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The Aggregation of the Agricultural Supply Utilisation Accounts

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THE AGGREGATION OF THE AGRICULTURAL SUPPLY UTILISATION ACCOUNTS

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FOREWORD

Understanding the nature and dimensions of the world food problem and the policies available to alleviate it has been the focal point of the IIASA Food and Agriculture Program since it began in 1977.

National food systems are highly interdependent, and yet the major policy options exist at the national level. Therefore, to explore these options, it is necessary both to develop policy models for national economies and to link them together by trade and capital transfers. For greater realism the models in this scheme are being kept descriptive, rather than normative. In the end it is proposed to link models to some twenty countries, which together account for nearly 80 per cent of important agricultural attributes such as area, production, population, exports, imports and so on.

To support the work of FAP, a data bank has been organized. One of the most important constituent elements of this bank is the Supply Utilisation Accounts (SUA) provided by the FAO on magnetic tapes. These accounts report in detail a complete flow of agricultural products in the chain between production and final consumption, not only for the natural products such as maize, apples or cattle, but also for processed or derived products such as starch, canned fruit or sausages. However, it was necessary to arrive at a much more general commodity classification which could be used in our analytical work. Ulli Sichra and Günther Fischer present in this paper the aggregation logic and program procedures developed to process the SUA data.

Kirit S. Parikh
Program Leader
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PREFACE

It is our hope that the publication of this paper will satisfy a number of requests, some of which stem from the very distant past, to provide detailed information about the data aggregation done by the FAP at IIASA. The Supply Utilisation Accounts on Agricultural Products (SUA), published by the FAO, have been the starting point for the aggregation of agricultural commodities and the time series available for the FAP commodity lists, as well as the basis for the FAP Data Bank. The SUA and its aggregates have been widely used in the FAP Modeling work, at IIASA and at the collaborating institutions.

This paper gives first some general explanations concerning the original SUA, and concentrates then mainly on the "aggregation-logic", for general cases and for special cases.

The last section deals with the computerization of the aggregation, as this constituted the main effort and seems to be a very valuable idea for similar types of calculations.

The appendixes, a large part of this paper, go into greater detail for the interested reader and for the users of the accounts.

ACKNOWLEDGEMENTS

This work would not have been possible without the friendliness and goodwill of the Food and Agriculture Organisation of the United Nations, Rome, which, by continually sending us the computer tapes with the SUA time series, its updates and other data, made this aggregation task possible. Special thanks are therefore due to a number of staff members of the FAO, especially to D. Agostinucci, J. Bruinsma, J. Hrabovszky, J. O'Hagan and L. Quance.

Many of the FAP staff at IIASA (past and present) and members of the collaborating institutions contributed with valuable suggestions on "commodity trees" and tracing of errors.

We would like as well to thank B. Riley for digging out parts of this paper which were thought lost, and finally for putting together all parts to a homogeneous "big thing".

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1. THE ACCOUNTS

1.1. Introduction

The FAO Supply Utilization Accounts present time series on about 1000 commodities related to agriculture. They cover population, macroeconomics, land use, crop production, livestock production, agricultural inputs (fertilizer, pesticides, machinery), fishery production and forestry. A complete list of the FAO commodity codes can be found in Appendix A. Commodity numbers greater than 1700 refer to aggregates and therefore have not been considered in our work. Leaving out also commodities referring to macroeconomics, fodder, forestry, machinery, etc., we are still left with a huge amount of data presenting balances of production, trade and use of about 500 agricultural commodities. In principle the accounts fit the standard accounting framework:

production = final demand + intermediate demand + exports - imports

Final demand is composed of the following components:

- stock change
- seed/breeding
- feed
- waste
- consumption (food)
- demand by manufacturing industry for nonfood use

Intermediate demand for a main product is called PROCESSED and reappears as INPUT in the accounts of one or more derived commodities.

The data are arranged in a five-dimensional format:

1) country
2) commodity
3) item
4) dimension
5) year

In our data base, the years 1961–1976 are covered for 56 countries (at this moment). The third dimension (item) specifies the type of information contained in the time series; the items relevant to us are:

extraction rate	04
production	05
imports	06
from stocks	07
to stocks	08
exports	09
feed	10
seed	11

waste	12
processed	13
food	14
other utilization	15

To each commodity a two-digit code is appended, distinguishing different kinds of commodities – crops, livestock, poultry, derived commodities, etc. This code influences the meaning of the item to which each item number refers.

For example, the code 04 means yield in the case of a crop, but extraction rate for a derived commodity and birth-rate in the case of animals. (For more details see Appendix B.)

There are about 100,000 records of data available, each record containing information for all years for one country, one commodity, one item and one dimension. The data for different countries vary in their completeness. There are a number of commodities which show up in the list of possible data, but are not referred to in any of the countries covered by our data. There is another set of commodities which have too little detail for meaningful use. A further group of commodities has been left out because they already show up in some form in other commodities (e.g. fish meal). Leaving out these commodities, one ends up with the aforementioned 500 commodities which are used in the aggregation.

1.2. Principles of Aggregation

Aggregation implies a loss of information. By selecting an appropriate aggregation procedure, one can minimize the information loss in accordance with the purposes of the model. The Supply Utilization Accounts that we use describe supply and demand for about 500 commodities. The accounts must now be processed to generate supply and demand data for the 19 aggregate commodities of FAP (see Appendix C), to be called the FAP commodity list. The FAP commodity list requires that only one quantity measure be given for each commodity (e.g. tons of wheat and wheat products). Therefore, within one national model, different stages of processing (e.g. wheat as sold by the farmer and wheat as bought by the consumer), should be represented as price differences (processing margins) and not as the physical transformation of unprocessed goods into processed goods. This, however, still leaves open the decision at which point in the processing chain should the output be measured. Should one measure the product as it leaves the farmgate and thus transform all further products back to the original stage or should a later stage of processing become the standard procedure?

The decision would be rather trivial in a closed economy, as straightforward national input-output coefficients would permit the description of the conversions. The decision is, however, very difficult in an open economy where international trading of products takes place at several levels of processing (wheat, wheat flour, macaroni, etc.).

In most cases, the raw product stage is the most appropriate, especially when one main product leads to different derived products (wheat vs. bread and pastry).

This may seem clear and easy to achieve at first sight, but there are a number of cases where it is not trivial. One example is sugar. The same

product, refined sugar, can be made from entirely different products: sugar beets, sugar cane, maize, etc.

When looking at trade and consumption of derived sugar products (i.e. commodities 162–171) it is not at all clear which part would have to be attributed to sugar cane and which part to sugar beet. In addition, there is also sugar NES (commodity 167) which covers sugar production from other sources. Although for a number of countries the input has been identified to come from starch of maize, this does not hold in all cases. Therefore, the derived product, sugar refined, is used to measure sugar production, consumption, trade and changes in stocks.

A similar problem arises in the case of livestock production. Although imports and exports of live animals are contained in the data, the usage is not at all clear. Furthermore, the FAP commodity list should distinguish between protein and fat. Therefore, livestock production has been aggregated in terms of meat, offals, fat, hides and milk. The values arrived at consider trade of derived products but not of live animals. We felt that this exception to our general rule of computing national production would be acceptable, since trade of live animals is usually of very little importance. Thus only the information on animal stocks was kept.

Another problematic case is the joint-product situation where one main product contributes to different commodities in the FAP classification. This frequently applies to oil crops, as they contribute both to protein feed and oil. In order to follow our principles of counting only national production, we could not simply use the figures for oil and cake production given in the SUA, but had to adjust them for trade of the respective primary crops. Before discussing how the calculations are to be made, we will again point to the reason of our concern. After the proposed transformations, it is possible to aggregate the resulting commodities using prices, or unit values, or any other suitable device. However, if we were to do this before bringing the different commodities in one group to a common level of processing, this would lead to double counting of the physical quantity contained in the processing item. On the other hand, we cannot simply leave out derived products, since information given there is needed to arrive at proper trade and consumption figures. To avoid double counting we use a weighted scheme of extraction rates and weighting factors (usually calorie or protein content), depending on the type of SUA-commodity with respect to the FAP commodity to which it will be aggregated.

Although it is quite clear that item 04, the extraction rate, which is an input-output coefficient, is to be used for the calculations, it is not in all cases obvious how we must proceed. The simplest case is as follows: we have to transform data on a derived product into data on the corresponding main product. For example: 1062 (eggs) and 1064 (dry eggs). In this case the final demand categories, exports and imports of the derived products should each be divided by the extraction rate, if available, and added to the corresponding demand categories, exports and imports of the main commodity.

One pitfall should be avoided, i.e. the adding of the production of the derived commodity to the production of the original commodity, since that would lead to double counting. However, even here we have problems; we cannot be sure that the same extraction rate applies to both the

imports and the domestically processed commodity. On the other hand, even if this is not the case, no remedy is possible as the accounts give no indication about the origin or destination of trade items. It is therefore better to ignore this problem.

The absence of an extraction rate could also cause problems. This can happen if the commodity is not processed domestically, or if information on the input quantity is missing. For some derived commodities there is only data available on trade, and no processing or production could be found (e.g. infant food). For such cases default extraction rates have been assumed. The huge amount of data that is to be processed makes a sophisticated approach to this problem impracticable. We therefore used the following, admittedly crude, procedure: whenever national figures have been available, these have been used for the calculation, otherwise a set of standard extraction rates has been applied. To arrive at this standard set we looked at all available rates for a particular commodity and selected one which we thought to be "reasonable". In the rare cases where no rate at all could be found (e.g. infant food) we tried to arrive at suitable figures. We feel that our procedure is acceptable especially in the latter case, since the commodities concerned are usually not significant with respect to the physical quantities involved.

The case of alternative uses of a main product gives no new complications, but some can arise when the accounting identity

production = final demand + intermediate demand + exports - imports

does not hold in the SUA. Usually that happens when only production and/or trade figures are given. The remedy we have chosen depends on the nature of the particular commodity and will be described later.

1.3. The Transformed Accounts

The aim of the first step in the aggregation of the SUA to FAP classifications was the elimination of intermediate consumption. As mentioned earlier, our calculations have been made on the basis of about 500 agricultural commodities. The "back calculation" of the derived products results in the so-called Transformed Accounts, i.e. some 280 commodities which only contain production, final use, trade and stock changes. Usually the derived commodities have been converted to the primary commodity with some exceptions. All items except 4, 13, 16 and 17 have been kept. 4, 16 and 17 are of no interest in this context. The elimination of intermediate consumption (item 13) was the intention of our work. It should be mentioned here that the back calculation was only possible under a specific set of assumptions which have been chosen to fit our overall aim to arrive at aggregated figures to be used in the FAP modeling work. Although some of them might seem to be fairly crude, we feel that the errors induced lie in the order of magnitude of possible imbalances unavoidably created by the applied methodology. As will be pointed out later, the back calculation of joint products is problematic and usually leads to commodity imbalances. In this case, but also when an imbalance is due to incompatible original data, various balancing mechanisms, depending on the type of commodity, have been applied.

1.4. Description of the Data Records

As mentioned earlier, each record provides for five dimensions, the time dimension always being completely covered in one record. There are 23 fields per data record, which are subsequently described.

1) Internal code not relevant for this purpose

2) The 3-digit country code permits reference not only to countries, but also to country groups. (Appendix D lists all possible countries and their codes.)

3) Commodities are identified by a 4-digit code. Although an additional 2-digit code is appended to each commodity (as shown in Appendix A), referring to different commodity groups (e.g. animals, derived animal products, main crops, derived products, fish, etc.), there is no distinction between different levels of processing.

4) The item code lies between 1 and 17, but the interpretation of the code depends on the commodity group that a particular commodity belongs to.

In the case of crops, for example, the possible items are:

	Main Commodity		Derived Commodity
01	opening stocks	01	opening stocks
02	area sown	02	–
03	area harvested	03	input
04	yield	04	extraction rate
05	production	05	production
06	imports	06	imports
07	from stocks	07	from stocks
08	to stocks	08	to stocks
09	exports	09	exports
10	feed	10	feed
11	seed	11	seed
12	waste	12	waste
13	processed	13	processed
14	food	14	food
15	other utilization	15	other utilization
16	closing stocks	16	closing stocks
17	seed rate	17	–

For live animals the items are the same as for crops, except for:

02	fem. reproduction age
03	fem. actually reproducing
04	birth rate
05	born
11	–
12	natural death
13	slaughtered
17	take off rate

and for meat animals they are also the same except for:

02	–
03	slaughtered

04	carcass weight
11	–
17	–

5) The dimension that a data record may have is

1	quantity
2	value
3	unit value

although for some commodities the dimensions might still have another meaning. The unit of quantity depends on the commodity group a specific commodity belongs to (metric tons, head, etc.). Values are given in 1000 $ and the unit value in $/mt, $/head, etc.

6) The first year indicator determines the starting year of the time series on that record. Usually 61 or 65 is used (1961 or 1965 is the starting year of the data).

