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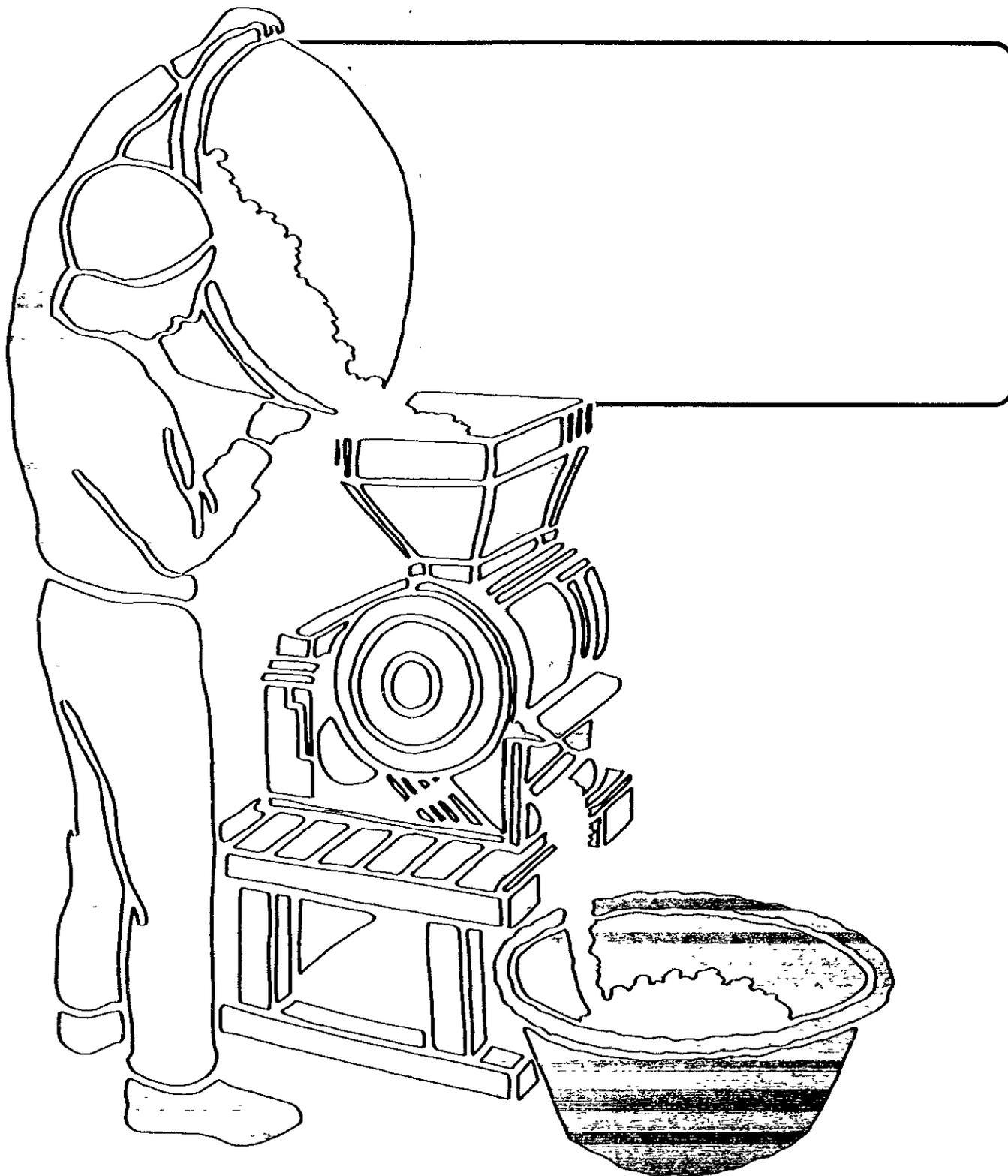
ISP-49191

# INTERNATIONAL SOYBEAN PROGRAM



**INTSOY**

College of Agriculture  
University of Illinois at Urbana-Champaign



TRIP REPORT

JANE E. GLEASON

Beijing and Sri Lanka  
11/26 - 12/8/86

Department at the University of Peradeniya, stated that it is feasible to conduct a soybean processing and utilization short course at Gannoruwa. SFRC is short-staffed, at present the only food technologist there is Fowzia, so INTSOY will need to contribute both staff and money. Nonetheless, conducting a short course would be welcome since it will contribute to the overall program at SFRC. The earliest time for the course is late next year, sometime after September. He suggested that an INTSOY staff member go to Gannoruwa in April or May to work out the details for the program. Also, a formal letter needs to be sent to Eddie Herath for approval of the course.

