

W A R T A
PENGELOLAAN PENELITIAN DAN PENGEMBANGAN
(R&D MANAGEMENT)

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**WARTA PENGELOLAAN PENELITIAN DAN PENGEMBANGAN
(R & D MANAGEMENT)**

1. Merupakan wadah komunikasi bagi masyarakat ilmuwan, para pengelola penelitian dan pengembangan pada umumnya, dan antar-alumni Widyakarya-Penataran Pengelolaan Penelitian dan Pengembangan pada khususnya.
2. Memuat karangan dan berita mengenai perkembangan pengelolaan penelitian dan pengembangan.
3. Terbit tiga bulan sekali, yaitu pada bulan-bulan Januari, April, Juli dan Oktober.

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DAFTAR ISI

KATA PENGANTAR DEWAN REDAKSI	iii
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KARANGAN

1. Kaitan antara Penelitian dan Pengembangan dengan Industri oleh : Gatoet Soedomo	1
2. R & D for the Development of Small Scale Industries: The LKN Experience by : Roestamsjah	6
3. Petunjuk Penyusunan Usulan Penelitian Oleh : Sumengen	15

B E R I T A

1. Piagam Kerjasama LIPI – UNPATTI	26
2. Widyakarya–Penataran Pengelolaan Penelitian dan Pengem- bangan LIPI – DRI – UNPATTI Ambon, 26 Agustus – 4 September 1982	26

Tulisan dalam "Warta" dapat dikutip dengan menyebutkan sumbernya

KATA PENGANTAR DEWAN REDAKSI

Warta No.4 tahun 1982 memuat dua buah tulisan yang menunjukkan perlu dipereratnya kaitan antara penelitian dan pengembangan dengan industri. Tulisan pertama mengemukakan perlu diperkuatnya struktur LITBANG untuk menunjang peningkatan inovasi di sektor industri. Peningkatan inovasi ini diharapkan dapat lebih mendorong akselerasi dalam proses industrialisasi dalam tahun-tahun yang akan mendatang.

Tulisan kedua mengemukakan suatu kasus penelitian dan pengembangan untuk membantu industri kecil. Dikemukakan adanya faktor-faktor yang perlu dipertimbangkan mulai dari memilih dan merumuskan masalah, mekanisme yang dipergunakan, sampai menyebarkan hasil penelitian di lingkungan industri kecil.

Kedua tulisan itu dikemukakan dalam pertemuan KIM'82 dan mendapat izin Koordinator Penyelenggara untuk dimuat dalam Warta.

Tulisan ketiga adalah suatu petunjuk menyusun usulan penelitian. Usulan penelitian merupakan suatu bagian yang penting dalam pengelolaan penelitian dan pengembangan, karena di dalamnya tergambar seluruh proses pemikiran dan kemampuan melaksanakan penelitian.

Akhirnya dapat dikemukakan tentang ditandatanganinya Piagam Kerjasama antara Lembaga Ilmu Pengetahuan Indonesia dengan Universitas Pattimura pada tanggal 26 Agustus 1982. Salah satu bagian kegiatan daripada kerjasama itu ialah bidang Pengelolaan Penelitian dan Pengembangan. Langkah pertama ialah diselenggarakannya Widyakarya-Penataran Pengelolaan Penelitian dan Pengembangan, yang merupakan kerjasama LIPI-DRI-UNPATTI pada tanggal 26 Agustus s/d 4 September 1982 di Ambon. Widyakarya-Penataran diikuti oleh 39 orang peserta dari UNPATTI, universitas di kawasan Indonesia bagian Timur dan Stasiun Penelitian Ambon LON-LIPI. □

R & D FOR THE DEVELOPMENT OF SMALL SCALE INDUSTRIES: THE LKN EXPERIENCE *)

by
Roestamsjah **)

INTRODUCTION

Conducting R & D for the development of small scale industries is very unique, in the sense that there are many factors which should be considered during the process of identification, formulation and selection of the R & D problems, as well as during the dissemination of the R & D results to the small scale industries. The LKN-LIPI (Lembaga Kimia Nasional-LIPI) or the National Institute for Chemistry, one of the research institutes under the Indonesian Institute of Sciences, has been implementing R & D programmes in the area of food technology, with the aim of improving the existing traditional food processing techniques. The institute's experience during the selection of the R & D problems, during executing the R & D activities, and also during the dissemination of the research results will be highlighted and discussed in this paper, in the effort to search for the suitable strategy in developing the small scale industries, particularly the traditional food industries

DEVELOPMENT OF THE LKN'S PROGRAMMES AND RESOURCES

The goal of the institute is to develop and to apply chemistry and chemical technology for the benefit of the community. The scope of the institute activities has been derived from LIPI's main functions, i.e. i) providing recommendations for national science policy, ii) promoting science and technology, iii) conducting scientific and technological research, iv) providing scientific and technological services, and v) institutional development.