7) The creation date of the data

8)-23) Data and the status indicator (for 16 years). The status indicator can be one of 4 characters, depending on the source of the data:

Blank or 0	official data
f	FAO estimate
*	unofficial data
c	computed data

The indicators have no influence on the aggregation of the data. We have introduced some more indicators, but they too have no influence on the aggregation.

Here it seems convenient to address the sources of our data base and the definition of "year" in the time series. The Food and Agriculture Organization of the United Nations, Rome, and within it the Statistics Division of the Economic and Social Policy Department, supplied us with these data. FAO collects the information mainly by annual questionnaires it sends to governments. With the help of these surveys and by collaboration with various agencies it arrives at consistent figures, the SUA. The definition of "year", however, does not lend itself to an easy explanation. In general "year" means calendar year, for production as well as for trade and use. Crops whose production period runs across a calendar year boundary are assigned to that calendar year in which the largest amount of production took place. There are, however, exceptions to these rules in some countries and for some crops. The relevant information can be found in the corresponding Production and/or Trade Yearbooks, which are compiled from the Supply Utilization Accounts. In general, information quoted as belonging to the time period 1980/81 is assigned to the year 1980.

2. THE REDUCTION OF COMPLEX COMMODITY STRUCTURES (PROGRAM AGSUA)

2.1. Target Commodities and Tree Structures

In the first stage of the overall aggregation task, we tried to identify the tree structures underlying the SUA and to use these for a first reduction of the great amount of data supplied by FAO. Within each of the commodity trees we defined a so-called "Target Commodity", i.e. the particular node in the tree structure which was to replace the tree after the application of program AGSUA. A list of the chosen target commodities can be found in Appendix E. Whenever possible, the primary commodities (e.g. wheat, apples, etc.) have been chosen. In the case of oil crops, oils and cakes had to be kept separate due to the commodity classification used in the FAP (see Appendix C). Another important exception is refined sugar, which is the target commodity in the case of sugar crops and products. Although some of the commodity trees look fairly complex, they can always be divided into subtrees which leave us with two basic configurations:

1) A commodity having only alternative derived commodities.
2) A commodity having only joint derived commodities.

Therefore, we have only to concentrate on the proper "back calculation" of these two cases. Below we describe the algorithms used in our program.

2.1.1. Case A: Alternative derived products

This situation occurs when the higher level commodity is processed in different ways to give various derived products (e.g. fruits can be canned, converted to juice, preserved, etc.). We denote the primary commodity by A (its items by A_i), as reported by FAO, its derived products by $B_k, k = 1,\ldots,M$ (their respective items by $B_{k,i}$) and the resulting aggregated target commodity by A– (accordingly $A-_i$, $B-_k$ and $B-_{k,i}$). Thus the current case is characterized by the identity

$$A_{13} \equiv \sum_{k=1}^{M} B_{k,3}$$

The corresponding commodity tree is:

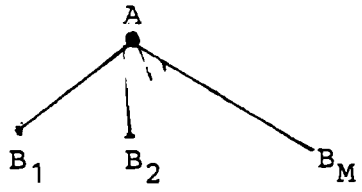


Figure 1

Remark: Under the present heading, we also cover the case of a single derived product, i.e. $M = 1$.

As explained before, A is usually our target commodity. In this case, we have:

$$A-_i = A_i + \sum_{k=1}^{M} (B_{k,i} / B_{k,4}) \quad i = 6,...,12,14,15$$

$$A-_5 = A_5$$

$$A-_{13} = 0$$

Sometimes, the target commodity is one of the derived products, e.g. B_k. We then back calculate all the B_i except B_k to A (which yields an A−) and thus are left with the simple tree

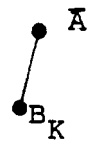


Figure 2

which is solved by:

$$B-_{k,i} = B_{k,i} + B_{k,4} * A-_i \quad i = 6,...,12,14,15$$

$$B-_{k,5} = B_{k,4} * A-_5$$

$$B-_{k,13} = 0$$

where

$$A-_i = A_i + \sum_{j=1,j\neq k}^{M} B_{j,i} / B_{j,4} \quad i = 6,...,12,14,15$$

Remark: Dollar values (usually only reported for imports and exports) for the main product and derived products are simply added up. No transformation is needed here.

2.1.2. Case B: Joint derived products

This situation occurs when the processing of a commodity results in several derived products simultaneously, e.g. wheat in flour and bran, or oil crops in oil and cake. In practice, we have only the case of two joint products, although the subsequent derivations apply to an arbitrary number of joint derived products.

The corresponding tree is:

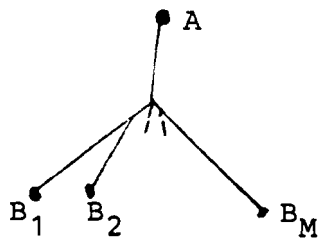


Figure 3

Again we first consider the case where A is the target commodity. To account for qualitative differences in the derived joint products we use a weighted scheme for back calculation. Each commodity is assigned a weight W_A and $W_{B,k}$, respectively. For reasons of consistency we have to have

$$W_A = \sum_{k=1}^{M} B_{k,4} * W_{B,k}$$

and therefore

$$A-_i = A_i + \sum_{k=1}^{M} B_{k,i} * \frac{W_{B,k}}{\sum_{j=1}^{M} B_{j,4} * W_{B,j}} = A_i + \frac{1}{W_A} * \sum_{k=1}^{M} B_{k,i} * W_{B,k}$$

$$i = 6,\ldots,12,14,15$$

$$A-_5 = A_5$$

$$A-_{13} = 0$$

The weights we have chosen are usually calorie or protein content (depending on the commodity type).

A different situation arises in the case of oil crops. There, both joint products had to be target commodities due to the commodity classification used in the FAP. Thus the commodity tree is

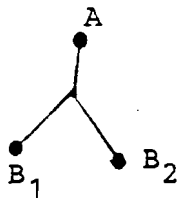


Figure 4

Here the weighted scheme is needed only for imports and exports. The scheme for the other elements is:

$$B\text{-}_{k,i} = B_{k,i} + B_{k,4} * A_i \qquad \begin{matrix} k = 1,2 \\ i = 6,\ldots,12,14 \end{matrix}$$

$$B\text{-}_{k,5} = B_{k,4} * A_5$$

For elements 6 and 9 we have a special scheme:

$$B\text{-}_{k,i} = B_{k,i} + B_{k,4} * A_i * \frac{W_{k,i}}{W_{k,1}+W_{k,2}} \qquad \begin{matrix} i = 1, 2 \\ k = 6, 9 \end{matrix}$$

and $W_{k,i}$ are the corresponding world market prices of oils and cakes.

Remark: Production (element 5) has been calculated in the above way to arrive at proper national figures.

2.1.3. The general case

We consider the case of a commodity A which has M jointly derived products B_k, k = 1,...,M and N alternative derived products C_j, j = 1,...,N.

This situation can be characterized by

$$B_{1,3} = B_{2,3} = \cdots = B_{M,3} = A_{13} - \sum_{j=1}^{N} C_{j,3}$$

Introducing an intermediate commodity C_0 by defining

$$C_{0,4} = 1.0$$

$$C_{0,5} = A_{13} - \sum_{j=1}^{N} C_{j,3}$$

$$C_{0,3} = C_{0,5}$$

$$C_{0,13} = C_{0,5}$$

$$C_{0,i} = 0 \qquad \text{for all other i.}$$

We replace the above tree by an equivalent tree which can be split into two subtrees belonging to the categories treated before.

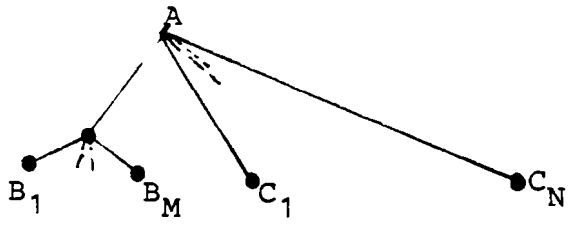


Figure 5

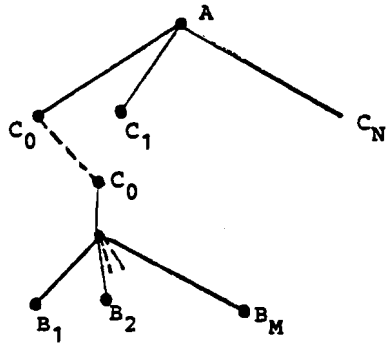


Figure 6

Commodities having only joint derived products are listed in Appendix F, those with only alternative derived commodities are shown in Appendix G. More complex commodity trees are discussed in Appendix I. There is quite a number of commodities which do not have any derived commodities, these are listed in Appendix D.

2.2. The Balancing Mechanism

By definition of the various items of the FAO Supply Utilization Accounts the following identity

$$X_5 + X_6 + X_7 \equiv X_8 + X_9 + X_{10} + X_{11} + X_{12} + X_{13} + X_{14} + X_{15}$$

i.e. production + imports + from stock =
= to stocks + exports + feed + seed + waste + processing + food + other

should hold for any commodity X (subscripts denote item numbers). In the case of our aggregated target commodities processing (X_{13}) has to be taken out since it has been replaced by the respective items of final usage of the derived commodities. The identity reads therefore

$$X_5 + X_6 + X_7 \equiv X_8 + X_9 + X_{10} + X_{11} + X_{12} + X_{14} + X_{15} \qquad \text{(aa)}$$

There are several reasons why (aa) does not always hold after application of the procedures outlined in the previous chapters:

a) Imbalance in some of the original FAO-SUA commodities. For some of the commodities only imports and exports are given. The admittedly simple procedure used in these cases was to create additional production or consumption according to the sign of the imbalance.

b) Due to the back calculation of joint products it was impossible to avoid minor imbalances.

c) It sometimes happened that the leaves of our commodity trees (i.e. the last stage of processing considered in our trees) also had a processing item. Typically this occurred when part of the production reappeared as input to one of the "NES" commodities. To avoid double counting in a consistent way, we decided to subtract processing from production in these cases and to treat the "NES" commodity accordingly.

d) In the cases where our target commodities are not primary commodities (e.g. sugar, oil crops) identity (aa) was used to compute production as we are interested in national production. Since the production items given in SUA also contain production from imported inputs we decided to transform higher level imports and exports to adjust the respective items of the target commodity and to compute production using (aa).

To handle the problems shown above we used several flags to indicate the appropriate mechanism. These are: blank, A, P, X, Y, Z. Furthermore, we specified a balancing index IBAL, i.e. an item number between 6 and 15. Flags and balancing indices used for each target commodity are given in Appendix E.

In the following, we describe the mechanism invoked by the different flags. For notational convenience we define

$$S1 = X_8 + X_9 + X_{10} + X_{11} + X_{12} + X_{14} + X_{15} - X_6 - X_7$$

$$S2 = S1 + X_{13}$$

X_{IBAL} = quantity of item IBAL (IBAL depends on the commodity)

2.2.1. Description of the various flags:

Flag:	Procedure
blank:	$D = X_5 - S1$ $XX = X_{IBAL} + D$ $X\_{IBAL} = \max(0,XX)$ if $XX \geq 0$ return $X\_5 = X_5 - XX$ return
A:	Only used to write out area data and stock numbers; write out items 2 and 3 for commodity number < 864 (i.e. crops) and item 1 for commodity number ≥864 (i.e. livestock numbers)
P:	$D = X_5 - S2$ $XX = X_{IBAL} + D$ $X\_{IBAL} = \max(0,XX)$ $X\_5 = X_5$

if $XX \geq 0$ go to LABEL
$X_{-5} = X_5 - XX$
LABEL:
$YY = X_{-5} - X_{13}$
$X_{-5} = \max(0,YY)$
return

Remark: When YY is negative a warning is written out. In this case part of intermediate consumption originates from imports or stock changes and requires very specific adjustments.

X: $X_{-5} = \max(0,S2)$
if $S2 \geq 0$ return
$X_{-IBAL} = X_{IBAL} - S2$
return

Y: $X_{-5} = \max(X_5,S1)$
$XX = S1 - X_5$
if $XX \geq 0$ return
$X_{-IBAL} = X_{IBAL} - XX$
return

Z: $X_{-5} = \max(0,S1)$
if $S1 \geq 0$ return
$X_{-IBAL} = X_{IBAL} - S1$
return

To summarize the above statements: when the flag is blank or P we adjust the specified consumption item. Only if this leads to inconsistencies (negative values) we further adjust production. When the flag is X, Y, or Z we compute production and only when this leads to negative values we adjust the specified consumption item. For notational convenience the time subscript has been left out. It goes without saying that the algorithm is applied annually.

2.3. Country- and Commodity-Specific Adjustments

So far global procedures applied to all commodities and all countries have been described. In the following we shall comment on some country-specific or commodity-specific adjustments which we felt were not general enough to be dealt with in the command language of program AGSUA.

1) *Possible inputs to commodity 634* (beverages from distilled alcohol): In order to explain production of commodity 634 we have assumed that part of item 13 of the following commodities might be input to alcoholic beverages.