#### DEPARTMENT OF AGRICULTURE

E. Herath is in agreement with the project and expects that the Ministry of Agriculture will approve. He had very few comments about the proposal. Edward Suraweera, Department of Agricultural Economics, will be the contact person to obtain formal approval of the project. He too thinks that approval will be forthcoming although he reminded me that the MOA is not a rubber stamping agency. We discussed the budget and the administrative steps necessary to obtain approval for implementation.

Follow-up letters need to be written to Vijamanne, Meegama, Tilak Gunawardena, Eddie Herath, Edward Suraweera, Strickland, Flynn, and Dharmasena.

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Food Technology  
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Culture Collection

National Food  
Product  
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National S & T  
Information  
Station of Fd.  
& Fer. Ind.

working on various subjects in order to research and develop many more nutritional, convenient, economic and safty food products to meet the needs of consumers.

#### ORGANIZATION

At present the food research system in China is organized by the central research institute as SRIFFI and many local research institutes as well as research laboratories in factories.

There are 354 staffs in the SRIFFI, among them there are 236 technical personnel, including 21 senior engineers, 134 engineers and 88 technicians with university or college qualification. More than 16 people were sent abroad to study. Countries that they have been to are the U.S.A., Japan, East Germany, West Germany, France, Italy, Canada and the Soviet Union. 12 graduate students are being trained in the SRIFFI.

The organization of the SRIFFI is shown in the diagram.

#### Director

Director is the top leader of the Institute. There are also two deputy directors who help the Director with his work.

#### Academic Committee

The activities of the Academic Committee are: approving the research plan, checking the research work, examing the results, making the decision to transfer the achievements from laboratory to pilot plant, even to commercial production and raise the technical level of the scientific workers.

#### Divisions and Groups

Food and Fermentation divisions are the basic research units in two main different fields in the Institute. Various groups have been organized according to the topic studied. The group leader is in charge of the research work of his own topic. However the division leader takes care of all the research work in his division. The group might changed when the subject is altered.

The Technical Information Division provides the technical information from international and domestic sources for the research work.

pilot plant provides operating facilities for testing production of new food products, or with new technologies.

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- (7) Studies on method of immobilization for enzyme and microbiol cells.
- (8) Studies on determination and prevention of trace contaminants in fermented foods.
- (9) Establishment of the quality and hygiene standards of fermented foods.
- (10) Studies on production of single cell protein from waste liquor of fermentation industry.
- (11) Analysis of aroma components in chinese famous spirits.
- (12) Studies on preservation, classification and identification of industrial microbiol strains.

#### MAJOR ACHIEVEMENTS

During the last two decades, in the area of food science over 260 research papers were published. Quite a few were already applied to the production. In fermentation science area about 200 research papers were achieved in the same period of the time.

##### 1. In food research division

(1). Breeding of agriculture varieties. A number of canning varieties of tomato, yellow peach and tangerine with good quality in color, texture and flavour which meet the requirements for can processing.

(2). Canning technology. The procedures of pretreatment of raw materials and sterilization schedules have been established for main products. It resulted in great improvements in colour, flavor and texture of contents and reduction of the loss of vitamin C.

(3). Sterilization of canned foods. Isolated and identified flat sour (F.S.) bacteria in canned food, then determined their thermal characteriatic values e.g. D and Z values and overcame the can spoilage by F.S. bacteria.

(4). Baby food. Developed some formula of baby food fortified by adding amino acids, vitamins and minerals. Those are benefit to the malnutrition children.

(5). Healthy beverage. Developed Kiwi (Chinese gooseberry) juice and chinese hawthorn juice which have curative effect on high blood pressure through the clinical test.

(6). Machinery for food processing. Investigated and designed several pieces of equipments for food processing; e.g. continuous high pressure sterilizer for canned foods; whole production line for

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## MAJOR TASKS

In SRI LANKA the subjects studied are either basic research topics or the most frequently occurring technical problems throughout the country. On the other hand, local research institutes have their own subjects aimed at solving local problems, and the research laboratories in factories also do the same.

### 1. Food Research Division

- (1) Breeding of varieties for fruit and vegetable processing.
- (2) Studies on preservation of raw materials and semi-products of food industry.
- (3) Improvement of processing technology for canned food.
- (4) Studies on formula of baby foods.
- (5) Preventing loss of nutrients during food processing.
- (6) Studies on extraction, concentration and isolation of soy protein.
- (7) Improvement of manufacturing process of soy milk.
- (8) Studies and design of food processing machineries.
- (9) Investigation and development of food packaging materials and of their properties.
- (10) Studies on determination and prevention of trace amount of contaminants in food products.
- (11) Investigating the methods for determination of micro-nutrients in foods.
- (12) Establishment of the quality and hygiene standards of food products.
- (13) Development of a variety of soft drinks.
- (14) Comprehensive utilization of raw materials and treatment of wastes.

