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INSTITUTE OF FOOD TECHNOLOGY THROUGH
CREATION OF A NATIONAL FOOD PACKAGING CENTRE

DP/BRA/82/030

BRAZIL

Technical report: Institutional Development - Food Packaging *

Prepared for the Government of Brazil by the
United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of Mr. R.K. Chowdhary,
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Vienna

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R. K. CHOWDARY

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Summary of findings, Conclusions
and recommendations.

The United Nations Development Programme through UNIDO is contributing to the project 'Consolidation of the Existing Capacity of Institute of Food Technology (ITAL) through the creation of a National Food Packaging Centre since 1982. The programmes and activities of the packaging section (termed hereafter as CETEA) have been analysed during the mission and the main findings and recommendations to sketch the outline of further growth of the Centre are presented in the report. Some of the key areas are as under.

1. One of the main objectives of international assistance to help create a nucleus of trained technical staff on various aspects of food packaging broadly stands accomplished.
2. To a limited extent CETEA has undertaken a few problems in the field of packaging related research. Its major thrust in the last two years had been confined to undertaking analysis work for the industry.
3. The Centre's training activities are extremely limited and are spordaic in nature. The training programmes thus far conducted had been well participated.
4. CETEA is greatly handicapped by the non existence of a transport worthiness testing packaging laboratory. It is endeavouring to step up its services in the field of packaging development. It would require the back up facilities for testing packages under simulated conditions of distribution hazards.
5. CETEA is perhaps the only focal point in Brazil devoted to the development of packages, training of personnel and packaging research in the Country. Its information base is very weak. This, not only, will effect its own performance but greatly limit its benefits to the industry who may seek a variety of information on a wide spectrum of the packaging and related industries.
6. Legally, the National Packaging Centre does not exist as yet. Accordingly, the activities have not grown to the extent one would desire these to grow to satisfy the demands of the packaging industry.

7. The research projects completed at the Centre had been mainly relating to certain material characteristics. It is time the Centre undertook some research projects of packaging development of national importance.

8. For improving the effectiveness of the Centre a number of recommendations have been made, These are grouped as those relating to research projects, expansion of services, facilities relating to equipment, personnel; organisational restructure. Special emphasis had been laid on formulations of work Plan and promotional measures. The section on 'Conclusions and recommendations' highlights these.

9. Coupled with research, one of the key areas for transfer of skills and upgradation of packaging technology relates to the field of training. Currently, this activity is followed as a side activity and is not functioning as a well programmed one in the mainstream of the Centre's functions. It is essential to correct the situation, as it is through the support of training programmes that a multiplier effect of projecting research findings and creating quality awareness, assurance and improvement has a better chance of success.

10. Formulation of standards of packaging for food, the conversion of some of the standards to mandatory laws and regulations - is another important area, the Centre may have to address itself to. As a recommendatory body, it may demarcate certain priority areas where work could be undertaken immediately.

11. The Federal Government of Brazil regards food industry as the prime industry. A great deal of food losses continue to take place unabated: CETEA may take up a programme of packaging development for some selected products to minimise food losses.

12. CETEA needs to take up some projects on packaging development for food in relation to particular destination markets. It may act in association with the foreign trade department to identify products.

1.0. INTRODUCTION

The Brazilian government regards food industry as the prime industry in the economic and industrial development of Brazil. In conformity with the policy, a food packaging Centre (CETEA), project at ITAL - was initiated with the joint cooperation of Government of the State of São Paulo, the Brazilian Government (FINEP - EMBRAPA) and the UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP) through the United Nations Industrial Development Organisation (UNIDO). The project objectives relate mainly to the development of national expertise by way training of CETEA staff in packaging technology relating to food.

- 1.1. The report concerns the mission to examine and review the services rendered by CETEA to the packaging and food industries in Brazil and to look into factors that could have further strengthened the Centre and prepared it as an instrument to promote packaging growth in Brazil. The terms of reference for the mission are enclosed at appendix I.
- 1.2. All the terms of reference were completed in response to the mission assignment. Two rounds of discussions were held with various groups at CETEA and matters relating to the introduction of services which are need based and can bring about an accelerated development of the food packaging industries were discussed, and the experience of the consultant shared with the groups. A Seminar on Packaging for Export of food products was addressed at São Paulo. Participants from the packaging and food industries evinced a lot of interest and brought forward their problem areas during the discussion sessions.