The institute was established formally from scratch in 1962, the institute's programme was broadly defined, and staff recruitment was conducted through the selection of university graduates as well as through fellowships to students interested in working at LIPI. The number of research workers has been increasing recently in line with the development of space available and the development of R & D activities (see figure 1). An effort of consolidating the R & D programmes has been initiated since 1973, when it was felt that with the limited resources (researchers and research facilities) it was considered essential to have a sound programme which was considered relevant to the national development plan.

*) Revised paper presented at the Annual Meeting KIM '82, "From Academic Research to Industry", Bandung 16 June 1982. (published with permission).

**) National Institute for Chemistry, Indonesian Institute of Sciences.

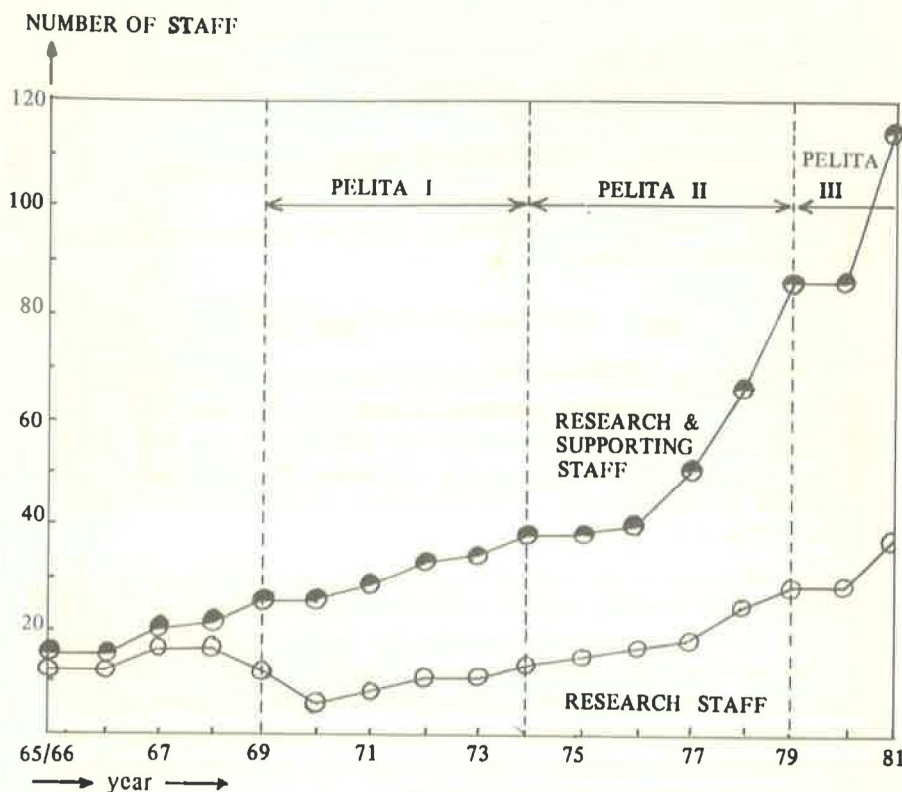


Figure 1.

Number of research staff accumulated at LKN-LIPI since 1965

(○ : research staff; ● : research and supporting staff).

In 1981/1982: there are 115 employees including 35 research staff.

A set of criteria which the Minister of State for Research used for the setting up of national research priorities was applied in a simple manner. The set of programmes in order of priority consisted of the following :

- i. food protein
- ii. industrial chemicals
- iii. development of chemical methods of analysis
- iv. dissemination of research results

As a consequence of this programme consolidation, some of the research staff had to orient themselves to new areas of research such as food protein. Since 1979 LIPI has had the policy that LKN should orient its R & D activities to food technology and recently this policy was modified so that LKN should initiate an R & D programme in the field of industrial chemicals as the second main stream. This was in line with the recommendation of the institute evaluation, conducted by a team in 1979.

