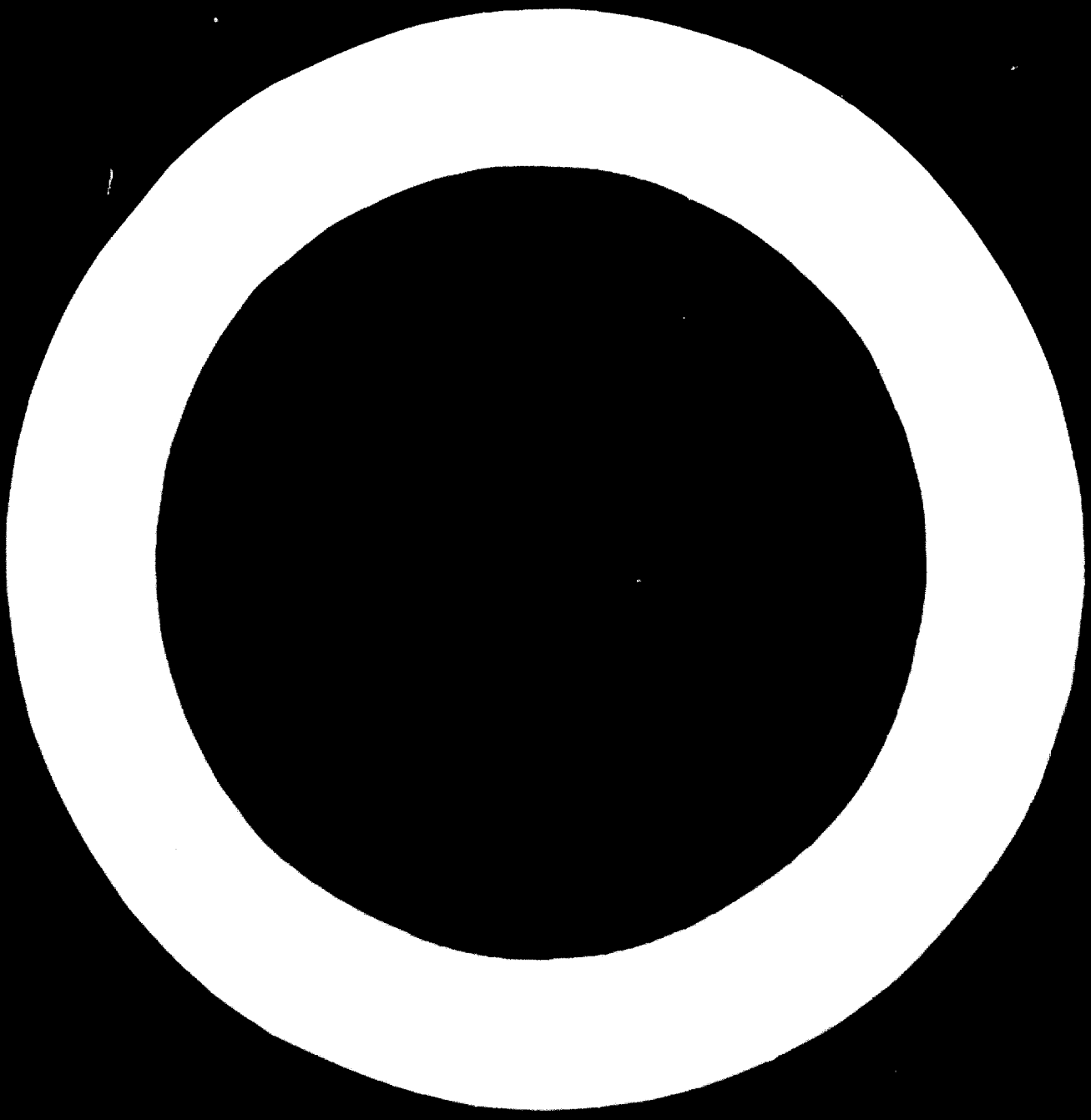


1. Introduction

This report is largely based upon the speaker's recent experiences of the Packaging Industry in North Africa, notably in Tunisia. It assembles the ideas, however, from many years of work in the Packaging Industry, in both developed and developing countries. The subject is analysed under the following headings :-

- The General Level of Packaging Industry Development
- The Resulting Requirements of the Packaging Industry
- Some ways of Meeting these Packaging Industry Requirements.

