

FACTORS INFLUENCING THE ECONOMY OF FATTY TISSUE /EFT/ - A MODEL OF POLAND

K.J.KRAJEWSKI and D.M.KOŁOŻYN-KRAJEWSKA^{x/}

Warsaw Agricultural University /SGGW/
 Department of Food Technology, Department of
 Human Nutrition and Home Economics^{x/},
 03-899 Warszawa, ul. Grochowska 272, POLAND

SUMMARY

Economy of Fats Tissue /EFT/ a subsystem of economy of fat is related to other subsystems and on the other hand to the Meat Economy. Unfavourable phenomena and a decrease of resources in both food economies in Poland /1981-1982/ caused a cumulated negative effect in the economy of fats, fat balance-sheet problems and a demand increase. Due to limited resources, the optimization of the EFT in the macro- and microeconomic scale is essential. Because of a great number of links which manage fat tissue with different management specificity/complex approach and analysis of the problem with system methods is necessary.

In the present work the EFT Model in a macro economic scale was constructed, technical indices of utilization and then material flows in the model were found. Also the EFT Model was analysed in microeconomic scale, considering the necessity of meat plant.

These analysis allowed the determination of main factors influencing the EFT, such as: meat-fat raw materials resources and the production structure in the meat industry, balance-sheet of edible fats in the country, demand of feed industry, trends of fat utilization for technical purposes, and the model of fat consumption.

Main factors influencing rational fat tissue economy in microeconomic scale are: the kind and features of meat and non-meat raw materials, the program and technology of production, the machine performance and workers qualifications. This determines a approach to construction of control systems in the EFT in the macro- and microscale.

INTRODUCTION

Animal tissue fats, obtained as a result of processing carcasses of animals for slaughter in the countries with unfavourable climatic conditions for growing of plants, giving vegetable fats, still play a big role in fats economy of these countries. Availability, complementary character in relation to meat production/especially of pork/ and stable nutritional traditions, are the main reasons for high position of animal fats among other edible fats in Central European countries, in spite of fact that the role of high consumption of saturated fats in ethiopatogenesis of metabolic diseases of civilization is well known /1/.

In meat processing, animal fats are the main component of meat products, indispensable from the viewpoint of structure and stabilization of raw material system, sensoric properties /consistency, taste and smell/ and yield

of products/2/. Reasonable utilization of fat is justified, therefore, by the requirements of technology and economics of production processes. Changes in raw material composition of meat products/supplement of meat protein substitutes/cause the increase in demand for animal fats in production process.

The main reasons for the increase of interest of the industries, processing animal fat into technical purposes (especially tallow) are desirable composition of fatty acids of animal fats, market availability, need for utilization of increase of meat production and the requirements of natural environment protection.

The mentioned factors, decisive in the EFT /on the level of meat processing, food economy and national economy/ should be analysed in their relationships and conditions and sometimes in the contradictory developmental tendencies. It requires a complex analysis of fats economy in a system approach on various economic levels.

The purpose of the present work is to construct the EFT-models on two levels: national one and that of meat industry plant, as the initial stage of optimization and control of processes of EFT.

MATERIALS AND METHODS

Analysis and classification of factors determining EFT were conducted on the basis of data and information collected in the units which utilize the above fats in Poland. For assessment and presentation of mutual relations between the participants in utilization of animal tissue fats, the system approach was applied and the system methods were used: Diagnostic Analysis and Structured Systems Analysis /4,5/.

RESULTS AND DISCUSSION

In the years 1960-1984, the share of animal tissue fats in economy of fats in Poland was decreased/see table encl./ in respect of resources, industrial production, sales and consumption of edible fats. These tendencies profitable from viewpoint of nutrition, cause simultaneously tensions in fats balance-sheet in Poland. The resources in meat-fat mass in Poland were decreased in the years 1979-1984 by 37% and resources of animal tissue fats by 29% /6/. This state, in the light of limited possibilities of obtaining other edible fats, made a decision about the need for balancing the animal tissue fats. It, in turn, determines the necessity for optimization of economy of these fats in situation of non-balanced needs of industry and market. The range of relations between the participants of EFT makes a decision about the system approach to the optimization problems.

According to the principles of system methods in the first stage of system analysis, we build a model of relationships, dependencies and functional connections between all elements of the isolated system-economy of animal fats -EFT System.

We understand the Economy of Fats Tissue/EFT/ as the compact chain of production and service links utilizing animal tissue fats , bound up with the goods-money-information flow, oriented to the satisfaction of economic and social demand for these fats. A simplified model of this economy is shown in fig.1. Definition of the model, of the compositional elements and relations inside the model, allows to describe it, using mathematical functions and then ,to build a system of control of EFT under the conditions of limited resources of these fats.