At present LKN'S activities can be grouped as follows :

- i. food technology
- ii. feed technology
- iii. industrial chemicals
- iv. development of chemical analysis methods
- v. environmental chemistry.

With respect to food and feed technology, LKN has considerable experience which will be discussed below.

R & D FOOD PROBLEM IDENTIFICATION

In identifying R & D food problems it is important to consider the food system, where the food chain, consisting of production, handling and storage, processing, distribution and consumption, is supported by the R & D and other services, as shown in *Figure 2*. The efficiency of the food chain system will depend on the efficiency of the components in the food chain system. (Bachtiar Rifai, *et al.*, 1982).

The efficiency of the various components in turn will depend on the availability of the necessary services to the food chain system. It is expected that R & D coupled with other services like health, education, training, financing, communication and management could have an impact of the food chain system. It is believed that consumption will stimulate production, so that a complete cycle in the food chain system is obtained. Services of upstream industries like fertilizers, pesticides, seeds and agricultural machinery will also influence the production of food.

Using the above food system the food problems in developing countries like Indonesia could be identified more closely, whether they are scientific and technological in nature, economic, social, ecological or concerned with food policy and regulations. It should be noted here that the goals of food research and development in developing countries like Indonesia, is to provide more and better food at lower cost. Better food means the food will be more socially acceptable, more nutritious and safer. The production of more food for consumption will involve an integrated effort in all pre-harvest and post-harvest activities, in fact in the whole food chain system.

Various traditional foods, especially the fermented foods are manufactured and consumed daily in Indonesia, such as *tahu*, *tempe*, *oncom*, *kecap*, *tauco*, and *tape*. It is true that the traditional fermentation process practiced today reflects the long and intimate association between man, his food and his environment. Such processes have been retained as part of the cultural pattern of the people concerned.

The increasing interest and activities in research and development in the area of traditional protein rich foods will certainly make a significant contri-

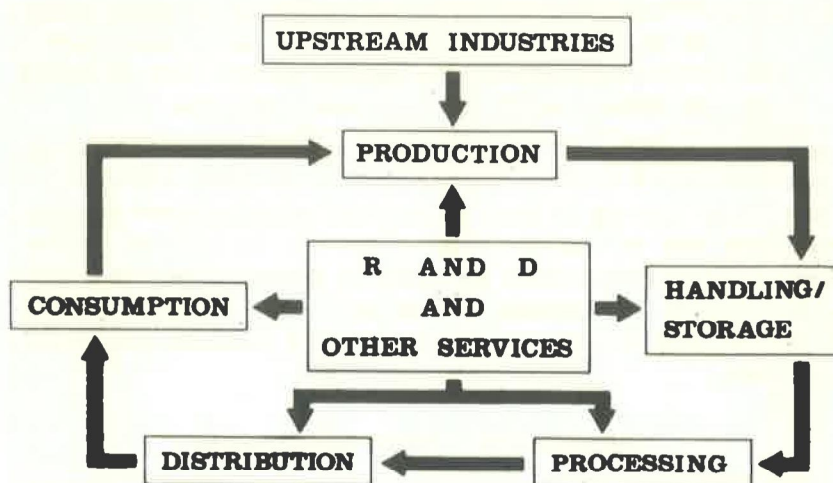


Figure 2
R & D in the food chain system

bution towards future development. From this point of view it is important to improve the present manufacturing techniques such as the utilization of conventional and nonconventional substrates, the development of the micro-organisms used, improving the quality control in the fermentation processes, and also exploring the diversification of the fermented products. The preservation techniques for the fermented food products should be given special attention also. Systematic evaluation of the existing fermented food products still has to be done and an effort towards the standardization of traditional fermented food products should be initiated.

THE INSTITUTE'S CLIENTS

Generally the institute's clients can be categorized into three types, namely :

- i). **the resource providers**, which provide funds, equipment or information to the institute for conducting R & D or known as project sponsors. The resource providers are usually the government, regional association of government such as ASEAN (Association of South East Asian Nations)
- ii). **the service users**, which use scientific and technological service provided by the institute. They consists of the small or medium scale industries, the cooperatives of the small scale manufacturers such as the traditional food manufacturers

- iii). the resource providers and service users, which use the institute service and at the same time provide resources for the service. One example of this category is the alcohol plant utilizing molasses from the nearby sugar cane industry, public service and research institutes.