The report investigates Packaging Industries in developing countries, by industry types and by market requirements, under the above headings, as follows :-

2. The General Level of Packaging Industry Development

2.1 Standards of Packaging Materials and Equipment

In the main, the Packaging Industries in developing countries can be divided into two clear categories, those packaging industries where automatic packaging equipment is used, such as metal and glass container manufacture, and those where it is not. For the former, a degree of mechanisation is essential for viable manufacturing operations and thus much of the plant is modern and consistent with current practice in developed countries although output rates are generally less. They are, however, adequate for present market demands.

Where packaging can be produced by manual methods, for instance, in the wooden box making industry, this is often the most appropriate method in the developing country environment. Such methods give production flexibility and provide employment for the relatively cheap local labour.

Examples of most modern packaging techniques are available in the developing countries and the packaging manufacturers and users are often aware of the latest developments. Nevertheless, it is difficult for them to appreciate the practical implications of these developments or their relevance to the needs of the developing countries. In general, packaging is only imported if the quantities required for the local markets are insufficient to justify local manufacture; aerosols, for example, are normally imported at present. The scope for dramatic change in packaging manufacture is, therefore, limited and each proposal for the introduction of new packaging methods has to be carefully analysed and costed to ensure its financial viability and the real market demand for it.

Just as there are wide disparities in the type and standard of manufacturing plant, there are wide variations in the quality of packaging available. There is often a clearcut division between packs intended for export and packs for the home market. The former attempt to match the quality in the customer's country, the latter often provide minimal standards of production and presentation. In addition, within the home market, there are wide variations in packaging standards which mirror the wide variations in standards of living within these countries. Thus, there is a very small market for luxury goods, very expensively packaged; the small quantities of such packs and the permissible high price enable very laborious but high quality packaging methods to be used. For the bulk of the market, however, the minimum of packaging is used, consistent with the low purchasing power of the consumers.

2.2 Introduction of Technological Innovations

There is limited scope for technological innovations in packaging in developing countries and such innovations must be chosen very carefully to be appropriate to the economy concerned. Thus, the developing countries should not necessarily copy the Western precedent, rather they should learn from it and adapt Western processes to their own market needs. There have been too many examples of "white elephants" in the Packaging Industry and in other sectors - that is, industries which are too modern and too sophisticated for the market at which they are aimed and the country in which they are operating.

In some industries, notably glass and metal containers, the present plant is normally modern and adequate both in terms of quality and of capacity. Expansion or development of these industries involves a straight forward increase in either number or capacity of machines of the same type; there is thus no major technical change involved. Such industries are not, as a whole, in need of guidance or intervention to achieve modernization.

Some types of packaging, notably that utilising cork or jute materials are generally in a stable or declining market and, therefore, only need the gradual replacement of existing equipment rather than expansion or modernisation. In this situation, older, slower and more flexible equipment is often more appropriate than the modern alternative.

The main opportunities for technological innovations occur in relation to new types of packaging which use relatively cheap raw materials and can, therefore, be viable in the developing countries. Among these are containers made from thermoformed plastics, expanded plastic foams and moulded pulp.

2.3 Packaging Quality and Standardization

Quality, as defined for the purposes of this report, is a consistently high level of package formation, decoration and cleanliness. This is desirable in the home market, especially for food products, if the package

is to perform its functions of protecting and preserving the product. It is essential in export markets because of the more taxing distribution process and also because sales will be impaired if pack quality is inferior to normal standards in the developed countries.