2.0. Appraisal of the activities of the Project concerning Services given to the food and packaging industry.

2.1. The major aim of the project is to strengthen the national system of scientific and technological development at the Institute of Food Technology (ITAL) through the creation of a National Food Packaging Centre (CETEA). In pursuit of this aim, special emphasis had been laid and is being further accorded to the upgradation of technical expertise of the packaging section of ITAL preparatory to the creation of a National Centre. With the joint efforts of the Federal Government of Brazil, the State of São Paulo, UNIDO, the packaging Section has been able to acquire and develop technical expertise. This development has given it a good start to serve the Brazilian packaging and food industries.

2.2. Apart from developing it's own expertise by way of training of the staff on different aspects of packaging, the efforts of the project management had been to extend its services to undertake certain research projects, conduct training programmes, carry out analytical tests and organise seminars and take part in events intended to upgrade packaging awareness, participate in the work of the committees for the formulation of packaging standards. As a result of the efforts put in by the project, although to a limited extent, the conditions for further work has been created at least in the Southern and more industrially oriented parts of Brazil and in particular in the State of São Paulo.

2.3. In the formative stage of it's development, CETEA Section has structured itself in to four major groups viz metal and glass packaging, plastic and paper board, food packaging systems and food analysis. These groups are working under the guidance and leadership of the project coordinator and have produced outputs of different types in each of the areas of applied research, analytical testing, training and assistance in the formulation of packaging standards.

- 2.4. CETEA is deriving its existence and resources mainly from ITAL, and is organisationally placed as a section of the Planning and ENGINEERING Division of ITAL. In view of the expanding and growing demands in the field of packaging research and development, standardisation, training, documentation and information services, packaging material analysis, modifications and innovations in packaging design and packaging of food for exports, domestic markets and defence; prevention of food losses through improvements in packaging; formulation of guidelines for packaging laws and regulations, national plan for the growth of the packaging and package related industries, etc, it is considered appropriate that the present status of the packaging section should be elevated to a full fledged packaging Centre immediately. This elevation coupled with appropriate financial, technical and laboratory supports, it is felt, will not only bring a qualitative up lift in the standards of services, but be instrumental in attracting and retaining technical expertise at the Centre - crucial to its technical performance. Simultaneously, it would provide an impetus and the necessary stimulus to reach out a vast potential of focus groups of its services. The move may provide CETEA an identity both for its own sake and much more for the sake of its place in the service of the Brazilian food packaging industry. In its present form, any preferential treatment of the packaging section, howsoever considered good in the best interests of the country, is apt to create misgivings and conflicts among other sections of ITAL and may prove to be counter productive.
- 2.5. CETEA, as mentioned in the foregoing, has been able to address itself to some of the problems of the packaging industry. The enormity of the problem areas is too wide to enable CETEA to comprehend them all and attempt worthwhile research based solutions particularly in the context of the facilities available. The possibilities for the Centre to accept problem solving consulting assignments for packaging development, expand its training programmes for packaging personnels and contribute more effectively to the formulation of packaging standards, certification of performance of packages ... are stupendous. The Centre's effectiveness will greatly improve with the

support of a full fledged transport packaging testing laboratory for assessing the stress characteristic of the packages through simulation of hazardous conditions obtaining in the journey cycles in the distribution system. In its absence, the Centre is greatly handicapped to advise and undertake research in a very important area of food distribution and the inter-se-relationship of packaging to thwart the all effects caused due to inadequacies of the system of storage, handling and transportation in Brazil. It is envisaged, that as the contact area of the Centre with the industry develops and expands, the Centre's technical staff shall be able to gain more appreciation of the problems of the industry and use this as an input for attempting pragmatic solutions of the problems of the packaging and food industries.

2.6. Research Projects and Technological Assistance

CETEA had completed a few research studies in the past. These mainly related to studies in the area of shelf life and characteristics of packaging material - their evaluation for a particular food product. It is worth mentioning that the studies undertaken so far have been in certain limited sphere of the packaging industry. These may not, in general, be able to claim country wide relevance and or bear a relationship with the projects of national importance. It is recognised that it was not possible to attempt a more intensively involved national project as the technical staff of the Centre during the period was being trained in and outside Brazil. The centre is now planning to undertake a couple of research projects that are part of a much wider national fabric and fit into the welfare oriented stature of the Federal Government of Brazil. Projects for packaging development for packaging of food products consumed by low income groups in Brazil and school going children have already been identified. No doubt, these projects are of great national importance and are a potent force of establishing the reputation of the Centre if successfully pursued and worthwhile solutions were obtained there of.