15	wheat
27	rice
44	barley
56	maize
71	rye
89	buckwheat
103	mixed grain
116	potatoes
165	molasses
564	wine

In the case of molasses, item 13, when present, was assumed to go to commodity 634. In all other cases, the program checks whether item 13 matches the inputs of the derived products assumed in the particular tree structure. Any surplus is kept as potential input to commodity 634. To avoid double counting this commodity is left out in the last aggregation stage.

2) *Adjustment of maize imports in UK:* As a matter of fact, the UK imports substantial amounts of maize which are partly processed to maize starch (64) and further to sugar NES (167). Since we are interested in domestic production (as has been outlined earlier), the appropriate part of maize imports has been transformed to sugar imports and sugar NES production (from imported maize) has been canceled.

3) *Potatoes:* The particular tree structure for Austria and Denmark (see Appendix H) has been corrected explicitly to allow a general treatment. Another peculiarity treated here is the considerable input of sweet potatoes (122) to flour of potatoes (117) in Japan.

4) *Soybean adjustment in UK:* As in the case of maize, the United Kingdom imports essential quantities of soybeans which, however, are partly processed into oil meals (commodity 343). Accordingly we adjust imports of soybeans and oil meals, as well as production of oil meals.

5) *Tomatoes:* It has been observed that tomatoes are not only processed into commodities 390 to 392, but occasionally also into one of the vegetable NES products (commodity 464 to 474). Production of tomatoes is reduced accordingly to avoid double counting.

6) *Buffalo Milk:* China is treated explicitly since cheese (commodity 955) is produced from skim milk (commodity 954) instead of milk (commodity 951). (See Appendix H).

7) *Sheep Milk:* Iran and Morocco are treated explicitly since cheese (commodity 984) is produced from skim milk (commodity 985) instead of milk (commodity 982). (See Appendix H.)

8) *Lard:* Our general assumption that lard is produced from fat of pigs does not apply to all countries under consideration. In some countries also pigmeat (commodity 1035) is processed into lard. Furthermore, lard is sometimes processed into stearine (commodity 1221). To avoid possible double counting, fat of pigs has been treated with special care.

9) *Cocoa:* Special treatment was necessary in the case of Brazil (see Appendix H).

10) *Beef and Veal:* Although the products derived from beef are mostly alternative commodities, exceptions have been found for a few countries. These cases have been treated explicitly.

It should be noted here that the above exceptions do not cover all the irregularities in the SUA. We felt, however, that our careful choice of balancing procedures left us with the need for only a few explicit corrections.

2.4. Aggregation of the Transformed Accounts

2.4.1. Conversion of transformed accounts to volumes (Program CONVSUA)

After the fairly complex task performed by program AGSUA, the resulting partly aggregated commodities are converted to volumes using the weights listed in Appendix E. Up to two different weights have been applied because of the different dimensions used in the two FAP commodity classifications (see Appendix C). The first weight usually is an average 1969 to 1971 export price (in US $), the second weight when used converts to a particular physical measure (wheat equivalent, oil equivalent, etc.), depending on the aggregation index. The application of the program is straightforward and needs no further explanation. The different volumes will subsequently be used to aggregate the FAO commodities in the FAP commodities.

2.4.2. Aggregation of the transformed volumes to FAP classifications

2.4.2.1. *The 19- commodity classification (Program AG1)*

This program is used to aggregate the output from the previous steps to the detailed commodity classification listed in Appendix C. Special care is required in the case of oils and fats. Since data of inputs to derived products (tallow, stearine, margarine, oils boiled, etc.) are either not available or not easily identifiable, we proceed as follows:

Let A_i $i \in I1$ denote primary oils or animal fats
and B_j $j \in I2$ secondary products. Then

$$X1_i = \sum_{j \in I1} A_{j,i} \qquad i = 5,\ldots,15$$

$$X2_i = \sum_{j \in I2} B_{j,i}$$

i.e. for each year and each item we sum over primary and secondary oils separately. This is easily possible since all commodities concerned here have been converted to oil equivalent by running program CONVSUA.

The final aggregate, which we denote by X_i, is then obtained as:

$$X_i = X1_i + X2_i \qquad i = 6,\ldots,12,14$$

$$XX = X1_5 + X_6 + X_7 - X_8 - X_9 - X_{10} - X_{11} - X_{12} - X_{14} - X2_{15}$$

$$X_{15} = MAX(0,XX) + X2_{15}$$

$X_5 = X1_5$

if $XX \geq 0.0$ return

$X_5 = X1_5 - XX$

This particular algorithm has been chosen since it seems that item 15 of the SUA in the case of oil crops sometimes reappears in secondary oil products, which would lead to double counting in the aggregation. It should be noted that in the rare cases of fully consistent data on oil usage, our procedure yields the exact values, i.e.

$X_{15} \equiv X1_{15} + X2_{15}$

In the case of oils we have

I1 = { 237, 244, 252, 247,258, 261, 266, 268, 271, 276, 281, 290, 293, 297, 331, 334, 337, 340 }

I2 = { 1242, 1274, 1275}

In accordance with the requirements of the FAP commodity classification we distinguish between several types of primary animal fats:

a) Bovine and ovine fats

b) Fat of pigs

c) Poultry fat

d) Fish oil

Despite the difficulties mentioned above, we had to consider secondary animal fats, and therefore our calculations have been based on the assumption that tallow and degras are made from bovine and ovine fats, whereas stearine is produced from pig fat, i.e.,

I1 = { 869, 949, 979, 994, 1019, 1129, 1168}

I2 = { 1222, 1225}

for bovine and ovine fats, and

I1 = { 1037}

I2 = { 1221}

for fat of pigs.

The control information printed by program AG1 indicates that in general the adjustments are negligible compared to production figures. For some countries, data on animal fat seem to be inconsistent.

2.4.2.2. *The 10- commodity classification (Program AG2)*

Finally a program is applied to aggregate the output of AG1 further to the 10-commodity classification used by the FAP (see Appendix C). Since all the "dirty" work of the overall task occurs at previous stages, this final aggregation is straightforward.

3. COMPUTERIZATION OF THE COMMODITY AGGREGATION

3.1. General Structure

In the previous chapters the theoretical framework for the aggregation of the FAO Supply Utilization Accounts to FAP Commodity Classifications has been outlined. In this chapter a few details on the technical side of this fairly complex job will be given.

The whole work has been divided into two major parts.

1) The Reduction of SUA to Target Commodities:

   This has been described in Chapter 2. The program designed for that purpose has been called AGSUA.

2) Aggregation of Transformed Accounts:

   For convenience this part has been further split into three subitems.

   a) Conversion to Volumes (by Program CONVSUA)

   b) Aggregation to detailed FAP Commodity List (by Program AG1)

   c) Aggregation to 10-Commodity list (by Program AG2)

Chart 1 shows a schematic representation of the different steps to be executed in the aggregation procedure.

3.2. Program AGSUA

In this section we describe the implementation of the first part of the aggregation, i.e. the transformation of the SUA to target commodities. As has been explained in Chapter 2, basically this task can be reduced to cases A and B, i.e. the alternative derived product tree and the joint product tree. For an efficient processing of the vast amount of data provided by FAO, we designed a computer program which can be controlled by a simple command language. There are six different commands available: RG, FC, CO, CC, AD, WR. Using these commands, it was possible to code conveniently the instructions for the back calculation of complex commodity trees.

a) The RG-card:

The RG-card is used to load a certain set of commodities into an internal buffer. Usually all commodities belonging to a commodity tree have to be loaded in that way. If, for example, the derived products of wheat are to be transformed to wheat, we need to work on wheat (15), flour of wheat (16), bran (17), macaroni (18), bread (20), pastry (22), and wheat starch (23). The corresponding command is:

RG 0015 0023

The format of the RG-card is:

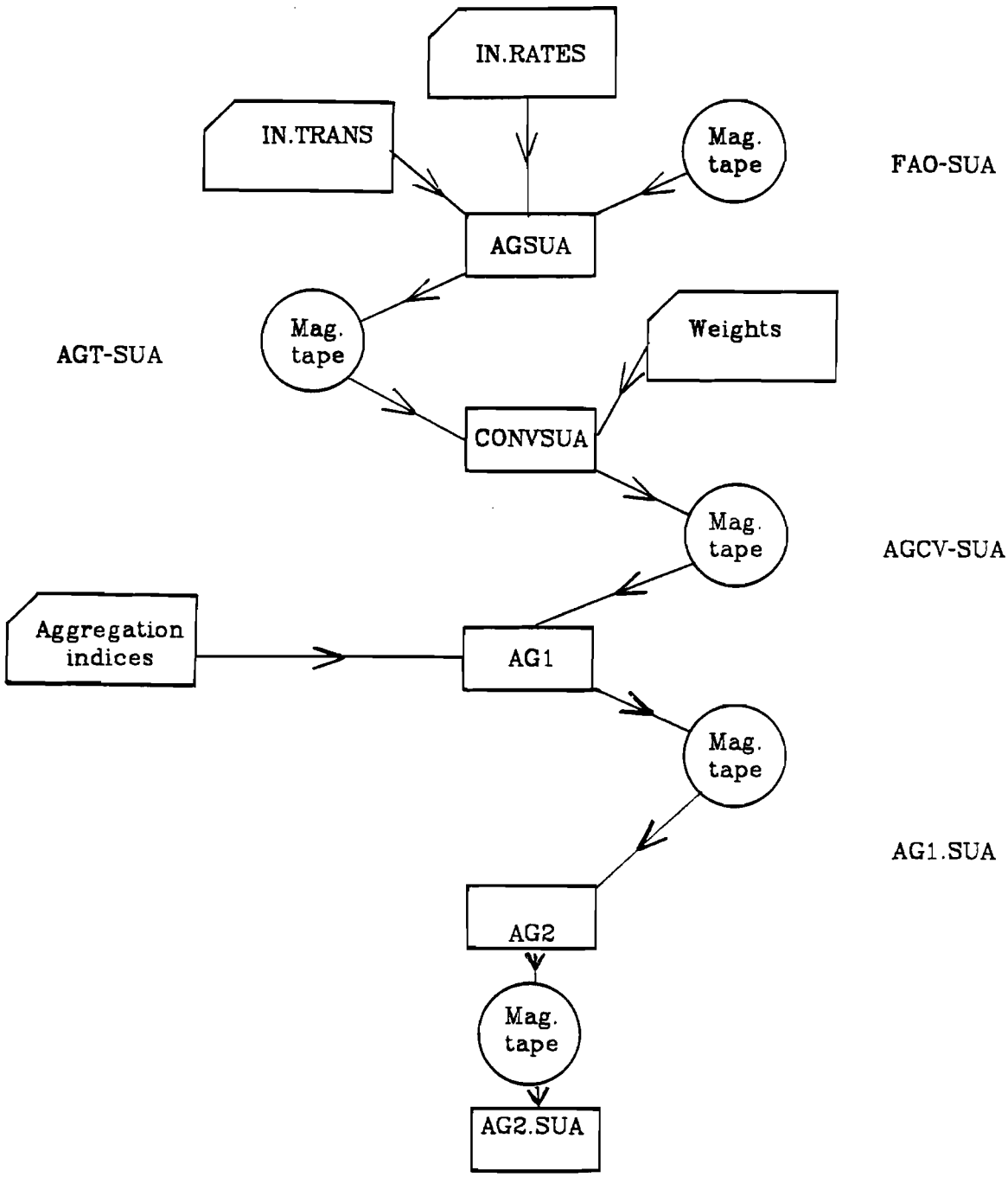
RG MINC MAXC

where MINC and MAXC specify lower and upper bounds respectively. All commodities with codes ICODE subject to:

$$MINC \leq ICODE \leq MAXC$$

are stored in an internal buffer. Together with the data from the SUA tape the corresponding default extraction rates are retrieved from a separate file (IN.RATES). Furthermore, the routine for country and commodity-specific adjustments is called.

Chart 1. Aggregation of SUA to FAP Commodity Classficiations



b) The FC-card

The FC-card is used to specify weights for the back calculation of joint derived products. The format of the FC card is:

FC ICODE1 WEIGHT1 ICODE2 WEIGHT2 ...

where ICODE denotes a particular commodity code and WEIGHT the respective weight. A maximum of 7 weights can be specified on one FC card. In sticking to the example of wheat we recall that flour and bran are joint derived products. In the weighted scheme for aggregation outlined in Chapter 2, we use calorie content as weights in the case of cereals. The weights used are (in kcal/100 gr): 334 for wheat, 364 for flour, 257 for bran.