From experience of developing countries, it seems that there is room for considerable improvement of packaging quality standards and methods of controlling them. In many cases the managements of the companies concerned are also unhappy with the quality produced and wish for guidance on quality control methods. In other packaging plants, quality control appears to be absent and packaging quality is erratic and often inadequate as a result.

In many countries Governments have laid down broad, nominal specifications for container sizes and capacities to achieve some rationalisation; these norms have generally been derived from European or American standards. Such standardization, where enforced, should make production more economic but it does not achieve a major objective of standardization, namely consistent quality and interchangeability. Thus, within a typical nominal standard size, there are often large variations in critical dimensions between different suppliers and countries. These variations preclude interchangeability of packaging components and are likely to impair the final pack quality.

2.4 Conflict between Home Trade and Export Needs

The packaging needs within developing countries and in their export markets will remain different for many years to come and tend to conflict in their requirements. In both cases, the needs are specific and cannot be met simply by reproducing current Western packaging designed for large and affluent markets. The objective must be to adapt packaging industries to meet these needs, not to pursue blindly the Western example.

The characteristics of packaging for the home and export markets are found to be broadly as follows :-

- Home Markets

  - the total markets available for packaging in developing countries are often insufficient to justify major plant investment,

  - the limited, but growing, market for high quality convenience packaging does not justify local manufacture if costly tooling or moulds are required. As a result, restricted importation of such packaging will continue to be necessary. Thus, high quality metal, glass and moulded plastics packaging may be restricted, whereas there will be scope for high quality paper and flexible plastics packaging,

  - much of the population of developing countries use little packaging at present and will only gradually be persuaded to purchase packaged articles, starting with low cost packaging which gives a basic minimum of protection,

  - almost all packaging materials are or can be re-used in the developing countries; low labour costs and the value of secondhand materials ensure this. There is thus little advantage in disposable packaging and the principle of package recovery can be encouraged,

  - concerning packaging, the market is uneducated and, therefore, uncritical about quality and appears to accept low standards of packaging hygiene. As education improves, better packaging quality may be demanded,

  - a declining proportion of packaging needs will continue to be met by artisanal production with little control of standards or quality.

- Export Markets

- the market for packaged goods is primarily located in the developed countries and this fact, coupled with the limited range of products normally exported, dictates export packaging standards, as follows :-

  - to sell in developed countries, high standards of presentation are needed. To achieve this it is desirable to employ Western design and marketing experts to advise on sales promotion through packaging; this is seldom the policy at present,

  - similarly, Western quality standards are not always observed. These require development of the quality control function but do not necessarily increase packaging costs,

  - exporters from developing countries seldom appreciate that packaging and distribution costs are necessarily a major proportion of the selling price of an exported product, especially if the product is fragile or perishable. The packer does not always realise that his product will only reach its market in saleable condition if it is adequately packed and that in this case the product cost may represent a small proportion of the final selling price,

  - there is resistance to packaging changes from some exporters; the frequent demands for better, cheaper, export packaging can not be met if the packers are not willing to experiment with alternative methods.

It is thus evident that there may be considerable discrepancy and therefore conflict between the packaging needs at home and for export. Such unresolved conflicts can only lead to inefficient production and the proliferation of "second-class packaging" for local markets.

2.5 Levels of Education and Training

At present, Government Education and Training Centres are concentrating, rightly, on providing good, basic technical training with a view to the long term raising of educational standards. In the meantime, however, there is relatively little education or training in specialist functions such as packaging. It is considered that this lack of training helps to explain the wide disparities in standards of packaging in the developing countries. There seems to be a tendency for manufacturers to ignore quality standards in pursuit of short term profits and for package users to disclaim responsibility for their packaging operations by blaming their pack quality, not their process.

3. The Resulting Requirements of the Packaging Industry

In view of the characteristics of the Packaging Industries in developing countries which have been itemised above, it is considered that the following are the main requirements for its future development.