Table 1 shows the types of service provided by the institute associated with the institute's R & D programme and the types of clients. The clients as shown in that table are the direct clients, which established direct contact or relationship with the institute. It can be seen that for LKN, the institute clients as the resource providers are mainly the government through projects funded either by the government development budget or presidential aid, or through projects under the ASEAN-Australia Economic Cooperation programmes.

THE INSTITUTE -- CLIENT RELATIONSHIP

Since LKN has made a commitment to serve the small scale industries, particularly the small scale food industries, many obstacles had to be overcome during the planning of the institute's activities. Establishment of good relations between the institute and the clients, either as resource providers or service users, became very important. There are many obstacles to good relations between the institute and the clients, namely the institute, client and the environmental obstacles. LKN has experienced major obstacles such as :

- o lack of physical facilities, such as space, equipment, replacement parts
- o lack of trained or experienced staff
- o insufficient interest in practical problems and awareness of user needs
- o low pay of research and supporting staff
- o insufficient information resources
- o insufficient marketing skills.

Most of the above mentioned obstacles were partially overcome through the institute participation in the ASEAN protein project since 1975, where the institute gained research equipment which in turn generated recognition from the government by providing laboratory space needed to house the equipment. The institute has been assigned as the coordinator of the implementation of the ASEAN protein project in Indonesia, and the project itself has generated cooperation among the eight research institutes participating in the projects. The ASEAN protein project was then followed with the ASEAN food waste materials project since 1980 and recently the ASEAN food technology project since 1982. The activities of the projects like the survey and industrial visits, training, workshops and symposiums have provided opportunities to the research staff to overcome the institute obstacles to good relations with the clients.

The clients obstacles to good relationship with the institute for

Table 1. Types of service provided by the institute vs types of clients (X : resource providers; (X) : service user;
(X) : resource providers/service users)

Types of service provided by the research institute	Types of client (individual or cooperatives)	Industries		Government		Association of Government (ASEAN)	Research Institute/Agencies Universities	Public Service/Consumers Association
		Small	Medium	Large	Local	National		
1	<u>Basic studies :</u> - National survey on soybean production and utilization (1976) - Survey on management & utilization of food waste materials (1980) - Survey on industrial chemicals from food waste (1981-1982) - Feasibility study on onion drying at the village (1979)						(X) (X) (X) (X)	
2	<u>Improvement of process and quality of products :</u> - traditional protein rich foods (tempe, tahu, oncom, soysauce) (1975-1982) - feed from agricultural/agro-industrial waste materials (1980-1982) - food preservation (dehydration & canning) (1982) - Acetic acid from crude alcohol (1979-1982)	(X) (X) (X)				(X) (X) (X)	(X) (X) (X)	
3	<u>Technical consulting/training :</u> - food processing demonstration center - feed processing demonstration center	(X) (X)			(X) (X)			
4	<u>Chemical analysis :</u> - food composition and toxins analysis						(X) (X)	(X)

the case of small scale industries as service users, are the low level of general education, inadequate technical management and marketing skills, and limited investment and working capital. For the case of resource providers, such as the government agency in charge of assessing project proposals, the client obstacles were due to lack of mutual interest and understanding of the problems to be tackled., lack of confidence in the institute's technical capabilities, and the fear of duplicating efforts with other research institutes.

The nature of environmental obstacles to good institute-client relationship could be technological, economical, social, legal, political or subjective/emotional. For the development of small scale industries, the government has recently introduced the concept of resettlement of the small scale industries. LKN as requested by the Cooperatives for the Indonesian tofu and *tempe* manufacturers, has made a prefeasibility study on the establishment of a canning industry for cooked soybean curd and tempe products, where the raw materials will be produced by the manufacturers relocated in one particular area. The scheme of the relationship is shown in *figure 3*. The project will be implemented this year at Gunung Sempu, Yogyakarta.