The project management has been advised to undertake one product at a time and try to develop an alternative system in its total perspective including the cost-optimisation

of packaging and production and distribution economies of scale and skill there of. As on date, the technical staff is more oriented to the chemistry of the material and much less familiar with the design, structure, shape, style, performance testing of packages against distribution hazards, and cost-optimisation. It is advisable to proceed cautiously and gain experience of handling a project of national importance incorporating its total dimensions, seek successful solutions and there after transcend to other projects.

- 2.7. CETEA's research staffs orientation is mostly in the areas of evaluation of material characteristics of the packaging material, product-package related shelf life studies. It is time to orient them as well to areas of costing, machineability of material, production and distribution economies associated with a particular packaging system. The knowledge of cost-benefit analysis of a particular system is a weak wicket. The situation if allowed to persist may divorce the research staff from the realities of business and accordingly diminish the usefulness of their findings in the impersonal world of business.
- 2.8. With research and development and packaging technology being increasingly integrated with marketing and sales, the interesting possibilities for product-packaging development that are more market directed exist. In the context of inter-disciplinary character of the type of research and development expected to prevail, and to have an on going involvement in the Corporate competitive strategy formation, it is appropriate to broaden the structure of the expertise so as to involve expertise on design; marketing research, training and information services.

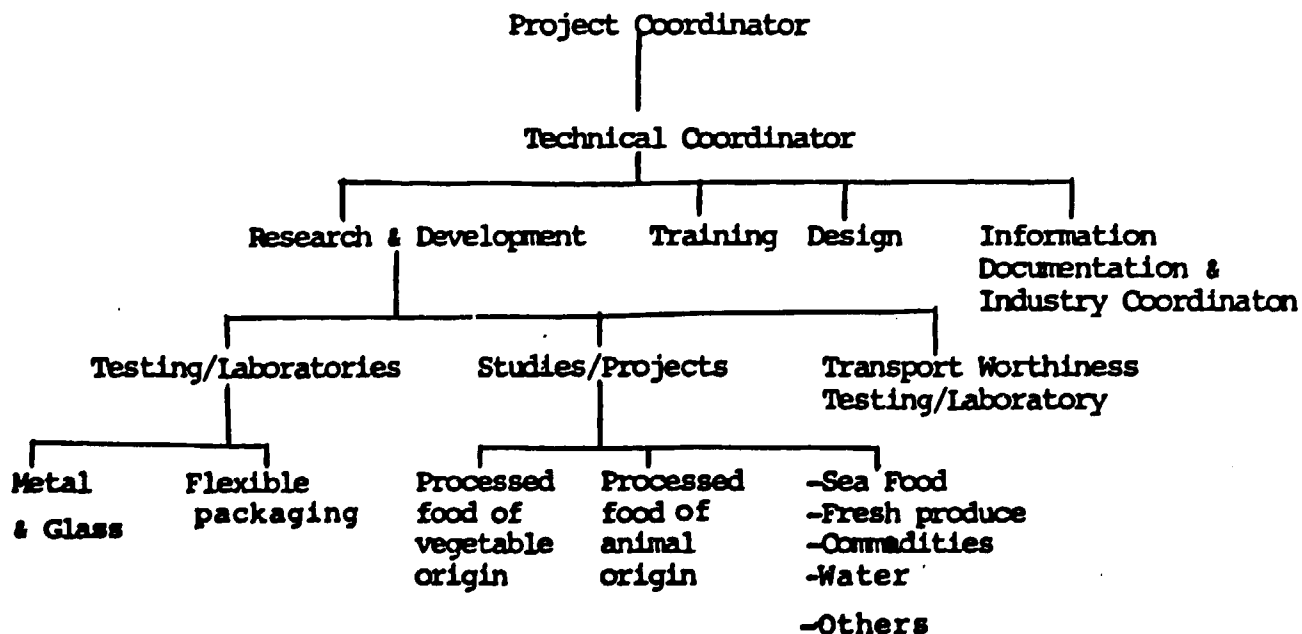
3.0. TRAINING PROGRAMMES

- 3.1. CETEA's training programmes in the field of food packaging and related aspects are intended to create awareness and impart basic knowledge. These are steps in the right direction but soon the centre may have to address itself to design and conduct training programmes for a wide array of participants for specific areas of food packaging. From the programmes of material based applications in food packaging and quality control to those of value engineering and cost effective packaging, packaging laws and regulations; packaging of fresh products, packaging of food products for exports, etc. may become an expected and well demanded phenomenon. The demand for training programmes may increase many folds as a result of identification of the training needs of the industry and manifestation of the phenomenon of packaging awareness and urge to compete.
- 3.2. The basic programmes on food packaging and Quality Control are well participated and responded. The initial responses justify to reserve a special place for training activity in the structure of CETEA. It is important to have training as a separate functional entity. Not only this activity is vital to diffuse knowledge and skills to a wide and diverse industrial organisation-small, medium and large but also to a number of service sector organisations like the Railways, airlines, shipping and road transport, postal authorities - the latter are dealing with packages and can be instrumental in serving as catalyst for influencing change in the introduction of right packaging standards. Generally, the medium of training programmes was on in built mechanism to upgrade the knowledge of the technical staff engaged in conducting these programmes and simultaneously help develop contacts between the industry and the Centre, foster better communications and result in further use of other services offered. Training is an important and essential activity and should be given a separate place under the responsibility of a packaging training specialist who possesses the right combination of technical knowledge and pedagogical skills with a flare for use of modern methods and techniques of training.