3.1 Training

Education and training in packaging matters is an urgent requirement in the developing countries. Growth of the Packaging Industry in terms of output and scale of operations generates the need for increasing numbers of well trained managerial, supervisory and technical staff to manage the various business operations. In particular, it is essential that modern, often complicated processes are operated at maximum efficiency, and to meet this need, qualified managerial, supervisory and technical staff are required.

To provide this education, in a packaging context, it is desirable to have the following aids :-

- training programmes for nationals, to train technicians in the use of specific pieces of packaging equipment; to train supervisory and technical management in the principles of packaging design technology and economics; to inform Government Officials and planners responsible for taxation, subsidies and tariffs of the need, from the national stand point, of assisting the packaging industry,

- lecture courses and seminars with technical experts from the developed countries as guest speakers,

- an abstracting service for the Packaging Industry to make available to managers relevant published information on packaging processes and equipment,

- a library of reference books and technical data on packaging and packaging equipment,

- an advisory service, at national and supranational level concerning packaging developments, international packaging standards, transit hazards and methods of minimising transit damage,

- educational exhibitions of international packaging and of the best packaging available in the developing countries.

3.2 Introduction of new Technologies and Industries

As previously indicated, the scope for introducing new packaging technologies in the developing countries is heavily circumscrid. The limited markets and the limited resources of the developing countries

make many Western packaging systems irrelevant. It is, therefore, important that proposals for the introduction of new packaging in the developing countries should be carefully analysed and cost justified by packaging experts who know the market requirements.

The main characteristics necessary for successful introduction of new packaging methods into the developing countries are as follows :-

- the package produced should have a viable market, either home or export, preferably both,

- the plant should not be capital intensive and, preferably, it should be possible to build up the production in a series of small units, rather than be committed to one very large plant,

- it is desirable that the package manufacturing and using processes should employ local, relatively unskilled labour, provided that this does not over-price the resulting package,

- if possible, the package should be produced from raw materials available within the developing countries. If not, the raw material should be available for importation at relatively low, stable prices. These criteria rule out many more sophisticated package technologies being developed in the West. In broad terms, it can be proposed that the paper and board based Packaging Industries and those utilising the cheaper plastics are more likely to meet the needs of the developing countries than highly capital intensive industries such as metal or glass container manufacture.

3.3 Pack Standardization

For home markets, it is particularly desirable that the range of packages manufactured should be sufficiently restricted and should, as far as possible, be standardised. By this means, it is possible to achieve the economics of relatively large scale production even within the limited markets available. Standardization also facilitates the operation of Government or Industry wide standards monitoring and quality control bodies so that, in turn, better package quality should be achievable.

3.4 Competition between Packaging Sectors

Competition should be encouraged between the different sectors of the packaging manufacturing industry as a means of improving standards and cutting down prices. In the capital intensive industries, in particular, the developing countries can seldom afford two or more plants to make one type of package such as, for example, the food can. In this situation, to avoid monopoly conditions without wasting resources, it is desirable to encourage competition between the sectors. Thus, glass jars can compete with metal cans for the processed food and vegetable markets. Expanded polystyrene foams can compete with paper pulp and plastic thermoformings for the packaging of eggs. An example of competitive costing between paper pulp and thermoformings for egg packaging is given in Appendix I.

3.5 Recovery and Re-use of Packaging Materials

At present the methods of recovering and re-using packaging materials in the developing countries are as a rule primitive and artisanal. There is seldom an organised system of refuse collection and separation; instead under privileged sections of the community, the young and the aged, spend disproportionate time and effort in the haphazard recovery of useful articles for individual profit. It is suggested that in this situation

there is an urgent need for nationally organised collection systems which can allow the recovery and re-use of these valuable materials. Facilities for collection, separation and recovery of packaging and other waste should be provided at installations close to centres of population. The developing countries have great advantages over the developed Western economies in this field of conservation of resources, for the following reasons :-

- the value of used materials is relatively high, especially if they are imported and therefore justify recovery,

- the quantity of packaging waste to be recovevered is at present small, so that small scale facilities could be installed now and could be expanded with the need,

- the cost of the labour intensive operations needed for packaging recovery would at present be acceptable, because of the current low cost of unskilled labour in the developing countries.