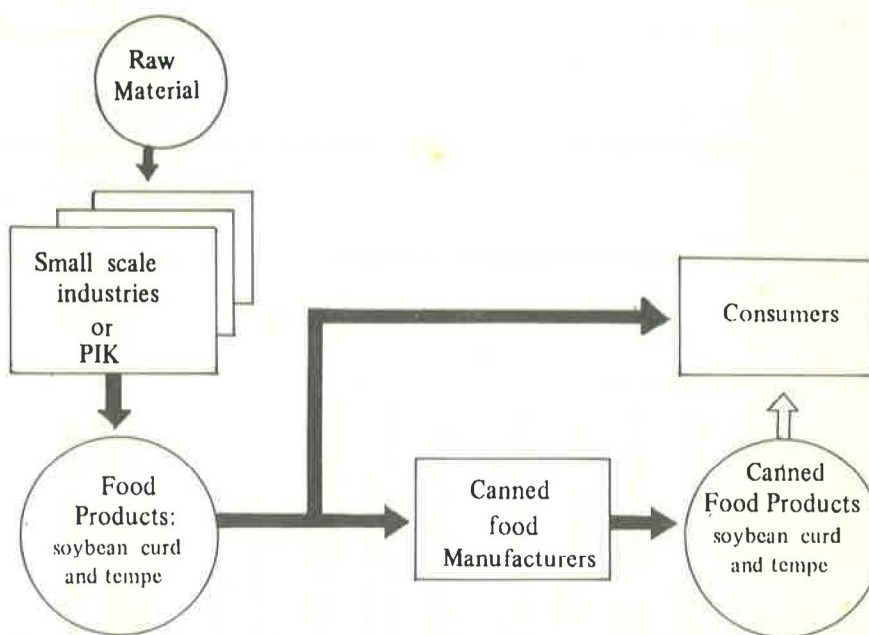


Figure 3.
Relation of the small scale industries and the canned food manufacturer.

It is hoped that by relocating the manufacturers in one appropriate location, the obstacles for developing the small scale food industries could be overcome with respect to marketing, increasing product quality and production capacity, increasing absorption capacity for the credit provided for investment and working capital, the chance providing guidance and services as well as stimulating the other activities in the community.

As it was mentioned before, LKN has recently (1981) established several demonstration centres in the village, namely :

- (i) the demonstration centre for protein rich food processing at the village of Dawuan, district of Subang, West Java Province. Most of the results of the R & D activities were introduced in the form of training workshops. Three training courses were conducted and the distribution of participants is shown in Table 2. Most of the participants mainly held the elementary school certificates. The aim of establishing this centre was to obtain the best dissemination model of the research results to the small scale industries and the interested social groups in the community.
- (ii) The feed processing demonstration centre has been established at Ujung Berung, Bandung, for the chicken (broiler and layers) and at the village of Playen, Gunung Kidul, Yogyakarta, for the cattle. Firstly, the institute has recognized the need for such a centre. Through the cooperation with the faculty of animal husbandary, University of Gajah Mada, the centre was established, which generated new research activities at the institute,

Table 2.
Number of participants at the three training workshops
at the village of Dawuan

Participants Training	Manufacturers			Others	Wives of Civil Servants ("Dharma Wanita")	Total
	Tempo	Oncom	Soybean curd (tahu)			
First Training (20-24 January 1981)	1	13	2	4	—	20
Second Training (28 April — 2 May 1981)						
* morning session				—	20	20
* afternoon session	7	9	5	—	—	21
Third Training Workshop (25 - 29 August 1981)						
* morning session				—	20	20
* afternoon session	4	12	5	—	—	21
TOTAL	12	34	12	4	40	102

in the production of feed mixed concentrates from agricultural food waste materials.

CONCLUSION

From the LKN experience just described in conducting R & D activities for the purpose of developing the small scale industries, it can be concluded that :

1. The institute capability is determined by the number, qualification and motivation of the research and supporting staff of the institute.
2. The institute should be able to select R & D programmes which create further challenging opportunities.
3. In serving the small scale industries during the planning of its activities, the institute is expected to make a careful assessment of the needs of the institute clients and the various factors involved.
4. In conducting the R & D activities and in serving the small scale industries, the institute should encourage the involvement of the potential expertise from other research institutes or agencies, which could be organized in a form of cooperative projects.
5. In effectively disseminating the research results to small scale industries, the institute should make a special effort in establishing and maintaining the institute – client relationship, i.e.



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