3.3. It is true that the packaging group of ITAL had been organising courses, seminars for the food and the packaging industries in Brazil. The level of activity, though restricted due to resource limitation, had been able to unleash further demand for courses and seminars. It appears to be a healthy and growth based trend, but the satisfaction of the demand calls for a much greater preparedness, training source expansion and audio-visual structured programmes. It is advisable to tap this healthy trend and reinforce the resources of the group. Simultaneously, efforts should be made to train a cadre of at least three technical persons on the subject of training methods and techniques, curriculum development, writing of case histories, subject treatment, use of audio-visuals aids, handling of questions, appraisal of the programmes, etc. Further, exposure of centre's specialists to some of the packaging Institutes like the Indian Institute of packaging, Bombay, TNO, DELFT, Holland, will be helpful in developing their faculties in training.

4.0. STRUCTURE OF PACKAGING GROUP

4.1. The four pronged structure of the packaging group divided into glass and metal packaging; plastic and paper board, food packaging system and food analysis initiated in the formative stages of the project have helped in affording the centre to develop specialised knowledge about various packaging material. A packaging specialist owes his/her loyalty to no single material but works for total packaging economies. The material based structure though helpful in endowing the centre with indepth knowledge about material properties and measures for quality control, have been found wanting in affording an interactive and interrelated approach in the evaluation and development of packaging standards. The consultant had held discussions with various groups through an indepth poser and instrument used to help reveal the need for modification of the structure if required. The discussions were rewarded by the willingness to discuss and collectively involve another structure that may be more need based in relation to the requirement of the user industries and at the same time be viable to afford an internal management of resources. Out of the three models presented by the consultant, the groups appear to favour the following model of group-ing as an alternative to the existing structure.



4.2. The services of training, information and documentation and industry coordination, design and transport worthiness testing, do not exist as separate and well classified services. These, it is suggested be created as and when the manpower and other resources are available. In the interim period, it is advisable to create the training as a separate function and entrust it to a head of department.

The activities such as training, information and documentation and industry coordination and design are recommended to be accorded a separate and distinct place as when the full complements of resources are available.

4.3. The three major arteries of the functional structure viz Research and Development, Training, Information and documentation.... are to be entrusted to the coordination and management of a departmental head each. All the departmental heads would be under the management of a technical coordinator reporting directly to the project coordinator. The role and functions of the technical coordinator and departmental heads in particular need to be clearly defined.

4.4. It is envisaged that the technical coordinator would be responsible, among other things, for the formulation of the project proposals, preparation of guidelines and plans for allocation of technical manpower resources, ensuring timely completion of tasks, final preparation and submission of projects reports, and creating working atmosphere for fostering development of the expertise at the centre, etc. He/she would deputise for the project coordinator in his absence and assist him in the execution of the plans for development and growth of the Centre.

4.5. The project coordinator if spared from devoting his time and energies to minor matters of routine nature, would, it is hoped, be in a position to help stimulate the demand for the centre's services by expanding and developing contacts with the food and packaging industries. Besides, he needs to unleash measures that accelerate the tempo of packaging awareness and development according to the felt needs of country. The

suggested restructure, it is hoped, may prove to be in the best interest of the centre and may be experimented.