If a precedent of packaging waste recovery on an organised basis can be established now, a trend can be set and an example given to the developed countries in the art of conservation and of preserving the environment. Implemented now, such a policy need not be expensive to operate and can easily be extended as the problem grows.

3.6 Export Packaging Requirements

The requirements of the export markets of developing countries are quite different as a whole from their internal packaging needs. It is essential if sales are to be achieved, that the pack design and pack quality must be suited to the markets at which they are directed. This may well necessitate the employment of design agencies and other organisations in the export market to plan and design the pack. Alternatively,

it should be possible for nationals of the developing countries to be trained to the required levels by encouraging them to work in the packaging field in developed countries.

It is also important that exporters are educated to a fuller realisation that adequate packaging, and corresponding expenditure on packaging, is essential if the exported product is to reach its market in a saleable condition. It is suggested that the Government export agencies in the developing countries need to pay particular attention to the instruction of their exporters in this field. Thus, the exporter should not be surprised to discover that, for a delicate product, his export packaging costs may well exceed the value of the product itself.

4. Ways of meeting Packaging Industry Requirements

Among the ways of meeting the Packaging Industry requirements which have been identified in Section 3, the following are considered particularly appropriate and relevant to the needs of developing countries.

4.1 Packaging Centres or Institutes

It is advocated that, to meet the education and training requirements which were discussed in Section 3, it is desirable that national or regional packaging centres should be established in the developing countries. These centres would fulfil the education and training requirements set down in Section 3.1. They could also help in the drawing up of standards for packaging, in the introduction of packaging quality control techniques, and in the particular problems of exporters.

4.2 Quality Control and Testing Centres

It may be desirable, especially where a Government Laboratory function already exists, that Government sponsored package testing

centres should be established. These centres, preferably spread on a regional basis throughout the country, would provide reference quality standards for packaging materials and packaging and would also operate random testing schemes, particularly for exported products. Such centres could also take the lead in providing quality control training courses, both for packaging manufacturers and users.

4.3 Specialist Aid and Finance

The introduction of new packaging methods and materials, where these are shown to be justified, may require an injection of specialist aid and finance. The specialist aid can be provided by experts in the industry concerned brought in from the developed countries, preferably under the auspices of an international body such as UNIDO. For small scale capital investment, for pilot projects to prove a new packaging technique, the U.N. is able to release special funds as part of its international development programme. In addition, it may well be possible to attract relatively small scale outside investment in a pilot project, though in most cases, such capital would only be available if some financial interest in the total project was also permissible.

4.4 Development Programmes

A typical development programme for the Packaging Industry of a developing country is included in Appendix II. The approximate financial implications of the introduction of new types of packaging as part of such a programme are presented in Appendix III.

5. Conclusions

In conclusion, it must be emphasised that the packaging needs of developing countries are at present fundamentally different from those of the developed, Western World. In general, packaging has made relatively little impact on the national economies of developing countries. This starting point gives the

developing countries the chance to appraise the state of packaging development throughout the world and to select the best methods and materials from the point of view of their own resources and requirements. At the same time, they can avoid the mistakes and excesses of some Western packaging. Thus, the developing countries have a real opportunity to suit their packaging industries to their needs; this opportunity must not be missed.

IDCAS Joint Regional Consultation on Packaging — ANNEXE I

REQUIREMENTS OF PACKAGING INDUSTRIES IN DEVELOPING COUNTRIES

COUTS DE FABRICATION DES BOITES THERMOFORMEES POUR SIX OEUFS

Hypothèse : Une machine thermoformeuse fonctionnant à plein temps sur divers produits pendant toute l'année

- 500 000 boites à oeufs sont nécessaires.