### 2. Fermentation Research Division

- (1) Breeding of grape varieties for wine and barley varieties for beer.
- (2) Studies on processing mechanization of chinese traditional alcoholic beverage ( rice wine and chinese spirit ).
- (3) Improvement on technique and equipment for beer and wine.
- (4) Studies on technology and equipment of high fructose syrups.
- (5) Studies on some food-grade enzyme preparations.
- (6) Studies on some organic acids and amino acids fermentation.

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(4). Several enzyme preparations have been studied. Such as  $\alpha$ -amylase, isoamylase, glucamylase, glucose oxidase, protease and cellulase.

(5). Production of citric acid, vitamin B<sub>12</sub> glutamic acid etc. from starch or molasses by fermentation methods has also successfully been studied.

(6). Single cell protein. A new procedure of producing both food single cell protein from molasses, and feed single cell protein from sulfite liquor waste has been developed.

(7). Industrial microorganisms. In addition to culture collecting new method for classification and identification of cultures are being studied in the lab.

Mutants from yeast, bacterial and fungi by using physical and chemical mutation reagents are also being studied.

(8). Identified the aroma constituents of chinese famous liquor "Mao dai" and the others, determined the trace metals, residue pesticides and aflatoxin etc. in the liquors. Then made some suggestion for quality control.

(8). Established the standards of product quality in national and ministry level.

#### ASSOCIATED ORGANIZATION

##### 1. Centers

(1). National Food Product Inspection Center. (a). To inspect the qualities of food products with regard to organoleptic, physical-chemical properties, hygiene, nutrition and packaging, according to the food products standards and hygiene regulation of Ministry of Light Industry. Also to provide the data for drawing up and revising the standards as well as quality evaluation. (b). To monitor the qualities of main products, appraising and checking high quality products and evaluating the new products. (c). It serves as a representative of Ministry of Light Industry to carry out the arbitrate inspection for disagreement of food quality in food import and export. (d). Studying and developing the new analysis and inspecting technique. to meet the continuously growing requirements in food area. (e). To take the responsibility of directing and coordinating works of six branches throughout all the country, organizing the technical exchange programmes, unifying the analysis methods and training the people working on food quality control.

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canned mushroom such as preboiler, grader, slicer and so on; The machine for draw and re-draw cans.

(7). Food packaging materials. Formulating different kinds of interior can coatings including acid and sulfur-resistant coatings, meat releasing coatings and coating for crown cap and twist-off cap; Formulating sealing compounds can lids and bottle caps; Determination of physical and chemical properties of lacquered and unlacquered tinplate and tin-free steel; Investigation of model corrosion system and accelerated method for testing material.

(8). Determination of trace harmful contaminants in food products. Studied and drawn up a series of analysis methods such as heavy metals Hg, Pb, Cd, Cr, Cu, Zn, As..... pesticide 666, DDT, nitrosamine, 3,4-Benzopyrene. A general survey of contaminants in canned vegetables seafood, wine, rice wine, beer, spirits, ham, bacon, honey and so on has been done.

2. In fermentation research division

(1). New materials for brewing. Sixteen excellent varieties of grapes for wine and two varieties of barley for beer have been bred.

(2). New technology for brewing. Some new technologies have been used for production of spirit liquor, wine and beer etc. The quality of products was improved and the period of processing was shortened e.g. (a). Developed a new procedure of liquid state fermentation of Chinese liquor instead of the traditional procedure of solid state fermentation. (b). Studies on top yeast for brewing. (c). Improved non-biological stability of beer. (d). Improved the quality of wine by heating and hastened the aging process. (e). Raised the efficiency of materials fermented by using new facilities to cook grain materials in continuous ethanol production. (f). Improved the processing for production of whisky and brandy.

3. New facilities for brewing. More than forty projects have been done in this field, for example; (a). Facilities for producing of Koji using thick layer aerating method. (b). continuous cooking tank for production of rice wine. (c). Press filter for production of rice wine. (d). Liquid-brewing tanks for production of rice wine. (e) Removal trub whirlpool tank for production of beer. (f). Large cylindrical-conical tanks for production of beer. (g). Self-aspirating fermenters. (h). Mills for wild starch materials.