The corresponding FC-card reads

FC 0015 334. 0016 364. 0017 257.

c) The CO-card

The CO-card is used to specify a particular commodity code to be referenced in subsequent CC and AD cards. The format of the CO-card is:

CO ICODE IEL1 IEL2 ...

where ICODE is a 4-digit commodity code and IEL a 2-digit element number in the range

$1 \leq IEL \leq 16$

Upon a CO-command, all data items of the specified commodity are loaded into a separate working buffer. Calculations coded on a subsequent CC-card are performed on the referenced items of the working buffer. The data buffer addressed by the RG-card is not affected. Example:

CO 0018 06 07 08 09 10 11 12 14 15

This card tells the program that all data records of commodity 18 (macaroni) are to be copied to the working buffer. Subsequent calculations will be performed for all items from 6 (imports) to 15 (other utilization) except for 13. Except for imports and exports, only records with dimension code 1 are treated. Import and Export values (dimension code = 2) are internally stored as elements 18 and 19. This special feature has been included since the aggregation of values can be done usually by simply adding them up. An exception to that rule will be discussed later together with the CC-card. If ICODE is not within the range of the latest RG-card, an appropriate message is printed and all subsequent control cards are skipped until another CO or RG card.

d) The CC-card

The purpose of a CC-card is to describe certain calculation rules. The format of the card is:

CCxICODE1 OP1 ICODE2 · · · ICODEN OPN

where

x	is a flag from the set {blank, F, X}
ICODE	is a 4-digit commodity code (MINC≤ICODE≤MAXC, or ICODE = 0000, or ICODE = 9999)
OP	is a 1-digit operator code (1≤OP≤7)

A maximum of ten commodity and operator codes can be specified on a single CC-card. The following operators can be used:

code		calculations	stack update (yes or no)
1	add	Z:=Z+Y	y
2	subtract	Z:=Y-Z	y
3	multiply	Z:=Z*Y	y
4	divide	Z:=Y/Z	y
5	enter	...	n
6	invert	Z:=1/Z	n
7	scaled rate	Z:=Y/(Y+Z)	y

The routine interpreting the CC-card has an internal stack of ten elements. When starting the calculations for a particular CC-card, the stack is initialized as follows:

5	0	-
4	0	-
3	0	-
2	0	Y
1	FCT	Z

where the value of FCT depends on the flag which has been set:

FCT	FLAG
1.0	blank
1.0	X
W	F

W is the weight specified on an FC card for the argument of the latest CO-card. This feature is used when back calculating joint derived commodities in a weighted scheme. If the flag is not blank, the extraction rate is multiplied by an appropriate commodity weight. (For F-flag, the weight is taken from the last FC card; for X-flag, the yearly commodity world market price is taken.) This feature is needed when a weighted scheme is used for the back-calculations.

Upon the occurrence of a valid commodity code the corresponding extraction rate is looked up in the data buffer. If the search is not successful the respective default rate is used. Unless the last operator was 5, the stack is lifted and the new rate is put into location 1 (in case the last operation was "enter" the new rate overwrites the Z location). When the commodity code is 0000 or 9999 the stack remains unchanged (except the previous operation was "enter" upon which the stack is updated). Then the operator code is interpreted and the necessary calculations (using stack locations Z and Y) are performed. For all operators except 5 and 6 the stack is updated afterwards, i.e. stack locations 3 to 10 are pushed down one location. Upon exit of the current routine, the value of location Z is passed to the variable FCT which then is used to transform all the items of the last CO card. To illustrate the above we give an example showing the contents of the stack after interpretation of each argument.

Example: Consider the case when macaroni is converted to flour. The corresponding control cards read:

RG 0015 0023

CO 0018 06 07 08 09 10 11 12 14 15

CC 0018 5 9999 4

Below, the contents of the stack are given after each step:

		value	stack location
CC	...	...	4
	...	0	3
	Y	0	2
	Z	1.0	1
0018	...	0	4
	...	0	3
	Y	1.0	2
	Z	$X_{18,4}$	1
5	...	0	4
	...	1	3
	Y	$X_{18,4}$	2
	Z	$X_{18,4}$	1
9999	...	0	4
	...	0	3
	Y	1	2
	Z	$X_{18,4}$	1
4	...	0	4
	...	0	3
	Y	0	2
	Z	$1/X_{18,4}$	1

As has been mentioned earlier, the resulting factor FCT is applied to all of the specified items with a dimension code equal to one. In the case of oil crops, however, our approach made it necessary to split import and export values of the primary oil crops to oil and cake imports. This can be achieved by setting the flag equal to X upon which FCT is calculated as a weighted share and applied to the elements stored as items 18 and 19. To illustrate this point, we list the commands for splitting soybeans to oil of soybeans and cake of soybeans:

RG 0236 0238	load commodities 236, 237, 238 into buffer
WRA 0236	write out item 2 and 3 (area)
CO 0236 06 07...15	address commodity 236
CC 0237 5 9999 3	calculate FCT = $X_{237,4}$ and

	apply to elements 6 to 15
ADX 0237	add to respective elements of commodity 237
CO 0236	address only element 18 and 19 of commodity 236
CCX 0237 5 0238 7 9999 3	calculate scaled rate $FCT = X_{237,4} * p_{237} / (X_{238,4} * p_{238} + X_{237,4} * p_{237})$
AD 0237	add to respective elements of commodity 237

The features of the AD card will be described later. The example shows that we split the import and export values of commodity 236 indirect proportionally to the extraction rates of the target commodities, whereas the physical quantities are obtained simply in multiplying by the respective extraction rate.

e) The AD-Card

The AD-command is used to add the items of the commodity specified on the last CO card to the respective items of the commodity stated on the AD card. The format of the card is:

AD ICODE or ADX ICODE

When the X-flag is used, then only elements with dimension code = 1 are treated, otherwise also items 18 and 19 (values) are added.

Remark: The data buffer containing all time series in the specified range remains unchanged as long as no AD-command is executed. Therefore, after the proper set of CC-cards, the appropriate AD-card has to be used before the occurrence of the next CO-card which will overwrite the working buffer.

f) The WR-command

The WR-command is used to write out the transformed target commodities. Upon execution of a WR-card the balancing procedure (depending on the flag) is applied and all records of the specified commodity are written out. The format of the card is:

WRX ICODE1 JBAL1 ICODE2 JBAL2 ...

where

X	denotes a one-character flag
ICODE	a 4-digit commodity code
JBAL	a 2-digit element code in the range $6 \leq JBAL \leq 16$

The available flags and the meaning of the balancing index have already been described in Chapter 2. Up to nine commodities can be specified on one WR-card. It has to be noted, however, that all commodities specified on one WR-card are subject to the same balancing mechanism. The entire control card file used for the transformation of the SUA is listed in Appendix J.

3.3. Program CONVSUA

The conversion of the transformed FAO commodities to volumes, generated by the previously described program (AGSUA), is done with the program CONVSUA.

In Appendix E the weights are listed which have been used to arrive at the proper volumes. For some commodities it was necessary to use two different weights because of the different dimensions of the aggregated commodities in the different commodity classifications of the FAP. For these commodities then, two different volumes are calculated in CONVSUA.

3.4. Program AG1

This program is designed to aggregate the main commodities calculated with AGSUA and transformed with CONVSUA, to a detailed FAP Commodity Classification (19 Commodities and 8 By-products, Appendix C). As all commodities already exist in their proper unit (m.t., proteins, US $), this program simply adds up the ones which jointly form a new commodity in the detailed FAP classification. The primary and secondary oil and fat commodities are balanced in a consistent way as described in Chapter 2, and care is taken of:

- area of oil cops (= area of oil crops + area of cotton)
- area of protein feed (= area of oil crops)
- input to fats from ovine and bovine and pigs (= inputs to meat of these livestock categories).

3.5. Program AG2

Even simpler than AG1, AG2 reduces the detailed FAP Commodity Classification to the small FAP Commodity Classification (see Appendix C). This is done by adding the corresponding elements of those commodities which jointly form a new commodity. Care has to be taken to always use the same dimensions for the commodities which are being combined into one aggregate.

The only conversion done in this program is for pig meat, where metric tons meat are converted to metric tons protein, using the weight 0.098 (amount of protein per metric ton of pig meat). The contributers to the different commodities in the small list can be seen in Appendix C.

It should be mentioned here that the last steps of aggregation as described above (CONVSUA, AG1 and AG2) are specifically oriented towards the FAP modeling effort, whereas Program AGSUA might be useful in a much wider context. On the other hand these programs are very flexible and can easily be adapted for any other type of aggregation.

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APPENDIX A

List of FAO Commodities, Their Codes and Groupings

Commodity Code	Group Code	Short Title	Long Title
1	1	population	population
2	14	macroecon.1	macroeceonomics one
3	14	macroecon.2	macroeconomics two
10	3	total trade	total trade
12	17	land use	land use
13	17	irrigation	irrigation
14	16	land use	land use (bis)
15	2	wheat	wheat
16	3	flour wheat	flour of wheat
17	3	bran wheat	bran of wheat
18	3	macaroni	macaroni
20	3	bread	bread
22	3	pastry	pastry
23	3	wheat, starch	wheat starch
27	2	rice, paddy	rice, paddy
28	3	rice, husked	rice, husked
31	3	rice, milled	rice, milled
32	3	rice, broken	rice, broken
34	3	rice, starch	rice, starch
35	3	bran rice	bran of rice
36	3	oil rice brn	oil of rice bran
37	3	cake ricebrn	cake of rice bran
41	3	breakf cerls	breakfast cereals
44	2	barley	barley
46	3	barley, pearl	barley, pearled
49	3	malt barley	malt of barley
50	3	malt extract	malt extracts
51	3	beer barley	beer of barley
56	2	maize	maize
58	3	flour maize	flour of maize
59	3	bran maize	bran of maize
60	3	oil maize	oil of maize
61	3	cake maize	cake of maize
64	3	starch maize	starch of maize
66	3	beer maize	beer of maize
68	2	pop corn	pop corn
71	2	rye	rye
72	3	flour rye	flour of rye

73	3	bran rye	bran of rye
75	2	oats	oats
76	3	oats, rolled	oats, rolled
79	2	millet	millet
80	3	flour millet	flour of millet
81	3	bran millet	bran of millet
82	3	beer millet	beer of millet
83	2	sorghum	sorghum
84	3	flour sorghm	flour of sorghum
85	3	bran sorghum	bran of sorghum
86	3	beer sorghum	beer of sorghum
89	2	buckwheat	buckwheat
90	3	flour buckwh	flour of buckwheat
91	3	bran buckwht	bran of buckwheat
92	2	quinoa	quinoa
101	2	canary seed	canary seed
103	2	mixed grain	mixed grain
104	3	flour mix gr	flour of mixed grain
105	3	bran of mix gr	bran of mixed grain
108	2	cereals nes	cereals nes
109	3	infant food	infant food
110	3	wafers	wafers
111	3	flour cereal	flour of cereals
112	3	bran cereal	bran of cereals
113	3	cer prep nes	cereal prep nes
116	2	potatoes	potatoes
117	3	flour potat	flour of potatoes
119	3	potato stch	potato starch
121	3	potato tap	potato tapioca
122	2	sweet potato	sweet potatoes
125	2	cassava	cassava
126	3	flour cass	flour of cassava
127	3	cassava tap	cassava tapioca
129	3	cassava stch	cassava starch
136	2	taro	taro (coco yam)
137	2	yams	yams
149	2	roots tub ns	roots and tubers nes
150	3	flour rt tub	flour of roots and tuber
151	3	roots tub dr	roots and tubers dried
156	2	sugar cane	sugar cane
157	2	sugar beets	sugar beets
158	3	cane sugar	cane sugar
159	3	beet sugar	beet sugar
161	2	sugar crops	sugar crops nes
162	3	sugar,c. raw	sugar (centrifugal, raw)
163	3	sugar,n-cent	sugar (noncentrifugal)
164	3	sugar refind	sugar refined
165	3	molasses	molasses
167	3	sugar nes	sugar and syrups nes
168	3	sugar conf	sugar confectionery
169	3	beet pulp	beet pulp
170	3	bagasse	bagasse
171	3	sugars flav	sugars flavoured

176	2	beans, dry	beans, dry
181	2	brd beans,dr	broad beans, dry
187	2	peas, dry	peas, dry
191	2	chick-peas	chick-peas
195	2	cow peas,dry	cow peas, dry
197	2	pigeon peas	pigeon peas
201	2	lentils	lentils
205	2	vetches	vetches
210	2	lupins	lupins
211	2	pulses nes	pulses nes
212	3	flour pulses	flour of pulses
216	2	brazil nuts	brazil nuts
217	2	cashew nuts	cashew nuts
220	2	chestnuts	chestnuts
221	2	almonds	almonds
222	2	walnuts	walnuts
223	2	pistachios	pistachios
225	2	hazelnuts	hazelnuts (hazelnuts)
234	2	nuts	nuts nes
236	2	soybeans	soybeans
237	3	oil soyabean	oil of soya beans
238	3	cake soybean	cake of soyabeans
242	2	groundnuts	groundnuts in shell
243	3	groundnut she	groundnuts shelled
244	3	oil groundnt	oil of groundnuts
245	3	cake groundt	cake of groundnuts
249	2	coconuts	coconuts
250	3	coconuts,des	coconuts, des
251	3	copra	copra
252	3	oil coconuts	oil of coconuts
253	3	cake coconut	cake of coconuts
256	3	palm kernels	palm kernels
257	3	palm oil	palm oil
258	3	oil,palm ker	oil of palm kernels
259	3	cake,palm ker	cake of palm kernels
260	2	olives	olives
261	3	olive oil	olive oil
262	3	olive,pres	olives, preserved
263	2	karite nuts	karite nuts (sheanuts)
264	3	karit nt but	butter of karite nuts
265	2	castor beans	castor beans
266	3	oil cast bns	oil of castor beans
267	2	sunflwr seed	sunflower seed
268	3	oil sunf sd	oil of sunflwer sd
269	3	cake sunf sd	cake of sunflower seed
270	2	rapeseed	rapeseed
271	3	oil rapeseed	oil of rapeseed
272	3	cake rapeseed	cake of rapeseed
273	3	olive resid	olive residues
274	3	oil oliveres	oil of residues
275	2	tung nuts	tung nuts
276	3	tung oil	tung oil
280	2	safflower	safflower seed