- 4.6. It is essential to introduce a system by which the progress of a long term project could be monitored on a regular basis. This would enable the project management to initiate any remedial measures at the appropriate time before it was too late. There are distinct possibilities that the centre may take up a couple of important long term projects. It may be desirable to list the critical activities involved and review their progress in a planned manner. The PERT (Project Evaluation and Review Technique) may be adopted.
- 4.7. Uptil now, CETEA has been engaged mainly in the work relating to packaging material testing and shelf life studies of various types of food referred to it by the industry. These activities, no doubt, are important but are not a substitute for the total packaging development work. The nature of work if pursued predominantly, may result in the talent of the Centre to be utilised in mere routine and mechanistic work of testing alone. The nature of work must undergo a qualitative shift in accepting and seeking work of packaging development nature and directing the efforts of the Centre to those research areas that can solve the problems of the Brazilian packaging and food industries. It is not intended to under rate the work done so far, be it be, in the research area and or in that of the testing of packaging material. A compositional shift, suggested in the foregoing, would pave the way for a much closer association between the industry and CETEA and may bring about a much faster growth of CETEA's capabilities in the application areas of packaging.
- 4.8. CETEA's relationship with other organisation like DINAL, CAFA, CNPq, EMBRAPA...etc is likely to become more intense and for more involved in future. Particularly in the area for package certification for and on behalf of DINAL, the analysis work may multiply five folds. It must however be recognised that the nature of such work will be of routine and repetitive nature and may greatly limit the Centre's resources

to be utilised for research projects, work relating to packaging development and development of test procedures in a wide variety of fields. It is judicious that the Centre helps these organisations in setting up packaging laboratories for testing and trains their staff accordingly. Tests involving more sophisticated equipment and procedures may be carried out at the Centre as a back up support to the work of these laboratories.

4.9. The small scale industry engaged in the production of food items needs a preferential treatment to tackle. There are problems of packaging in association with appropriate production technology. Thus equipped, they will promote extension of the domestic market and some of them may be able to penetrate the exports markets.

5.0. Government and private sector industries it is learned, feel the need to increase packaging quality and performance but lack the necessary methodology and equipment. The training programmes in the area of packaging quality control for the packaging industry and end users should be organised more frequently to fill the need for immediate assistance to the industries.

5.1. CETEA is, the only Packaging Focal Point-in the sector of food packaging. The search for solutions and innovations in packaging to minimise food losses is very urgent. The need of technical assistance in the area is very high. It is advisable that CETEA formulates a study on defining of packaging and logistic problems for a few selected areas where food losses are maximum and develops the packaging standards there of. To complement its resources, it may seek expertise / resources from other departments of ITAL and or even from other organisations.

5.2. With its logistic location at Campinas, it will be difficult for the Centre to reach out various points in the country that require packaging assistance. It is time, CETEA started thinking in the direction of creating liason points at other locations and strategies for dissemination of existing knowledge

in the field of packaging for food to different target groups, with the assistance of these liaison points.

- 5.3. There is a near absence of information and documentation services at CETEA. It is important to create the function at the Centre and train an information specialist to develop the activity. He/she would also manage the library services currently enjoying an informal status and scattered among the various operating groups.
- 5.4. In association with the creation of information and documentation services, CETEA may procure standard documentation office appliances and a mini Computer Compatible with IBM-PC XT with floppy disk drives and printer.
- 5.5. With a view to making CETEA a result centre, it is appropriate that a three years work plan and output expected thereof starting from January 1987 may be prepared, with necessary budget provisions and listing of costs to be borne by various interests - ITAL, self financing projects, training programmes, analysis, work, etc.
- 5.6. As a section of ITAL, the packaging centre on date, does not have much involvement of the industry in shaping its future course of plans and programmes. In the opinion of the consultant, the involvement of the industry at an appropriate advisory group level would be of great help both to the Centre as well as to the industry. Necessary mode of such involvement can be worked out.
- 5.7. There are different associations of packaging industries in Brazil. Each sector of the packaging industry has its own technical problems and desire to keep in line with developments in packaging techniques and technologies - particularly in the context of expanding domestic and export markets, longer journey cycles, developments in the mode of transportation and other forms of physical distribution. It is learned that the paper and paper board association has already its own laboratory and another packaging association (plastic film) is planning to set up its independent laboratory. These

trends are healthy and can be more profitably linked to Centre's facilities. A complementary relationship can be developed between the analysis work carried out at these laboratories and that at the Centre to optimise the benefits.

5.8. The activities to assist individual firms in solving the packaging problems has been mentioned earlier in the form of problem identification and dimensioning. This sector has to be approached in a strict commercial way and assured of confidentiality at least for a period of two years, before the Centre could use the findings in its training programmes. It is through this area, that the Centre obtains first hand knowledge of the serious problems and contributes to solve these. This is not only a self sustaining and fulfilling phenomenon but can win the support of the user industries large, medium and small. Often, it is argued that the large scale companies are able to seek solutions to their problems by referring these to their parent companies viz the collaborators. Over a period of time, it may prove to be quicker and better to obtain assistance of CETEA than that of the parent Company.