Description of the model by the mathematical functions should be preceded by the establishment of technical and economic parameters ,characterizing the material flow between the links of EFT, and by the elaboration of characteristics of the fundamental links of this economy. Fig.2. presents utilization of the resources of animal tissue fats ,obtained in agriculture during the flow through the particular links of the system. Particular attention was paid to the losses and decrease of fats/estimated in production and turnover as 9% of total resources of fats/; these quantities compose a serious source of threat to natural environment.

A fundamental link in the EFT is meat industry, including industrial plants. The above fact and the requirements for effectiveness of controlling the EFT in global scale, determine the need for elaboration of detailed model in plant scale. The requirements of production technology of meat products ,

of stability and quality of these products cause that especially great meaning is ascribed to standardization of meat products /among others ,in relation to fat content/ at minimal costs. It is possible owing to application of the methods of linear programming and microcomputers/7/.

LITERATURE

1. The role of fats in human nutrition- Editor A.J. Vergroesen, Academic Press London 1975
2. Wirth F.-Die technologische Funktion der Fette in feinzerkleinerten Fleischwaren, in: Fette als funktionelle Bestandteile von Lebensmitteln -Editor J. Solms, Forster Verlag AG Zürich/Schweiz 1973
3. Krajewski K., Grudziński J.-Przemysł Spożywczy-/Food Industry/1984,9,43
4. De Marco T.-Structured Analysis and System Specification. Yourdon Press, New York 1978
5. Kisielnicki J.-Metody systemowe. PWE Warszawa 1986
6. Krajewski K.-Bilans tłuszczów jadalnych a gospodarka tłuszczem mlecznym w Polsce w latach 1960-1984 , SGGW-AR Warszawa 1986 , Praca doktorska/Thesis for doctors degree/
7. Lorenz G.-Die Erstellung Kostenminimaler Einzelrezepturen in der Fleischwarenindustrie mittels linearer Programmierung, Paper C 33, 27 .Europäischer Fleischforscher Kongress ,Vien 1981

TABLE. SHARE OF ANIMAL TISSUE FATS IN THE LINKS OF FAT ECONOMY IN POLAND
IN THE YEARS 1960-1985 , GIVEN IN PERCENT

	1960	1975	1985
1. In resources of fats in agriculture	30	28	24
2. In industrial production of edible fats	28	27	18
3. In supply of market with edible fats	45	30	20
4. In average consumption of edible fats	47	35	30
5. In natural consumption of fats in farms	62	57	59
6. In application for technical purposes	50	39	23

Source: /6/

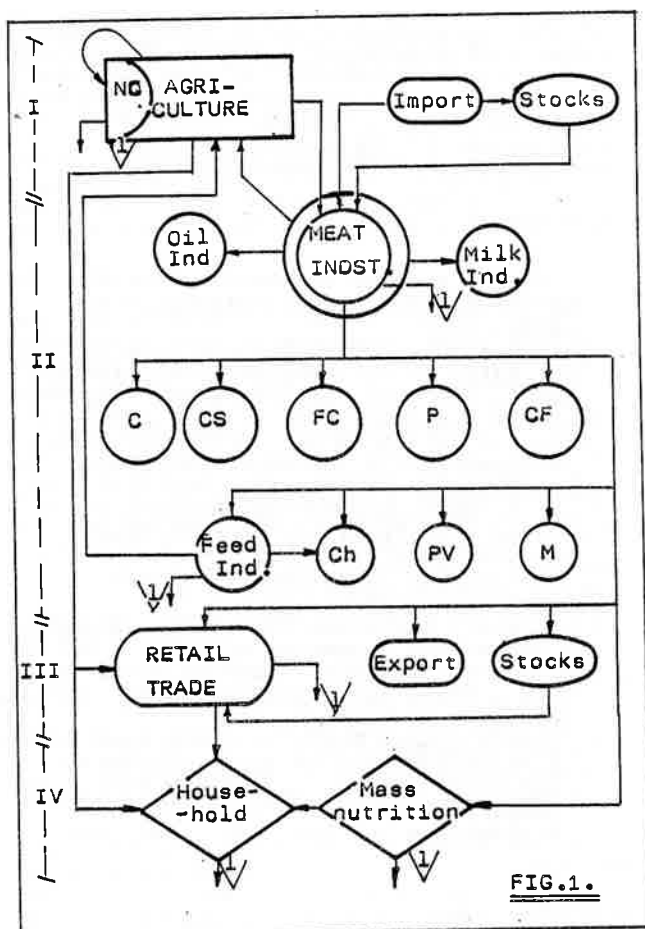


Fig.1. EFT Model- material flow

Levels of the Model:

I. RESOURCES , II. PRODUCTION AND INDUSTRIAL UTILIZATION: Catering /C/, Cold store /CS/, Food concentrate Industry /FC/, Poultry Industry /P/, Canned food Industry /CF/, Chemical Industry /Ch/, Paint and varnish Industry /PV/, Metal Industry /M/ , III.SALES, IV.CONSUMPTION

Natural consumption in farm/NC/

V - losses

9 : 4
AN OBJ
THE AC
I.F. V
LIVES
239 GI
SUMM
Bruis
probl
husbe
some
desir
to ar
speci
the c
brui
whic
brui
brui
INTR
The
catt
Aust
(195
ago
care
imp
Frai
198
Aus
bru
19,
and
bru
(19
Qu
tr

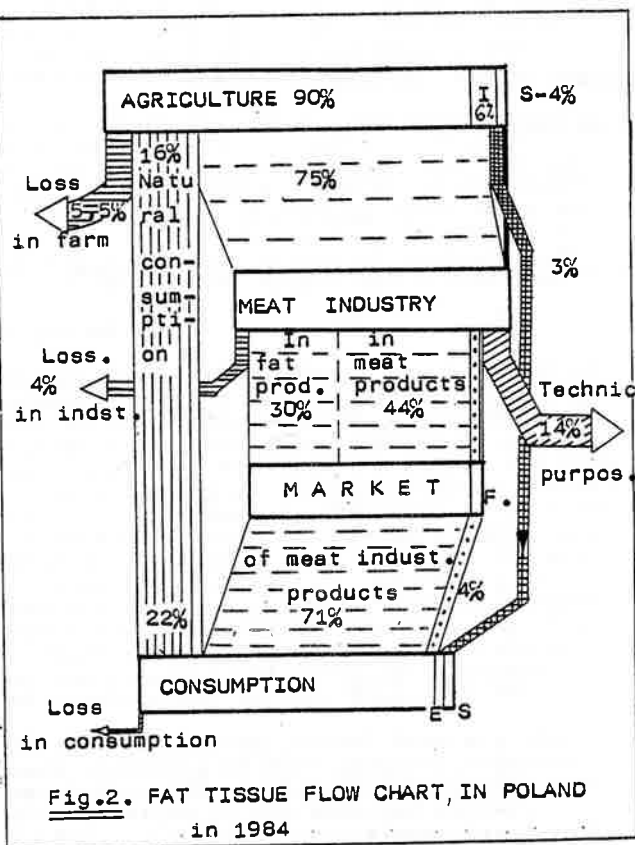


Fig.2. FAT TISSUE FLOW CHART, IN POLAND in 1984

Source: /6/ I-Import, E-Export
S-Stocks, F- in food prod.

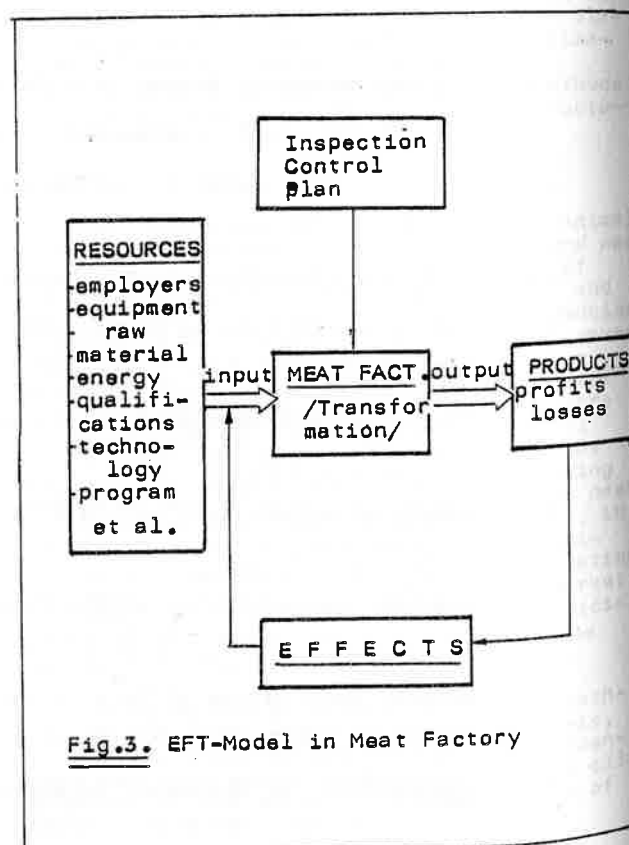


Fig.3. EFT-Model in Meat Factory