281	3	oil safflwer	oil of safflower
282	3	cake safflwr	cake of safflower
289	2	sesame seed	sesame seed
290	3	oil ses sd	oil of sesame seed
291	3	cake ses sd	cake of sesame seed
292	2	mustard seed	mustard seed
293	3	oil must sd	oil of mustard seed
296	2	poppy seed	poppy seed
297	3	oil pop sd	oil of poppy seed
298	3	cake pop sd	cake of poppy seed
299	2	melonseed	melonseed
329	3	cottonseed	cottonseed
331	3	oil cottons	oil of cotton seed
332	3	cake cotton	cake of cotton seed
333	2	linseed	linseed
334	3	oil linseed	oil of linseed
335	3	cake linseed	cake of linseed
336	2	hempseed	hempseed
337	3	oil hempsd	oil of hempseed
338	3	cake hempsd	cake of hempseed
339	2	oilseeds nes	oilseeds nes
340	3	oil vg or ns	oil of veget origin nes
341	3	cak oilsd ns	cakes of oilseeds nes
343	3	oil meals	flour/meal of oilseeds
358	2	cabbages	cabbages
366	2	artichokes	artichokes
367	2	asparagus	asparagus
372	2	lettuce	lettuce
373	2	spinach	spinach
388	2	tomatoes	tomatoes
390	3	juice tomato	juice of tomatoes
391	3	tomato paste	tomato paste
392	3	peeld tomato	peeled tomatoes
393	2	cauliflower	cauliflower
394	2	pumpk+sq+grd	pumpkins, squash, gourds
397	2	cucmbr+gherk	cucumbers and gherkins
399	2	eggplants	eggplants
401	2	chil+pep,grn	chillies+peppers, green
402	2	onions,green	onions+shallots, green
403	2	onions, dry	onions, dry
406	2	garlic	garlic
414	2	beans, green	beans, green
417	2	peas, green	peas, green
420	2	brd bean, grn	broad beans, green
423	2	string beans	string beans
426	2	carrots	carrots
446	2	green corn	green corn (maize)
449	2	mushrooms	mushrooms
459	2	chicory root	chicory roots
460	3	veg pr fr dr	veg prod fresh or dried
461	2	carobs	carobs
463	2	vegetables	vegetables fresh nes
464	3	veget dr nes	vegetables dried nes

465	3	vegt can nes	vegetables canned ns
466	3	juice veg ns	juice of vegetables nes
469	3	vegs dehydr	vegs.dehydrated 055.1
471	3	vegs vinegar	vegs pr by vinegar 55.51
472	3	vegs pr nes	vegs pr nes 55.52
473	3	vegs frozen	vegetables frozen
474	3	vegs temp pr	vegs in temp preservativ
486	2	bananas	bananas
489	2	plantains	plantains
490	2	oranges	oranges
491	3	juice orange	juice of oranges
495	2	tangerines	tang.mand.clement.satsma
497	2	lemon limes	lemons and limes
507	2	grapefruit	grapefruit and pomelo
509	3	grapef juice	grapefruit juice
512	2	citr frt nes	citrus fruit nes
513	3	citrus juice	citrus fruit juice nes
515	2	apples	apples
517	3	cider	cider
521	2	pears	pears
523	2	quinces	quinces
526	2	apricots	apricots
530	2	sour cherry	sour cherries
531	2	cherries	cherrries
534	2	peaches	peaches and nectarines
536	2	plums	plums
537	3	plums, dried	plums, dried (prunes)
541	2	stone fruit	stone fruit nes. fresh
542	2	pome fruit	pome fruit nes, fresh
544	2	strawberries	strawberries
547	2	raspberries	raspberries
549	2	gooseberries	gooseberries
550	2	currants	currants
552	2	blueberries	blueberries
554	2	cranberries	cranberries
558	2	berries nes	berries nes
560	2	grapes	grapes
561	3	raisins	raisins
563	3	must grapes	must of grapes
564	3	wine	wine
565	3	vermth simil	vermouths and similar
567	2	watermelons	watermelons
568	2	mel inc cant	melons incl cantaloupes
569	2	figs	figs
570	3	figs, dried	figs, dried
571	2	mangoes	mangoes
572	2	avocados	avocados
574	2	pineapples	pineapples
575	3	pineapple can	pineapples, canned
576	3	pineap juice	pineapple juice
577	2	dates	dates
600	2	papayas	papayas
603	2	frt trop nes	fruit tropical fresh nes

604	3	fr trp dr ns	fruit tropical dried nes
619	2	fruit nes	fruit fresh nes
620	3	fruit dr nes	fruit dried nes
622	3	fruit juice	fruit juice nes
623	3	fruit pr nes	fruit prep nes
624	3	flour fruit	flour of fruit
633	3	bev non-alc	beverages non-alcoholic
634	3	bev dis alc	beverages dist alcoholic
635	3	straw, husks	straw, husks
636	2	maize fd+sil	maize for forage+silage
637	2	sorghum fs	sorghum for forage+silag
638	2	rye grass fs	rye grass,forage+silage
639	2	grasses fs	grasses nes,forage+silag
640	2	clover fs	clover for forage+silage
641	2	alfalfa fs	alfalfa for forage+silag
643	2	legumes fs	legumes nes,forage+silag
644	2	cabbage fod	cabbage for fodder
645	2	pumpkins fod	pumpkins for fodder
646	2	turnips fod	turnips for fodder
647	2	beets fodder	beets for fodder
648	2	carrots fod	carrots for fodder
649	2	swedes fod	swedes for fodder
650	3	leaves+tops	leaves and tops
651	2	forage prod	forage products nes
652	3	veg prod	veg prod for feed
653	3	food wastes	food wastes
654	3	dregs,br+dis	dregs from brewing+dist.
655	2	veg root fod	vegetables+roots,fodder
656	2	coffee,green	coffee, green
657	3	coffee roast	coffee roasted
658	3	coffee subst	coffee subst cont coffee
659	3	coffee extr	coffee extracts
661	2	cocoa beans	cocoa beans
662	3	cocoa powder	cocoa powder
663	3	cocoa paste	cocoa paste cake
664	3	cocoa butter	cocoa butter
665	3	choc prod ns	chocolate products nes
667	2	tea	tea
671	2	mate	mate
674	2	tea nes	tea nes
677	2	hops	hops
687	2	pepper w/l/b	pepper,white/long/black
689	2	pimento	pimento, allspice
692	2	vanilla	vanilla
693	2	cinnamon	cinnamon (canella)
698	2	cloves	cloves, whole+stems
702	2	nutmeg	nutmeg, mace, cardamons
711	2	anise	anise, bacian, fennel
723	2	spices nes	spices nes
737	3	oil citronll	oil of citronella
748	2	peppermint	peppermint
753	3	ess oils nes	essential oils nes
754	2	pyrethrum	pyrethrum

755	3	pyret extr.	pyrethrum extract
766	2	seed cotton	seed cotton
767	3	cotton lint	cotton lint
768	3	cotton cardd	cotton carded combed
769	3	cotton waste	cotton waste
770	3	cotton lintr	cotton linter
771	2	flax raw	flax fibre raw
773	2	flax fibre	flax fibre and tow
774	3	flax tow	flax tow waste
777	2	hemp fibre	hemp fibre and tow
780	2	jute	jute
782	2	jute-like	jute-like fibres
788	2	ramie	ramie
789	2	sisal	sisal
800	2	agave nes	agave fibres nes
809	2	abaca	abaca (manila hemp)
821	2	fibre nes	fire crops nes
826	2	tobacco	tobacco leaves
828	3	cigarettes	cigarettes
829	3	cigars	cigars cheroots
831	3	tobacco prod	tobacco products nes
836	2	nat rubber	natural rubber
837	3	rubber dry	rubber natural dry
839	3	natural gums	natural gums
864	4	calves	calves
865	5	veal	veal
866	4	cattle	cattle
867	5	beef veal	beef and veal
868	6	offals cattl	offals of cattle, edible
869	6	fat cattle	fat of cattle
870	3	beef boneless	beef and veal,boneless
872	3	beef dss	beef dried salt smoked
873	3	meat extract	meat extracts
874	3	sausage beef	sausages beef and veal
875	3	beef prep	beef preparations
876	3	beef canned	beef canned
882	8	cow milk	cow milk, whole, fresh
885	3	cream, fresh	cream, fresh
886	3	butter, cows	butter of cow milk
887	3	ghee, cows	ghee (from cow milk)
888	3	sk milk cows	skim milk of cows
889	3	wh milk,cond	whole milk, condensed
890	3	whey,condens	whey, condensed
894	3	wh milk,evap	whole milk, evaporated
895	3	skmilk evap	skim milk, evaporated
896	3	sk milk cond	skim milk, condensed
897	3	cowmilk dry	dry whole cow milk
898	3	milk sk dr c	dry skim cow milk
899	3	dry buttermilk	dry buttermilk
900	3	dry whey	dry whey
901	3	cheese wcow	cheese (whole cow milk)
903	3	whey, fresh	whey, fresh
904	3	cheese scow	cheese (skim cow milk)

917	3	casein	casein
919	7	cattle hides	cattle hides, fresh
920	3	hide w	cattl
921	3	hide d	cattl
922	3	hide n cattl	hides nes cattle
927	7	skin f calve	skins fresh of calves
928	3	skin w calve	skins wet-salt calves
929	3	skin d calve	skins dry-salt calves
930	3	skin n cattl	skins nes calves
944	15	ind cattmeat	indigenous cattle meat
945	16	bio cattmeat	biological cattle meat
946	4	buffaloes	buffaloes
947	5	buffalo meat	buffalo meat
948	6	offal buffal	offals of buffalo, edible
949	6	fat buffalo	fat of buffalo
951	8	buffalo milk	buffalo milk
952	3	butter buffl	butter of buffalo milk
953	3	ghee buffalo	ghee (from buffalo milk)
954	3	milk sk buff	skim milk of buffalo
955	3	chees buffl	cheese of buffalo milk
957	7	buffalo hide	buffalo hides, fresh
958	3	hide w	buffl
959	3	hide d	buffl
972	15	ind buffmeat	indigenous buffalo meat
973	16	bio buffmeat	biological buffalo meat
974	4	lambs	lambs
975	5	lamb meat	lamb meat
976	4	sheep	sheep
977	5	mutton lamb	mutton and lamb
978	6	offals sheep	offals of sheep, edible
979	6	fat of sheep	fat of sheep
982	8	sheep milk	sheep milk
983	3	butter sheep	butter+ghee (sheep milk)
984	3	sheep cheese	cheese of sheep milk
985	3	sk milk shee	skim sheep milk
987	10	wool, greasy	wool, greasy
988	3	wool, scoured	wool, scoured
994	3	grease wool	grease incl lanolin wool
995	7	sheepskins	sheepskins, fresh
996	3	skin w sheep	skin wet-salted sheep
997	3	skin d sheep	skin dry-salted sheep
998	3	skin nes sh	skin nes sheep
999	7	skinwool sh	skin with wool sheep
1007	3	wool shoddy	wool shoddy
1008	3	hair carded	hair carded or combed
1009	3	wool waste	wool hair waste
1012	15	ind sheepmeat	indigenous sheep meat
1013	16	bio sheepmeat	biological sheep meat
1014	4	kids	kids
1015	5	kids meat	kids meat
1016	4	goats	goats
1017	5	goat meat	goat meat
1018	6	offals goats	offals of goats, edible