6.0. ANALYSIS OF DIFFERENT GROUPS OF CETEA'S SERVICES PARTICULARLY TO USERS IN THE PRIVATE SECTOR

- 6.1. CETEA's staff has been trained in different aspects of food packaging through intensive programmes of interactions with UNIDO's experts at the Centre, fellowship and study tours, involvement in some of the problem areas of the Brazilian industry and participation in the events taking place in Brazil. Adequate laboratory support in the areas demarcated in the project, has already been provided. The groups consist of young scientists mainly food technologists who have been given the requisite exposure and training in the field of packaging for food. One of the main objectives of the project is to have a food packaging group, which can address itself to complex and diverse problem areas of the Brazilian food industry and also provide technical and technological skills to promote export of food products - stands well accomplished. The project management, particularly the project coordinator, has been instrumental in not only creating a healthy working atmosphere but also been preparing the groups to involve themselves into the problem areas of the Brazilian packaging and food industries.
- 6.2. The nature of work pursued in the past is divided into organisations three distinct areas viz analysis work, research projects and training programmes undertaken on behalf of organisations in the private and government sectors. Predominantly, the packaging materials evaluation work had dominated the scene. The material evaluation work is forecasted to be double of its present work load immediately if the Centre accepted the work provided by DINAL - for certification of packages. To meet this increase without a commensurate addition to the work force, would deny the services of the laboratories to other clients and centre's own projects. This situation is least desirable and has already been dealt with in the foregoing.
- 6.3. CETEA as a research and training Centre devoted to packaging for food, should not distinguish between the projects and work emanating from the private or the Government managed industrial and services sectors concerned with food packaging. Subject to availability of resources, the real criteria for

more in terms of its contribution to the national economy rather than to the ownership characteristics.

- 6.4. The work relating to analysis which predominantly relates to testing of the packaging materials received much more prominence and kept occupied the technician for a major portion of the year. Most of the testing work undertaken is of a repetitive nature and does little to add to the upgradation of the skills at the centre. It is difficult to draw a line in terms of what to accept and what not to accept. The centre may adapt a criterion for accepting those types of analysis where the procedures have not been laid out, are innovative and new and will contribute to the enrichment of the work at the Centre and help the sponsoring organisations simultaneously. Adjudged thus, it would help the centre to pursue the objectives that contribute to its research and development efforts.
- 6.5. In the project areas, the groups at the centre had completed a few projects. No feedback is available to the groups about the fate of the recommendations made there of and the possibility of their implementation. No system to seek follow up information exists at CETEA. It is desirable to evolve a system to have this information. This procedure will bring a sense of professional confidence amongst the members of CETEA - to know that their findings have benefitted the sponsoring organisations and also enable it to analyse factors that failed to confer full benefits to these organisations.
- 6.6. The various groups need an orientation to problem identification and dimensioning of the food packaging industries. The research methodology and efforts put in by the groups can become more practical, if the persons conducting research were fully aware of the industrial scene. The knowledge about the cost of the material, its machineability factor, and in particular conditions of storage and

handling, etc. can enrich the evaluation work and assessment of stress characteristic of particular material. The inter-se relationship between the test criterion developed through simulation studies and the field performance may generate national data to help formulate packaging standards in future.

6.7. Almost all the engineers are taking part in various sub-committees on Standardisation for packaging and their involvement at times is more than twice in a month. It is better to regulate this activity and nominate a couple of engineers on behalf of the centre on these sub-committees. It is also prudent to suggest that these committees should meet not more than once in a month.

6.8. The technical staff is already quite productive. In order to remain up to date about packaging and package related work and be of assistance to the development of food and packaging industries in Brazil, library and documentation services, procurement of books and journals have to be very much improved. At present, the literature support in the area is extremely insufficient.

6.9. The groups have limited knowledge about the requirements of packaging for export of food products and the trends obtaining in the traditional and new overseas markets for Brazilian food. The area is of prime importance and CETEA can be a potent force in improving the standards of packaging for exports. Packaging development for exports is an on going activity and essentially needs a constant association with the changes taking place in the destination markets and how well the infrastructure of handling, storage and transportation prevailing in these markets would receive the Brazilian products. Similarly, there are no documents relating to the standards of packaging-I.S.O.; F.D.A. regulations and inspection notes-pertaining to U.S.A.; etc. available at the Centre. For the Centre to emerge out of a viable support in improving packaging for food exports, the necessity of overcoming these gaps need not be over emphasised.