Spécifications

	Dinars par an
- Dimensions de la boite à oeufs = 160 mm x 225 mm - Dimensions du moule de la machine = 600mm x 500 mm donc 6 boites par cycle - Débit de la machine = 60 cycles à l'heure = 360 boites à l'heure donc environ 35 semaines de production sont nécessaires - Coût de la machine = 3 000 Dinars - Amortissement sur 8 années = 375 Dinars par an donc coût d'amortissement se rapportant aux boites à oeufs	265
- Coût de la main d'oeuvre (deux ouvriers pendant 35 semaines à 250 millimes/heure)	700
- Estimation du coût de fonctionnement de la machine	1 000
- Coût de la matière première (12 grs par boite) donc coût de 6 tonnes de polystyrène	1 800
	3 765

Donc, pour 1 000 boites, le coût approximatif est de 8 Dinars, non inclus les frais généraux de l'usine.

ANNEXE I
(suite)

IDCAS Joint Regional Consultation on Packaging

REQUIREMENTS OF PACKAGING INDUSTRIES IN DEVELOPING COUNTRIES

COUT DE PRODUCTION DE BOITES MOULEES EN PATE A PAPIER POUR SIX OEUFS

Hypothèse : Une mouleuse de pâte à papier fonctionnant à plein temps sur plusieurs produits pendant toute l'année

- 500 000 boîtes à oeufs sont nécessaires.

Spécifications	**Dinars par an**
- Dimensions de la boîte à oeufs = 220mm x 225mm	
- Dimensions du moule de la machine = 450mm x 450mm donc cadence de 4 boîtes par cycle	
- Débit de la machine = 120 cycles à l'heure = 480 boîtes à l'heure donc environ 26 semaines de production sont nécessaires	
- Coût de la machine = 13 700 Dinars	
- Amortissement sur 8 années = 1 710 Dinars par an, donc coût de l'amortissement pour les boîtes à oeufs	890
- Coûts de la main d'oeuvre (trois ouvriers pendant 26 semaines à 250 millimes/heure)	780
- Estimation du coût de fonctionnement de la machine	1 200
- Coût de la matière première (35 grs par boîte), donc 17,5 tonnes sont nécessaires, au coût de	440
	3 310

Donc, pour 1 000 boîtes, le coût approximatif est de 7 Dinars, non inclus les frais généraux de l'usine.