1019	6	fat of goats	fat of goats
1020	8	goat milk	goat milk
1021	3	goat cheese	cheese of goat milk
1025	7	goatskins	goatskins, fresh
1026	3	skin w goat	skins wet-salted goats
1027	3	skin d goat	skins dry-salted goats
1028	3	skin nes goa	skins nes goats
1032	15	ind goatmeat	indigenous goat meat
1033	16	bio goatmeat	biological goat meat
1034	4	pigs	pigs
1035	5	pigmeat	pigmeat
1036	6	offals pigs	offals of pigs, edible
1037	6	fat pigs	fat of pigs
1039	3	bacon pigs	bacon-ham of pigs
1041	3	sausages pig	sausages pig meat
1042	3	meat pr pig	meat preparations pigs
1043	3	lard	lard
1044	7	pigskins	pigskins, fresh
1045	3	skin w pigs	skin wet-salted pigs
1046	3	skin d pigs	skin dry-salted pigs
1047	3	skin nes pig	skin nes pigs
1055	15	ind pigmeat	indigenous pigmeat
1056	16	bio pigmeat	biological pig meat
1057	4	chickens	chickens
1058	5	chicken meat	chicken meat
1059	6	offal chickn	offals liver of chickens
1060	3	meat pr chck	meat preparations chick
1061	3	meat od chck	meat canned chicken
1062	9	hen eggs	hen eggs
1063	3	eggs l hen	eggs liquid hen
1064	3	eggs dry hen	eggs dry whole yolks hen
1065	3	fat poultry	fat of poultry
1066	3	fat r poultr	fat of poultry rendered
1067	3	hen eggs no	hen eggs (no)
1068	4	ducks	ducks
1070	15	ind duckmeat	indigenous duckmeat
1071	16	bio duckmeat	biological duckmeat
1072	4	geese	geese
1077	15	ind geesmeat	indigenous geese meat
1078	16	bio geesmeat	biological geese meat
1079	4	turkeys	turkeys
1087	15	ind turkmeat	indigenous turkey meat
1088	16	bio turkmeat	biological turkey meat
1089	5	poultry meat	poultry t
1091	9	eggs ex hen	eggs,excluding hen eggs
1092	3	oth egg (no)	eggs, exc hen eggs (no)
1094	15	ind chckmeat	indigenous chicken meat
1095	16	bio chckmeat	biological chicken meat
1096	4	horses	horses
1097	5	horsemeat	horsemeat
1100	10	hair horses	hair of horses
1102	7	horse hides	horse hides, fresh
1103	3	hide w horse	hides wet-salted horses

1104	3	hide d horse	hides dry-salted horses
1105	3	hide y horse	hides unspecified horses
1107	4	asses	asses
1110	4	mules	mules
1120	15	ind horsemeat	indigenous horsemeat
1121	16	bio horsmeat	biological horse meat
1122	15	ind ass meat	indigenous ass meat
1123	16	bio ass meat	biological ass meat
1124	15	ind mulemeat	indigenous mule meat
1125	16	bio mulemeat	biological mule meat
1126	4	camels	camels
1127	5	meat camel	meat of camels
1128	6	offals camel	offals of camel, edible
1129	6	fat camel	fat of camels
1130	8	camel milk	camel milk
1133	7	hides camel	camel hides, fresh
1134	3	hides w	camel
1135	3	hides d	camel
1136	3	hide u	camel
1137	15	ind camlmeat	indigenous camel meat
1138	16	bio camelmeat	biological camel meat
1163	5	game meat	game meat
1164	3	meat dry nes	meat,dried,nes
1166	5	meat nes	meat nes
1167	3	offals nes	offals nes
1168	3	oils animal	animal oils and fats nes
1171	4	animals nes	live animals nes
1172	3	meat pr nes	meat prepared nes
1173	3	meat meal	meat meal
1174	2	fish meal	fish meal
1181	4	beehives	beehives
1182	10	honey	honey
1183	10	beeswax	beeswax
1185	10	cocoon reel	cocoons, reelable
1186	3	silk, raw	silk, raw and waste
1187	10	cocoon unr	cocoons, unreelable
1195	10	fur skins	fur skins
1213	3	hides nes fr	hides+skins nes. fresh
1214	3	hide ws	hide wet-salted
1215	3	hide ds	hide dry-salted
1216	3	hide nes	hide nes
1217	3	leather used	leather used and waste
1218	3	hair fine	hair fine animal
1219	3	hair coarse	hair coarse nes
1221	3	stearine	lard stearine oil
1222	3	degras	degras
1223	3	oils fish	oils fish mar mamm
1225	3	tallow	tallow
1232	3	food prep	food prep nes
1242	3	margarine	margarine + shortening
1243	3	fats prep ns	fat preparations nes
1259	3	food wastes	food wastes prep feed
1274	3	oils boiled	oils boiled etc

1275	3	oils hydrogn	oils hydrogenated
1276	3	fatty acids	fatty acids oils
1277	3	res fatty s	res fatty subst
1293	3	org mat 29	crude organic materls 29
1294	3	seeds	seeds fruits spores pl
1295	3	spermaceti	spermaceti
1296	3	waxes veg	waxes veg
1297	3	protein	protein concentrates
1299	11	soil mach	soil machinery
1300	11	agr mach nes	agr machinery nes
1301	11	tractors all	tractors all
1302	11	tractors tot	tractors agric tot
1303	11	tractors crw	tractors agric crawler
1304	11	tractors whl	tractors agric wheel
1305	11	garden tract	garden tractors
1306	11	harv thresh	harvester-threshers
1307	11	milking mash	milking machines
1308	11	lindane	lindane
1309	11	d d t	d d t
1310	11	b h c	b h c
1311	11	other chlorin	other chlor hydrocarbons
1312	11	aldrin etc	aldrin and sim insectic
1313	11	carbamates i	carbamates insecticide
1314	11	other herbicid	other herbicides
1315	11	toxaphene	toxaphene
1316	11	fenitrothion	fenitrothion
1317	11	parathion	parathion
1318	11	malathion	malathion
1319	11	org phos oth	oth org phosph insectic
1320	11	chlorobenzil	chlorbenzilate
1321	11	bot insc pyr	pyrethrum
1324	11	bot insc oth	other botanical insectic
1325	11	miner oils	mineral oils
1326	11	arsenicals	arsenicals
1327	11	bromides	bromides
1328	11	oth fumigant	other fumigants
1330	11	other insect	other insecticides
1331	11	dinitro comp	dinitro compounds
1332	11	dithiocarbam	dithiocarbamates
1333	11	seed dress m	seed dress org mercurial
1334	11	seed dress o	seed dress others
1335	11	sulphur	sulphur
1336	11	lime sulphur	lime sulphur
1337	11	urea derivat	urea derivatives
1338	11	aromatic cp	aromatic compounds
1339	11	carbamates h	carbamates herbicide
1340	11	copper comp	copper compunds
1341	11	oth fungicid	other fungicides
1342	11	2,4,-d	2,4,-d
1343	11	mcpa	mcpa
1344	11	2,4,5-t	2,4,5-t
1345	11	triazines	triazines
1346	11	anticoagul	anticoagulants

1347	11	oth rodent	other rodenticides
1348	11	pesticid nes	pesticides nes
1350	11	plant gr reg	plant growth regulators
1352	11	methoxychlor	methoxychlor
1353	11	aliphatic cp	aliphatic compounds
1354	11	nematocides	nematocides
1355	11	al phosphide	aluminum phosphide
1356	11	car tetrachl	carbon tetrachloride
1357	11	pesticides	pesticides
1360	11	nitrogfertlz	nitrogenous fertilizers
1361	11	ammon sulph	ammonium sulphate
1362	11	ammon nitrat	ammonium nitrate
1363	11	amm sul nitr	ammonium sulphat nitrate
1364	11	sodium nitr	sodium nitrate
1365	11	calcium nitr	calcium nitrate
1366	11	calcium cyan	calcium cyanide
1367	11	urea	urea
1368	11	amm phosph n	ammonium phosphate (n)
1369	11	other nitr fer	other nitrogenous fert
1370	11	oth compl n	oth complex fert (n)
1371	11	ammonia d ap	ammonia dir application
1372	11	calc am nitr	calcium ammonium nitrate
1374	11	nit fert nes	nitrogen fertilizers nes
1375	11	phosphfertlz	phosphate fertilizers
1376	11	sing superph	single superphosphate
1377	11	conc superph	concent superphosphate
1378	11	basic slag	basic slag
1379	11	amm phosph p	ammonium phosphat (p205)
1380	11	other phos fer	other phosphate fertil
1381	11	oth compl p	other complex fert (p205)
1385	11	phos fer nes	phosphate fertiliz nes
1386	11	potashfertiliz	potash fertilizers
1387	11	potas sulph	potassium sulphate
1388	11	muriate 45	muriate over 45 k20
1389	11	muria 20-45	muriate 20-45 k20
1390	11	crude salts	crude salts to 20 k20
1391	11	oth pot fert	other potash fertilizers
1392	11	compl fer k	complex fertilizer (k20)
1396	11	pot fert nes	potash fertilizers nes
1397	11	fert m nes	fertilizers manuf nes
1398	11	nat sod nitr	natural sodium nitrate
1399	11	phosphat nat	natural phosphates
1400	11	pot salt nat	natural potassium salts
1401	11	fertil organ	fertilizers organic
1402	11	ammonia	ammonia
1403	11	phosph acid	phosphoric acid
1404	11	sulphur acid	sulphuric acid
1405	11	agric lime	agricultural lime
1406	11	gypsum	gypsum
1410	11	int comb eng	internal combust engines
1411	11	electr motor	electric motors
1412	11	trucks farms	trucks on farms
1501	12	frwtr diad f	freshwater diadrom fresh

1502	13	frwtr fz whl	freshwater frozen whole
1503	13	frwtr fillet	freshwater fillets
1504	13	frwtr fz flt	freshwater frozen fillets
1505	13	frwtr cured	freshwater cured
1506	13	frwtr canned	freshwater canned
1507	13	frwtr pr nes	freshwater prep nes
1508	13	frwtr meals	freshwater meals
1509	13	frwt bdy oil	freshwater body oils
1510	13	frwt liver oil	freshwater liver oils
1511	13	frwt meal of	freshwater meal fr offal
1514	12	dmrsl fresh	demersl marine fish frsh
1515	13	dmrsl fz whl	demersal frozen whole
1516	13	dmrsl fillet	demersal fillets
1517	13	dmrsl fz flt	demersal frozen fillets
1518	13	dmrsl cured	demersal cured
1519	13	dmrsl canned	demersal canned
1520	13	dmrsl pr nes	demersal prep nes
1521	13	dmrsl meals	demersal meals
1522	13	dmrs bdy oil	body oils
1523	13	dmrs lvr oil	demersal liver oils
1524	13	dmrs meal of	demersal meal from offal
1527	12	pelagic frsh	pelagic marine fish frsh
1528	13	pelgc fz whl	pelagic
1529	13	pelgc fillet	pelagic fillets
1530	13	pelgc fz flt	pelagic frozen fillets
1531	13	pelgc cured	pelagic cured
1532	13	pelgc canned	pelagic canned
1533	13	pelgc pr nes	pelagic prep nes
1534	13	pelgc meals	pelagic meals
1535	13	pelg bdy oil	pelagic body oils
1536	13	pelg lvr oil	pelagic liver oils
1537	13	pelg meal of	pelagic meal from offal
1540	12	marine nes f	marine fish nes fresh
1541	13	marine fz whl	marine nes frozen whole
1542	13	marin fillet	marine nes fillets
1543	13	marin fz flt	marine nes frozen fillet
1544	13	marin cured	marine nes cured
1545	13	marin canned	marine nes canned
1546	13	marin pr nes	marine nes prep nes
1547	13	marin meals	marine nes meals
1548	13	marn bdy oil	marine nes body oils
1549	13	marn lvr oil	marine nes liver oils
1550	13	marn meal of	marine nes meal fr offal
1553	12	crstaceans f	crustaceans fresh
1554	13	crstc frozen	crustaceans frozen
1555	13	crstc cured	crustaceans cured
1556	13	crstc canned	crustaceans canned
1557	13	crstc pr nes	crustaceans prep nes
1558	13	crstc meals	crustaceans meals
1559	13	crst meal of	crustaceans meal f offal
1562	12	mlluscs frsh	mlluscs excl cephlp frsh
1563	13	molsc frozen	molluscs frozen
1564	13	molsc cured	molluscs cured