7.0. The Centre's technical staff have got the exposures to packaging laboratories and institutions in the industrially advanced countries. Brazil is a developing country, an exposure to the work being done in the field of packaging in a developing country could prove to be very beneficial and exchange of views, and the assistance may foster technical cooperation between developing countries. The Centre did initiate a step in this direction by extending its cooperation to a delegation from the ARAB Countries sponsored by UNDP. How far such contacts would take a concrete shape of technical cooperation in future is yet to be seen. The activity needs to be pursued further.

8.0. Evaluation of Project Facilities i.e. equipment, personnel, building facilities oriented to the food and packaging area.

8.1. It is essential to have a full fledged transport worthiness testing laboratory for packages at CETEA to facilitate the developmental work on packaging. The present arrangement of using ITP's facilities at São Paulo are not producing the desired results. Accordingly, the basic equipment and facilities of inclined impact tester, vibration table, compression tester, climatic rooms/chambers, drop testing table, rain water bath chamber, rotating drum are the high priority areas for the transport laboratory. These should be immediately provided.

8.2. In view of the present and potential work load, the equipment and the personnel needed in the existing laboratories particularly metal and glass, flexible packaging testing, and food analysis (seeking support of ITAI resources) are sufficient. A gross inadequacy however exists in respect of equipment needed for training aids for documentation and information services and the corresponding personnel for these important functions. These complementary and essential resources should be provided and persons trained in the respective fields in the immediate future.

8.3. The CETEA's staff are scattered in different buildings and so is the case of the laboratories. The position is being corrected by constructing another building to house the laboratories and staff at the same place. No provision exists for class rooms for training courses to be conducted at the Centre. It is suggested that at least two class rooms each with a seating capacity of 35 should be constructed. It is presumed that the present arrangement of sitting three research staff in the same room would be changed to reduce overcrowding and occasional disturbances caused to other members when a visiting member of the industry pays a visit to one of the researchers.

8.4. At least one room should be reserved for displaying the packages of the Brazilian food and the packaging industry. There can be a provision for having a permanent exhibition of packaging material and finished packages and the space/panels could be

9.0. Seminar on packaging for Food Exports

9.1. A Seminar on packaging for food exports was addressed by the consultant and moderated by Mr. Luis Madi- Project Coordinator, on the 19th December 1985 at São Paulo. Programme brochure for the seminar is enclosed at appendix III. Aspects such as packaging needs of the export markets, relationship between Quality and Cost; packaging laws and regulations, certification of Quality specification, role of research and development and technological assistance in packaging etc. were highlighted and deliberated upon by the Consultant. Nearly 32 members drawn from various segment of the industry participated at FIESP's premises and enriched the discussions for which leads were provided.

9.2. Serious gaps in the field of packaging for exports came to light and emphasis related to overcoming these through the development of market related packages based on R & D efforts of CETEA and other organisations.

The participants recognised the need for improving quality control of packaging materials and sought institutional assistance to complement their own resources. It was also felt that the availability of packaging related information for certain export markets of Brazil was very much lacking. The need to have this information was greatly emphasised.

10.0. CONCLUSIONS AND RECOMMENDATIONS

10.1. The project has been able to build up a nucleus of expertise in food packaging and it should be able to undertake further work in the area so as to benefit the high priority segments of the Brazilian Economy. A couple of projects has already been identified and work may soon commence there on. However, to make the Centre a meaningful focal point to provide totality of packaging related services to its growing user groups, its resources may have to be strengthened. Simultaneously, a directional shift in the research work is called for. A set of recommendations to make the Centre achieve its objectives with more speed and quality, is given below.

10.2. Legal

It is important to formally set up the Centre for food packaging. This would enable the Centre to create an identity of its own and facilitate it to attract and retain talents.

Research Projects

2. The centre should take up a couple of research projects intended to reduce food losses - particularly in the field of fresh fruits and vegetables.
3. At least one project of national importance in the field of food exports should be taken up by the Centre. The approach should be export market related so that the findings of the study could have a relationship with the commercial decisions.

Expansion of Services

4. The centre lacks certain services. It is important to expand its services to have well developed and need based training programmes, information and documentation and graphic designs services. The fragmented approach to training, currently, in force, it is apprehended will be too inadequate to answer the needs.
5. Problem solving consultancy services to assist individual

EQUIPMENT

6. Equipment and building space for having a transport worthiness testing laboratory to assist the stress characteristics of various types of packages in the distribution system should be provided. UNIDO may assist the Centre in setting up the laboratory. Basic equipment needed for the purpose viz those relating to compression, horizontal impact, drop, rotational stresses (drum testing), vibration, rain water hazards climatic effect.... testing should be provided.
7. For the use of information and documentation services and also to automatise some of the work in the laboratories; a mini computer compatible with IBM - PCXT with floppy disc drives and printer is recommended.