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international societies, organizations concerned by means of proposing and sponsoring various scientific activities such as symposia, conferences, seminar, short training courses for food industry and local research institutes etc.

#### INTERNATIONAL RELATIONS

Delegations from the institute have attended the 4th (Madrid, Spain.), 5th (Tokyo, Japan.), 6th (Dublin, Ireland.), World Congress of Food Science & Technology sponsored by IUFOST. The experts of the institute have also attended the related meetings organized by FAO, UNU etc. The institute has some connections with above international organizations and research and development organizations, such as fruit and vegetable processing (NetherLand), baby food and convenient food (Japan, U.S.A.), canned food (England), wine and beer (U.S.A. France), etc. In both ways, the people of the institute go abroad to do the research work together with foreign's scientists, or foreign experts are invited to hold seminar in China. The institute also exchanges the technical information with foreign food research centers.

#### FUTURE PLAN

We are studying a lot of interesting subjects in the field of food and fermentation science and technology of which about 30 subjects are the key work for improving the food patterns for different age groups. Doing this, we will promote the modernization of food industry in China. Let us take the following topics as the examples:

1. Development & utilization of soy protein.
2. Baby food.
3. High fructose syrup by enzymes.
4. Identification of chinese liquor and wine flavor compounds.
5. Retort pouch for a series of food products specially for Chinese traditional food and many others.

Another important plan for the institute is to construct new research buildings and supplement more sophisticated facilities, by doing so, we can put the research work on more modernized basis and catch up with the advanced world level sooner than ever before. We are able to promote the rapid development of food industry and serve our people more effectively in the near future.

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ALLIANCE

(2). The Center of Industrial Culture Collection It is one of six centers under the China Committee for culture collections of micro-organisms.

It has eight branches in Beijing, Shanghai, Tianjin, Inner Mongolia, Hunan, Guangdong and Sichuan.

More than 2200 industrial microbial strains is maintained in freeze-dried state and over 5000 cultures were packaged each year for distribution.

The main task of the Center: (a). Instructing and coordinating the work of 8 branches, to organize the programmes of exchanging experiences and training the technical persons. Unifying the methods for identification. (b). Collection and preservation of industrial cultures, supplying cultures and consulting of technique for factories, colleges and research institute. (c). Studies on microbial systematics, identification, nomenclature of cultures. Improving methods for the isolation, propagation and preservation. (d). Collection and handle of technical information on the collected cultures. (e). Screening high-yield cultures, determination and improving their specific abilities to industrial use.

(3). The National Scientific and Technology Information Station of food and fermentation industry. (a). Collecting the information and literatures in food and fermentation science and technology. After analyzing, cataloging, and editing, exchanging information to offer the best use for food scientists. (b). Collecting and accumulating the information of production and innovation in food and fermentation industry, the tendency of science and technology in food and fermentation as well as their economical index, It can be served as the references for the user concerned. (c). Inviting the experts all over the country to write papers so that the technic information will be able to exchanged. (d). Publishing various kinds of journals. Such as: The bi-monthly periodical entitled "FOOD & FERMENTATION INDUSTRY", which deals with research reports, reviews and other informations concerned. It is published internationally. Another journal in which foreign advanced technical articles are translated into chinese is published also namely: "Translated Collection".

## 2. Secretariat

The Secretariat of the Chinese Institute of Food Science and Technology (formerly the Society of Food Science and Technology, as well as the Society of Fermentation Science and Technology) is set up in this Institute. It connects itself widely with national and

PROJECT FILE

TRIP REPORT

BEIJING AND SRI LANKA

J. E. Gleason

CHINA

Ministry of Light Industry, Food and Fermentation Section, Beijing, China

The meeting I held with members of this organization centered on areas of mutual research interest. They identified three areas of interest. They are listed below according to their priorities:

1. Development of textured vegetable protein (TVP).
2. Extension of home and village level technologies.
3. Soybean (grain) quality.

The development of TVP is most important to China as a meat substitute. It is promising because it is economical to produce, and it is highly nutritious.

Home and village technology is of interest, but the researchers are uncertain what steps are needed for extension. I commented that there is no formula to extend new technology. Rather extension is essentially an economic and social issue which depends on the institutional framework and preferences within a specific country.

The third area of mutual interest, grain quality, was an issue they were unprepared to discuss. They stated that this is an internal problem in China, but not of high priority on the research agenda of their institution.