1565	13	molsc canned	molluscs canned
1566	13	molsc meals	molluscs meals
1567	13	mols meal of	molluscs meal from offal
1570	12	cephlp fresh	cephcpods fresh
1571	13	cphlp frozen	cephalopods frozen
1572	13	cphlp cured	cephalopods cured
1573	13	cphlp canned	cephalopods canned
1574	13	cphlp pr nes	cephalopods prep nes
1575	13	cphlp meals	cephalopods meals
1576	13	cphl meal of	cephalopods meal f offal
1579	12	aquto mammal	aquatic mammals
1580	13	aq m meat	aquatic mammals meat
1581	13	aq m meals	aquatic mammals meals
1582	13	aq m oils	aquatic mammals oils
1583	13	aq m prep ns	aquatic mammals prepnes
1584	13	aq m meal of	aqua mammal meal f offal
1587	12	aqutc anim f	aquatic animals nes frsh
1588	13	aq a cured	aquatic animals cured
1589	13	aq a meals	aquatic animals meals
1590	13	aq a prep ns	aquatic animals prep nes
1591	13	aq a meal of	aqua anim meal fr offal
1594	12	aqutc plants	aquatic plants
1595	13	aq p dried	aquatic plants dried
1596	13	aq p prep ns	aquatic plants prep nes
1601	2	sawl vener c	sawlogs+veneer logs(c)
1602	2	sawlogs c	sawlogs(c)
1603	2	veneerlogs c	veneer logs(c)
1604	2	sawl ven nc	sawlogs+veneer logs (nc)
1606	2	veneerlogs b	veneer logs(b)
1608	2	pulpwood c	pulpwood (c)
1609	2	pitprops c	pitprops(c)
1611	2	pulpwood nc	pulpwood (nc)
1612	2	pitprops nc	pitprops (nc)
1614	2	pulpwood	pulpwood
1615	2	pitprops	pitprops
1617	2	sc w plp(nc)	se-chem wood pulp(nc)
1618	2	unb site(nc)	unbleached sulphite(nc)
1619	2	chips	chips+particles
1620	2	residues	wood residues
1621	2	bl s-phite	bleached sulphite(nc)
1622	2	nwood cell f	nwood cellulose fibre
1623	2	other ind c	other indust roundwd(c)
1624	2	unb sate(nc)	unbleached sulphate(nc)
1625	2	other ind	other indust roundwd.
1626	2	other ind no	other indust roundwd(nc)
1627	2	fuelwood c	fuelwood(c)
1628	2	fuelwood nc	fuelwood (n)
1629	2	fuelwood	fuelwood
1630	2	charcoal	charcoal
1631	2	sleepers	sleepers
1632	2	sawnwood c	sawnwood (c)
1633	2	sawnwood nc	sawnwood(nc)
1634	2	veneer	veneer sheets

1637	2	bl sate(nc)	bleached sulphate(nc)
1638	2	ot plp straw	other fibre pulp straw
1639	2	ot plp bagas	other fibre pulp bagasse
1640	2	plywood	plywood
1641	2	plywood c	plywood c
1642	2	plywood b	plywood b
1643	2	ot plp bambo	other fibre pulp bamboo
1644	2	ot plp reeds	other fib pulp reeds esp
1645	2	blockboard	blockboard etc
1646	2	particle brd	particle board
1647	2	nwd partbd	non wood particle board
1648	2	disving(nc)	dissving plp wd+fib(nc)
1649	2	fibrebd comp	fibreboard,compressed
1650	2	fibred,ncomp	fibreboard,n.compressed
1652	2	p ctd w cont	ot pr+writ ctd wood cont
1653	2	p ctd w free	ot pr+writ ctd wood free
1654	2	mech wd pulp	mechanical wood pulp
1655	2	s-ch wd pulp	semi-chemical wood pulp
1656	2	chem wd pulp	chemical wood pulp
1658	2	p unc w cont	ot pr+writ unc wd contai
1659	2	p unc w free	ot pr+writ unc wd free
1660	2	unbl sulphit	unbleached sulphite pulp
1661	2	bl sulphite	bleached sulphite pulp
1662	2	unbl sulphat	unbleached sulphate pulp
1663	2	bl sulphate	bleached sulphate pulp
1664	2	pap linerbd	linerboard
1665	2	linrbrd kraft	kraft liner
1666	2	kft lnr unbl	unbleached kraft liner
1667	2	dissolving	dissolving wood pulp
1668	2	other fi pul	other fibre pulp
1670	3	waste paper	waste paper
1671	2	newsprint	newsprint
1672	2	oth linrbrd	other linerboard
1673	2	fting medium	fluting medium
1674	2	print+writin	printing+writing paper
1675	2	other paper	other paper+paperboard
1676	2	housh+san pa	household+sanitary paper
1677	2	flt md s-che	fluting medium semi-chem
1678	2	oth flt med	other fluting medium
1679	2	kft wr pack	kraft wrap+pkg paper
1680	2	sack kraft	sack kraft wrap+pkg pap
1681	2	wraping pap	wrpg+packg paper+board
1683	2	paper+bd nes	paper+paperboard nes
1684	2	prt+wr unc	ot pr+writ pap uncoated
1685	2	prt+wr coat	ot pr+wrt paper coated
1686	2	sol bl brd	solid bleached board
1687	2	ot fold bxbd	other folding boxboard
1688	2	ot wrpkgpabd	other wrap+pkg pap+papbd
1689	2	ot paper	other wrap+pkg paper
1690	2	ot paperbd	other wrap+pkg paperbd
1691	2	ot paper nes	other paper nes
1692	2	ot papbd nes	other paperboard nes
1693	2	blchd sulpha	bleached sulphate+soda

1694	2	ot kft wr pk	other kraft wrap+pkg
1695	2	folding bxbd	folding boxboard
1696	2	kft lnr blch	bleached kraft liner
1698	2	wood pulp c	total wood pulp cap
1699	2	paper+papbd	paper+paperboard
1701	3	grand total	grand total
1702	3	a fi fo prim	agr fish forestry prim
1703	3	a fi fo proc	agr fish forestry proc
1704	3	food	food
1705	3	food prim	food primary
1706	3	food proc	food processed
1707	3	no food	non food
1708	3	no food prim	non food primary
1709	3	no food proc	non food processed
1710	3	agriculture	agriculture
1711	3	agriclt prim	agriculture primary
1712	3	agriclt proc	agriculture processed
1713	3	crops	crops
1714	2	crops prim	crops primary
1715	3	crops proc	crops processed
1716	3	cereals	cereals
1717	2	cereals prim	cereals.total
1718	3	cereals proc	cereals processed
1719	3	roots+tubers	roots and tubers
1720	2	root+tub pr	roots and tubers,total
1721	7	catt+buf hide	cattle+buffalo hides,pr.
1722	3	sugar crops	sugar crops
1723	2	sugar prim	sugar crops primary
1724	3	sugar proc	sugar crops processed
1725	3	pulses	pulses
1726	2	pulses prim	pulses,total
1727	3	olive oil t	olive oil, total
1728	11	pho fert tot	phosphate fertilizer tot
1729	2	treenut prim	treenuts,total
1730	11	pot fert tot	potash fertilizers total
1731	3	oilcrops	oilcrops
1732	2	oilcrop prim	oilcrops primary
1733	3	oilcrop proc	oilcrops processed
1734	3	vegetables	vegetables excl melons
1735	2	vegetbl prim	vegetables primary
1736	3	vegetbl proc	vegetables processed
1737	3	fruit	fruit incl melons
1738	2	fruit prim	fruit primary
1739	3	fruit proc	fruit processing
1740	3	stimulants	stimulants
1741	2	stimul prim	stimulants primary
1742	3	whmilk,ev+co	whole milk,evapor.+cond.
1743	3	spices	spices
1744	2	spices prim	spices primary
1745	3	cheese(all)	cheese (all kinds)
1746	4	cattle+buff	cattle and buffaloes
1747	15	beef buf ind	beef+buffalo meat indig
1748	15	mut goat ind	mutton+goat meat indigen

1749	4	sheep+goats	sheep and goats
1750	2	fodder prim	fodder crops primary
1751	2	jute ans sim	jute and substitutes
1752	3	fibre crops	fibre crops
1753	2	fibre prim	fibre crops primary
1754	3	fibre prod	fibre crops processed
1755	3	livestock	livestock
1756	4	live animals	live animals
1757	3	livestock pr	livestock products
1758	3	live pr prim	livestock products prim
1759	3	live pr proc	livestock products proc
1760	3	animal pr pr	live animals,prod prim
1761	3	meat offals	meat and offals
1762	5	meat of prim	meat and offals primary
1763	3	meat of proc	meat and offals processd
1764	3	meat	meat
1765	5	meat prim	meat,total
1766	3	meat proc	meat processed
1767	3	beef mu pork	beef mutton pigmeat
1768	5	b mu po prim	beef mutton pigmeat prim
1769	3	b mu po proc	beef mutton pigmeat proc
1770	3	offals edibl	offals edible
1771	6	offals prim	offals edible primary
1772	2	offals proc	offals edible processed
1773	3	slaughtr fat	slaughter fat
1774	6	sl. fat prim	slaughter fats primary
1775	3	sl. fat proc	slaughter fats processed
1776	3	hides skins	hides ans skins
1777	7	hides prim	hides and skins primary
1778	3	hides proc	hides and skins processd
1779	3	milk	milk
1780	8	milk primary	milk,total
1781	3	milk procssd	milk processed
1782	3	eggs	eggs
1783	9	eggs primary	eggs primary
1784	3	eggs procssd	eggs processed
1785	3	veg products	vegetable products
1786	3	an products	animal
1787	3	oil and fat	oils and fats
1788	3	veg oil fat	veg oils and fats
1789	3	ani oil fat	animal oils and fats
1790	3	sugar s hony	sugar syrups honey
1791	3	trnut ex oil	treenuts oilcrp excl oil
1792	3	cer st sugar	cereals starchy sugar
1793	3	tot exc alc	grand total exc alcohol
1794	3	alcohol bev	alcoholic beverages
1795	11	crude fertlz	crude fertilizers
1796	3	off etc prim	coffee tea tob alc proc
1797	3	raw material	raw materials
1798	3	raw mat prim	raw materials primary
1799	3	raw mat proc	raw materials processed
1800	2	veget+melons	vegetables+melons,total
1801	3	fr ex m prim	fruit excl melons, total

1802	3	cereal bran	cereal bran
1803	3	oil cakes	oil cakes and meal
1804	3	citrus prim	citrus fruit,total
1805	11	agr requisit	agricultural requisites
1806	3	beef buff m.	beef and buffalo meat
1807	3	mutton g. m.	mutton and goat meat
1808	3	poultry meat	poultry meat
1809	3	milk dr sk	skim milk+buttermilk,dry
1810	3	cow b cheese	cow and buffalo cheese
1811	3	butter ghee	butter and ghee
1812	3	skmilk,ev+co	skimmilk,evaporat.+cond.
1813	3	fibres silk	vegetable fibre and silk
1814	2	coarse grain	coarse grain primary
1815	3	milk p ex bu	milk and prod excl buttr
1816	3	ev cond milk	evaporat condensed milk
1817	11	nit fert tot	nitrogenous fertiliz tot
1818	11	tot fertiliz	total fertilizers
1819	3	dry milk	dry milk (all kinds)
1820	11	agr machnry	agriculture machines
1821	12	tot mar fish	total marine fish
1822	12	finfish frfz	finfish fresh frozen
1823	12	finfish proc	finfish processed
1824	13	f s frozen	fish shellfish frozen
1825	13	flt chll fz	fish fillet chilld frzen
1826	13	shlf f fz cr	shellfish fresh frzn cred
1827	13	f s cured	fish shellfish cured
1828	13	f s canned	fish shellfish canned
1829	13	f s prep nes	fish shellfish prep nes
1830	13	fish meal	fish meal wh and offal
1831	13	fish oil	fish body and liver oil
1832	13	shlf cann pr	shellfish canned prepard
1833	13	fish prod	fish fishery products
1834	13	fish food	fish food
1835	13	fish nonfood	fish non food
1836	13	fish fz w fl	fish frozen whole fillet
1837	13	fish cured	fish cured
1838	13	fish cann pr	fish canned and prepared
1839	13	fish total	fish + fishery prod tot
1840	12	total fish	total fish catch
1841	3	oilcpr-p.oil	oilcrop prim ex palm oil
1842	2	pul nut olcr	pulses, nuts, oil crops
1843	2	millet+sorg.	millet and sorghum
1844	2	misc cereals	miscellaneous cereals
1845	2	misc roots	miscellan. roots+tubers
1846	3	sugar+honey	sugar crops and honey
1847	2	orang+tang	oranges and tangerines
1848	2	other citrus	citrus nes + grapefruit.
1849	2	misc fruits	miscellaneous fruit crop
1850	5	misc meat	miscellaneous meat
1851	12	crust+moll	crustac. mollusc. ceph.
1852	12	oth aq an+pl	oth aquatic animals+plants
1853	6	ani+fish oil	animal+fish oils+fats
1854	2	tea and sim	tea+similar beverages

1855	2	hops+chicory	hops and chicory roots
1856	3	beer	beer
1857	3	oth alc bev	oth alcoholic beverages
1858	3	skimmed milk	skimmed milk
1859	2	wood pulp nm	wood pulp exc mechanical
1860	2	paper+-board	paper+-board ex newsprnt
1861	2	roundwood	roundwood
1862	2	roundwood c	roundwood(c)
1863	2	roundwood nc	roundwood(nc)
1864	2	fuelwd+charc	fuelwood+charcoal
1865	2	ind roundwd	industrial roundwood
1866	2	ind round c	industrial roundwood (c)
1867	2	ind round nc	industrial roundwood(nc)
1868	2	sawlog+ven	sawlogs+veneer logs
1869	2	pitprops	pitprops
1870	2	pulpwd+part	pulpwood+particles
1871	2	other ind	other indust roundwood
1872	2	sawnwood	sawnwood+sleepers
1873	2	panels	wood-based panels
1874	2	fibreboard	fibreboard
1875	2	wood pulp	wood pulp
1876	2	paper+bd	paper+paperboard
1877	2	forest prod	forest products
1878	2	pulp for pap	pulp for paper
1879	2	wood+lumber	wood and lumber
1880	2	pitp+oth ind	pitprop+oth ind roundwd