Personnel

8. For elaboration and development of training, documentation and information and design services, provision of technical staff well trained in the respective field is recommended.

9. Training of Centre's technical staff

Industrial orientation of the technical staff should be upgraded. At the present moment, they have too little appreciation of the packaging problems relating to food exports and industry oriented problems of the packaging and related industries.

Organisational

There is a need to restructure the technical groups in order to have a well integrated approach to packaging research projects, analysis and problem solving consultancy work. It is recommended to restructure the groups into four functions i.e. research and development, training, information and documentation and industry's coordination and design services and introduce a new functionary - technical coordinator.

11. It is important to develop liaison/contact points in other

These contact points can be used for dissemination of existing knowledge in the field of food packaging to various target groups and provide feed back to the centre on certain key problem areas of packaging in their territories.

12. A way to involve industry in the affairs of the Centre may be looked into. It may be advisable to have advisory committee/s involving at least the packaging and some selected user industries. The move is intended to be mutually beneficial one.

Work Plan, Priorities and Implementation:

13. With a view to making CETEA more result oriented, a three year work plan commencing Jan 1987 may be prepared and implemented.
14. A compositional shift in the research projects undertaken by the Centre is recommended. The acceptability criterion in the priority considerations should be the projected contributions of the results of the study to the Brazilian economy.
15. The pre-emption of laboratory capacities by the testing jobs of one or two organisations is likely to happen. As a body of generating new knowledge, the centre should resist the temptation of accepting repetitive jobs but instead endeavour to seek jobs that are more complex and contribute to build up expertise and promote industrial growth.
16. Small scale industries in the food sector, need special attention to solve their packaging problems. There is a need to accord them a special treatment in the Centre's programmes.
17. A system to seek feed back on the recommendations made by the Centre should be developed. This may foster professional confidence and also enable the Centre to analyse factors

18. Too many members of technical staff are engaged in the standardisation sub committees. It is advisable to rationalise the area and facilitate participation of members not more than once in month.
19. CETEA should help the food processing industry in setting up Quality Control cells for packaging material. A very wide gap exists in the area and needs to be bridged immediately.
20. CETEA may review the existing laws and regulations for food food packaging and attempt measures to get these implemented. In effect, this would bring about an uplift of packaging technology and facilitate consumer protections against acts of economic vandalism by certain unscrupulous elements in the food industry.
21. It is time, the Centre developed and invited members of the industry to participate as guest speakers in its various training programmes.
22. An organised attempt should be made to invite guest speakers from the industry and arrange discussion meetings with the technical staff of the centre.

Promotion

23. CETEA may provide space for having a permanent exhibition of packaging material at its premises. This can be a self financing measure by commercially charging a price from the participating firms.
24. CETEA's participation in the seminars organised by productivity and management organisations, FIESP should be further encouraged.
25. CETEA has a great potential to be developed as a regional Centre for training of packaging personnel in Latin America. A few seminars of regional nature may be organised by inviting participants from other Latin American Countries and speakers from Brazil

26. A few one day seminars packaging for food exports, packaging for consumer protection, packaging its role in the distribution system, packaging and quality of life, packaging and loss prevention may be organised to create proper awareness of packaging in Brazil.
27. The Centre's links with other technical and educational bodies need to be radically improved. Well organised and specific efforts for exchange of views through participation and programmes of mutual interest are considered to be good to accomplish this objective.
28. For rewarding excellence in packaging for food; CETEA may institute Brazilian star award for innovations in consumer packages, transport packages and packaging materials and use this opportunity to project the Centre's activities in the right quarters with the right perspectives.
29. CETEA is at a stage when the industry in the State of São Paulo appears to be very receptive to new ideas and innovations in packaging. Strategy planning on the part of CENTRE is very much needed to tap this encouraging trend.



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APPENDIX

JOB DESCRIPTION

TITLE: Expert on Food Packaging Development

ACTIVITIES:

The expert is expected to work with the technical staff of the Center under the supervision of the Project Coordinator to develop the following activities:

- 1- Short courses and internal seminars related to the development of food packaging.
- 2- Appraisal of the activities of the Project BRA/82/030 concerning to the services given to the food and packaging industry.
- 3- Analysis of the different groups of CETEA, regarding to the services presented to the users, oriented to the private sector.
- 4- Evaluation of the Project facilities, i.e., equipment, personal, building facilities, oriented to the food and packaging area.
- 5- Short Seminar to the Food and Packaging industries in the following subject: New Development of Food Packaging for Developing Countries.
- 6- Prepare a final report in English regarding to the activities of the mission.