PLANS A COURT ET A MOYEN TERMES POUR LA MISE EN OEUVRE DES PROPOSITIONS

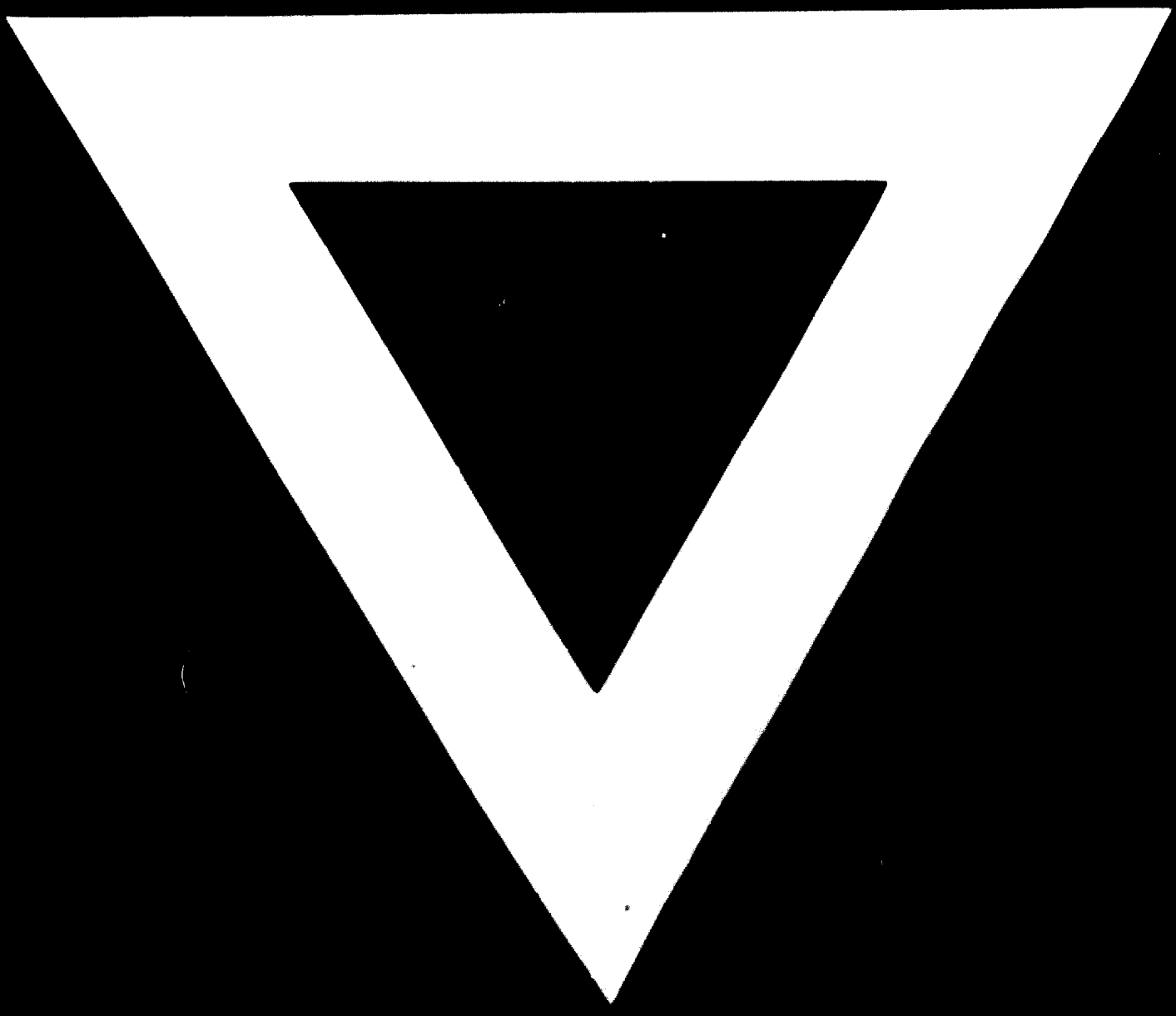
ualifiés	Plan à Court Terme Phase d'Elaboration du Planning (1972)	Phase de la Mise en Oeuvre (1973)	Phase des Opérations (1974)	Plan à Moyen Terme (1975 - 1979)
Assistance technique d'ONUDI				
- Désignation de l'Expert	Profil, choix et engagement de l'Expert	L'Expert programme et surveille les activités suivantes :	L'Expert programme et surveille les activités suivantes	Non nécessaire d'établir un programme défini de l'assistance de l'Expert
- Aide financière pour les projets-pilotes	Décider des projets à subventionner et planning du programme des subventions	Subvention nécessaire au Laboratoire des Emballages, au Centre de l'Emballage et pour le matériel-pilote des projets recommandés	Subvention pour le matériel dont l'achat a été reporté après la phase de mise en oeuvre	Non nécessaire d'établir un programme officiel de subvention
Organisation Centrale Nationale pour le Développement de l'Industrie de l'Emballage	Désignation de l'Administrateur du Développement de l'Emballage	L'Administrateur du Développement de l'Emballage contrôle tous les projets	L'Administrateur du Développement de l'Emballage contrôle tous les projets	L'Administrateur du Développement de l'Emballage continue à contrôler tous les projets
Laboratoire d'Essais des Emballages	Examen et obtention de l'acceptation des propositions	Planning des locaux, du matériel et du personnel Choix de l'emplacement ou des locaux Spécification et achat du matériel Interviews et choix du personnel Surveillance du projet d'installation Introduction à l'industrie de l'emballage	Etablissement des normes de qualité et obtention de l'acceptation du Gouvernement et de l'industrie	Extension progressive aux autres secteurs
Centre National de l'Emballage	Examen et acceptation du concept.	Planning détaillé des locaux et du personnel Interviews et choix du personnel Choix des locaux Equipement du Centre Création du Centre portée à la connaissance de l'industrie de l'emballage Mise en fonctionnement du Centre	Début des conseils et renseignements à l'industrie de l'emballage Organisation de premiers séminaires et conférences	Poursuite du service de conseils et renseignements Extension du programme des conférences et des séminaires, et peut-être des concours et des expositions
Cours de Formation sur la qualité des emballages	Examen et obtention du concept.	Introduction du concept à l'industrie de l'emballage Assistance à un secteur (boîtes de conserves) pour organiser le premier cours Donner le premier cours	Extension des cours aux autres secteurs de l'emballage	Poursuite des cours de formation pour former les nouveaux venus à l'industrie de l'emballage
Développement des Nouveaux Emballages - Projets comprenant : - verre - emballages plastiques thermoformés - films en plastique rétractable - papier et carton de qualité intermédiaire - complexes papier et film plastique - récipients à corps spiralé - emballages en pâte à papier	Examen et obtention d'une partie ou de tous les projets conseillés	Plan détaillé des projets avec le fabricant choisi Spécification et achat du matériel-pilote Installation et essais du matériel-pilote	Production-pilote par le fabricant Exploitation-pilote par les utilisateurs Distribution d'essais des nouveaux emballages Déterminer le succès des essais et faire le rapport exposant au Gouvernement Tunisien l'avenir des projets	Développement de la production des projets-pilotes. Ce développement étant fonction du mode de fabrication et de la croissance de la demande