UNDP will provide the funds for Dai and Wu to come to Illinois. In addition to the above areas of research, they are interested in Nelson's methods of producing soymilk. After viewing the equipment they use for soymilk production, I believe that these researchers can make a contribution to our program, and my impression is that they will be enthusiastic workers.

My recommendation regarding working with Dai and Wu is that upon their arrival we establish clearly a set of parameters under which they will work. That is, we make it clear what is expected from them and what they can expect to receive from us. This I believe will safeguard against misunderstanding of what roles the two parties will assume. I attempted to make it clear to them that establishment of a relationship with INTSOY is a two-way street and that we expect them to make a positive contribution to our program.

I viewed new office, lab, and pilot plant facilities which are presently under construction. These facilities will be completed in summer 1987. They stated that once the facilities are completed, they would welcome

researchers from Illinois to conduct collaborative work with them in Beijing.

### SRI LANKA

#### UNICEF

My first day in Sri Lanka I met with Dr. Vijamane at UNICEF. She agreed that the project as outlined in the research proposal is valuable to Sri Lanka and to UNICEF in general and therefore is willing to provide funds. After a second discussion with Dr. S. A. Meegama, UNICEF's Project Officer of Applied Research and Evaluation, we concluded that UNICEF will provide up to USD5,000 for hiring of research assistants and data collection activities.

#### UNDP

At UNDP I spoke with Tilak Gunawardena. Mr. Gunawardena is in charge of the Soybean Development Programme at UNDP and is interested in our project in Sri Lanka. He stated that UNDP will gladly give funds for implementation of the project, and stated that we at INTSOY should identify an item, such as travel, and ask funds specifically for that item. If rupees are needed, the request has to go through the Soybean Development Program at Gannoruwa. For the sake of expediency, he suggested that we request funds in dollars so that UNDP can make an outright grant to INTSOY. For this he suggested that airfare would be an appropriate request. We should make the request to Mr. Bhekh B. Thapa, the resident representative.

#### USAID

USAID will contribute money to be used at my discretion for implementation of the project. Chuck Strickland, John Flynn, and Mr. Charles are positive about the project. They mentioned that it is timely because of interest they have in processing and utilization of other subsidiary crops. In terms of the proposal, their only request was to include a small section on processing of other crops, which will be useful for them as they make plans to expand AID's food processing and utilization work in Sri Lanka. I agreed in principle to including some work on other crops, but also stated that this would need approval by INTSOY staff at Illinois.

#### SOYABEAN FOODS RESEARCH CENTRE

I met with Cecil Dharmasena twice while in Kandy and talked about two issues. First, with regard to our research proposal, he is in favor and looking forward to implementation. He stated that office space, office equipment, secretarial help, etc. would be provided by the Centre. He asked that we include recommendations and help with the practical promotion of soyfoods in Sri Lanka, because this could have an important bearing on the Centre's future program.

Second, Dharmasena, after contacting members of the Food Science

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BACKGROUND

The National Scientific Research Institute of Food Industry, as the earliest national food science research organisation after the liberation of China in 1949, was founded in 1955 in Shanghai. Three years later the institute moved to the capital city --- Beijing.

The National Scientific Research Institute of Fermentation Industry was established in 1958 in Beijing.

In 1966 under the supervision of Ministry of Light Industry, above two institutes were combined into one named "Scientific Research Institute of Food and Fermentation Industry, Ministry of Light Industry" (SRIFFI). The most important parts of food industry in China are administrated by Ministry of Light Industry. So the SRIFFI plays a very important role in progress of nationwide food science and technology.

The primary aim of the institute is to promote the growth of modern food industry with Chinese traditional features, and reasonable utilization of the national food resources, through research and development work. Besides, it offers a battery of services, including, consulting and answering technical enquiries; disseminating the technical information; analysis, testing, evaluation and quality arbitration of food products; training of personnel etc. to aid the development of food industry.

Unfortunately, during "the great cultural revolution" the Institute suffered heavy loss, and most of the people in the institute moved to Jiangxi Province to do manual labour, only limited persons stayed in Beijing and continued to serve nationwide food industry in necessitous aspects, including: inspection of food products for export; preservation of cultures; and collection of technical information.

After smashing "the gang of four", all people of the institute returned to Beijing in 1979. Since then the institute has recovered rapidly and has been getting great progress, because the government has paid much attention to the food research. The capital investment value reaches to 6 million Yuan (RMB) for the institute so far, and the annual research expenditure is about 2 million Yuan (RMB). Now scientists in the Institute are

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# INTRODUCTION

to

Scientific Research Institute

of

Food & Fermentation Industry

Ministry of Light Industry

The People's Republic of

China