PLANNING PROVISOIRE DES INVESTISSEMENTS

POUR LE MATERIEL NECESSAIRE AU DEVELOPPEMENT DES DIVERS SECTEURS DE L'EMBALLAGE

TOUS LES PRIX SONT EXPRIMES EN DINARS, ET COMPRENNENT UNE MARGE POUR LES FRAIS D'IMPORTATION

SECTEUR	TYPE DE MATERIEL	COUT DU MATERIEL-PILOTE	COUT DU MATERIEL DE PRODUCTION
Métal			
Récipients fer blanc	Fardeleuse et tunnel de rétraction	aucun	15 000
Bouchages	Presse de grande vitesse	aucun	25 000
Verre			
Bouteilles	Nouveau four et nouveau matériel	aucun	200 000 - 300 000
Bocaux	Mouleuse	11 000	Emploi du nouveau four ci-dessus
	Capsuleuse et étiqueteuse	7 500	multiples de 7 500
	Presse à capsules	aucun	20 000
Plastiques			
Films	Extrudeuse, machine à fabriquer les sacs	aucun	100 000 - 200 000
Emballage rétractable	Enveloppeuse et tunnel de rétraction	3 000	jusqu'à 300 000
Thermoformage	Thermoformeuse	4 200	multiples de 4 500
Moulage par injection	Mouleuse rotative	aucun	multiples de 10 000
Papier et Carton			
Récipients en carton ondulé	Nouvelle onduleuse et nouveau matériel pour fabriquer les caisses carton ondulé	aucun	jusqu'à 500 000
Carton laminé	Lamineuse et découpeuse de feuilles	aucun	130 000
Complexes papier et film plastique	Extrudeuse-lamineuse	2 000	150 000
Cartons	Machines à carton	aucun	50 000 - 200 000
Sacs	Machine à fabriquer les sacs	aucun	20 000 - 50 000
Récipients à corps spiralé	Spiraleuse et découpeuse de tubes	aucun	multiples de 10 000
Emballage moulé en pâte à papier	Mouleuse	14 000	multiples de 14 000



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