APPENDIX B

List of FAO Elements and Dimensions within the Different Groups

Group Code	Element Code	Element	Dimens. 1	Dimens. 2	Dimens. 3
1	1	total	1000		
1	2	female	1000		
1	3	females ma	1000		
1	4	birth rate	.0001		
1	5	born	1000		
1	6	immigration	1000		
1	7	** not used **			
1	8	** not used **			
1	9	emigration	1000		
1	10	rural total	1000		
1	11	urban total	1000		
1	12	agriculture			
1	13	agriculture	1000		
1	14	labforce tot	1000		
1	15	labforce tot	1000		
1	16	labf. agr.	1000		
1	17	labf. non agr	1000		
2	1	op stocks	mt	cum	
2	2	area sown	ha		
2	3	area harv	ha		
2	4	yield	*kg/ha		
2	5	production	mt	cum	
2	6	imports	mt	cum	$/mt
2	7	from stocks	mt	cum	
2	8	to stocks	mt	cum	
2	9	exports	mt	cum	$/mt
2	10	feed	mt	cum	
2	11	seed	mt	cum	
2	12	waste	mt	cum	
2	13	processed	mt	cum	
2	14	food	mt	cum	
2	15	other util	mt	cum	
2	16	cl stocks	mt	cum	
2	17	seed rate	hg/ha		
3	1	op stocks	mt		
3	2	** not used **			

3	3	input	mt		
3	4	extr rate	hg/mt		
3	5	production	mt	thous.	
3	6	imports	mt	1000 $	$/mt
3	7	from stocks	mt		
3	8	to stocks	mt		
3	9	exports	mt	1000 $	$/mt
3	10	feed	mt		
3	11	seed	mt		
3	12	waste	mt		
3	13	processed	mt		
3	14	food	mt		
3	15	other util	mt		
3	16	cl stocks	mt		
3	17	seed rate	hg/ha		
4	1	stocks	head	number	
4	2	fem repr age	head		
4	3	fem act repr	head		
4	4	birth rate	.0001		
4	5	born	head	cum	
4	6	imports	head	cum	$/mt
4	7	from stocks	head	cum	
4	8	to stocks	head	cum	
4	9	exports	head	cum	$/mt
4	10	feed	head	cum	
4	11	** not used **			
4	12	nat death	head	cum	
4	13	slaughtered	head	cum	
4	14	food	head	cum	
4	15	other util	head	cum	
4	16	cl stocks	head	cum	
4	17	take off rat	.001		
5	1	op stocks	mt		
5	2	** not used **			
5	3	slaughtered	head		
5	4	carcass wt	*kg/an		
5	5	production	mt		
5	6	imports	mt	cum	$/mt
5	7	from stocks	mt		
5	8	to stocks	mt		
5	9	exports	mt	cum	$/mt
5	10	feed	mt		
5	11	** not used **			
5	12	waste	mt		
5	13	processed	mt		
5	14	food	mt		
5	15	other util	mt		
5	16	cl stocks	mt		
5	17	** not used **			
6	1	op stocks	mt		
6	2	** not used **			
6	3	slaughtered	head		
6	4	f/c yield	hg		

6	5	production	mt		
6	6	imports	mt	cum	$/mt
6	7	from stocks	mt		
6	8	to stocks	mt		
6	9	exports	mt	cum	$/mt
6	10	feed	mt		
6	11	** not used **			
6	12	waste	mt		
6	13	processed	mt		
6	14	food	mt		
6	15	other util	mt		
6	16	cl stocks	mt		
6	17	of carc wt			
7	1	op stocks	mt		
7	2	** not used **			
7	3	slaughtered	head		
7	4	yield	*kg/an		
7	5	production	mt	thous.	
7	6	imports	mt	1000 $	$/mt
7	7	from stocks	mt		
7	8	to stocks	mt		
7	9	exports	mt	1000 $	$/mt
7	10	feed	mt	cum	
7	11	** not used **			
7	12	waste	mt	cum	
7	13	processed	mt	cum	
7	14	food	mt	thous.	
7	15	other util	mt	cum	
7	16	cl stocks	mt	cum	
7	17	wt per piece	hg	cum	
8	1	op stocks	mt		
8	2	cows	head		
8	3	milk animals	head		
8	4	yield	*kg/an		
8	5	production	mt		
8	6	import	mt	cum	$/mt
8	7	from stocks	mt		
8	8	to stocks	mt		
8	9	exports	mt	cum	$/mt
8	10	feed	mt		
8	11	** not used **			
8	12	waste	mt		
8	13	processed	mt		
8	14	food	mt		
8	15	other util	mt		
8	16	cl stocks	mt		
8	17	** not used **			
9	1	op stocks	mt		
9	2	population	head		
9	3	laying	head		
9	4	yield	hg		
9	5	production	mt		
9	6	imports	mt	cum	$/mt

9	7	from stocks	mt		
9	8	to stocks	mt		
9	9	exports	mt	cum	$/mt
9	10	feed	mt		
9	11	for hatching	mt		
9	12	waste	mt		
9	13	processed	mt		
9	14	food	mt		
9	15	other util	mt		
9	16	cl stocks	mt		
9	17	wt per egg	gram		
10	1	op stocks	mt	mt	
10	2	population	head	number	
10	3	prod populin	head	number	
10	4	yield	hg	hg	
10	5	production	mt	thous.	
10	6	imports	mt	1000 $	$/mt
10	7	from stocks	mt	cum	
10	8	to stocks	mt	cum	
10	9	exports	mt	1000 $	$/mt
10	10	feed	mt	cum	
10	11	** not used **			
10	12	waste	mt	cum	
10	13	processed	mt	cum	
10	14	food	mt	cum	
10	15	other util	mt	cum	
10	16	cl stocks	mt	cum	
10	17	** not used **			
11	1	in use	mt	number	
11	2	** not used **			
11	3	capacity prd	mt		
11	4	** not used **			
11	5	production	mt	number	
11	6	imports	mt	number	
11	7	from stocks	mt	number	
11	8	to stocks	mt	number	
11	9	exports	mt	number	
11	10	feed	mt	number	
11	11	** not used **			
11	12	loss	mt	number	
11	13	** not used **			
11	14	food	mt	number	
11	15	consumption	mt	number	100 kg
11	16	cl stocks	mt	number	
11	17	** not used **			
12	1	** not used **			
12	2	** not used **			
12	3	** not used **			
12	4	** not used **			
12	5	production	mt		
12	6	imports	mt	1000 $	$/mt
12	7	from stocks	mt		
12	8	to stocks	mt		

12	9	exports	mt	1000 $	$/mt
12	10	feed	mt		
12	11	breed/bait	mt		
12	12	waste	mt		
12	13	processing	mt		
12	14	food	mt		
12	15	other util	mt		
12	16	** not used **			
12	17	** not used **			
13	1	op stocks	mt		
13	2	** not used **			
13	3	input	mt		
13	4	extr rate	hg/mt		
13	5	output	mt		
13	6	imports	mt	1000 $	$/mt
13	7	from stocks	mt		
13	8	to stocks	mt		
13	9	exports	mt	1000 $	$/mt
13	10	feed	mt		
13	11	baiting	mt		
13	12	waste	mt		
13	13	processing	mt		
13	14	food	mt		
13	15	other util	mt		
13	16	cl stocks	mt		
13	17	** not used **			
14	1	pv cons expn			
14	2	gv cons expn			
14	3	grs cap form			
14	4	exports g+s			
14	5	imports g+s			
14	6	stat discr +			
14	7	stat discr -			
14	8	ind tax-subs			
14	9	gdp fc agr			
14	10	gdp fc min			
14	11	gdp fc man			
14	12	gdp fc oth			
14	13	gdp fc uns			
14	14	n f income +			
14	15	n f income -			
14	16	depreciation			
14	17	curr change			
15	1	** not used **			
15	2	** not used **			
15	3	production	head		
15	4	carcass wt	*kg/an		
15	5	production	mt		
15	6	** not used **			
15	7	** not used **			
15	8	** not used **			
15	9	** not used **			
15	10	** not used **			

15	11	** not used **	
15	12	** not used **	
15	13	** not used **	
15	14	** not used **	
15	15	** not used **	
15	16	** not used **	
15	17	** not used **	
16	1	** not used **	
16	2	** not used **	
16	3	production	head
16	4	live weight	*kg/an
16	5	production	mt
16	6	** not used **	
16	7	** not used **	
16	8	** not used **	
16	9	** not used **	
16	10	oth ar land	1000ha
16	11	pastur culiv	1000ha
16	12	pastur unclt	1000ha
16	13	forest grazd	1000ha
16	14	unused land	1000ha
16	15	built area	1000ha
16	16	** not used **	
16	17	** not used **	
17	1	total area	1000ha
17	2	inland water	1000ha
17	3	land area	1000ha
17	4	agr/land	
17	5	agric area	1000ha
17	6	arab+perm cr	1000ha
17	7	arable land	1000ha
17	8	temp crops	1000ha
17	9	tem meadow	1000ha
17	10	gardens	1000ha
17	11	tem fallow	1000ha
17	12	perm crops	1000ha
17	13	perm pasture	1000ha
17	14	forest+woodl	1000ha
17	15	other land	1000ha
17	16	pot for agr	1000ha
17	17	pot for for	1000ha

APPENDIX C

Commodity Classficiations of the FAP

The Detailed Commodity List (19 Main Commodities and 7 By-products) and Target Commodities of the Small Commodity Classification

Commodity		Dimensions		Target commodity	
code	name	1	2	code	name
3001	wheat + wheat products	1000 $	MT	3501	wheat
3002	rice	1000 $	MT rice milled	3502	rice
3003	coarse grains	1000 $	MT	3503	coarse grain
3004	vegetable oils	1000 $	MT	3508	other food
3005	protein feeds	1000 $	MT protein	3507	protein feed
3006	sugar and related prod.	1000 $	MT	3508	other food
3007	meat excl. pork+poultry	1000 $	MT carcass weight	3504	bov+ov meat
3008	pork	1000 $	MT carcass weight	3506	other meat
3009	poultry meat and eggs	1000 $	MT protein	3506	other meat
3010	dairy products	1000 $	MT milk	3505	dairy products
3011	vegetables,st. roots,leg.	1000 $	----	3508	other food
3012	fruits and nuts	1000 $	----	3508	other food
3013	fishery products	1000 $	MT protein	3508	other food
3014	coffee	1000 $	MT	3508	other food
3015	cocoa , tea	1000 $	----	3508	other food
3016	bev. from dist. alcohol	1000 $	----		
3017	clothing fibres	1000 $	----	3509	industrial crops
3018	industrial crops	1000 $	----	3509	industrial crops
3019	non-agricultural prod	1000 $	----	3510	non-agric
3020	bov.+ovine fats, tallow	1000 $	MT	3511	bov+ov fats
3021	pig fat, lard, stear.	1000 $	MT	3512	other fat
3022	fat from poultry	1000 $	MT	3512	other fat
3023	fish oil	1000 $	MT	3512	other fat
3024	meal from meat	1000 $	MT protein	3513	meat meal
3025	fish meal	1000 $	MT protein	3514	fish meal

3026	wool, hides, and hairs	1000 $	---	3515	wool+hides
3027	hides from pig	1000 $	---	3516	pig hides

The Small Commodity List (10 Main Commodities and 6 By-products)

Commodity		Dimension
code	name	
3501	wheat + wheat pr.	MT (2)
3502	rice + rice pr.	MT rice milled (2)
3503	grains	MT (2)
3504	bovine + ovine meat	MT carcass weight (2)
3505	dairy products	MT milk (2)
3506	pork+poultry+eggs+fish	MT protein (2)
3507	prot.feed from crops	MT protein (2)
3508	other food from crops	1000 $ (1)
3509	non-food from crops	1000 $ (1)
3510	non-agricultural prod	1000 $ (1)
3511	fats from bov.+ovine	1000 $ (1)
3512	oth.anim.fats	1000 $ (1)
3513	meat meal	MT protein (2)
3514	fish meal	MT protein (2)
3515	hides,hairs,wool	1000 $ (1)
3516	pig hides	1000 $ (1)

APPENDIX D

List of FAP Countries

4	algeria	Algeria
9	argentina	Argentina
10	australia	Australia
11	austria	Austria
16	bangladesh	Bangladesh
15	belgium-lux	Belgium-Luxembourg
21	brazil	Brazil
27	bulgaria	Bulgaria
33	canada	Canada
41	china	China
51	czechoslovak	Czechoslovakia
54	denmark	Denmark
59	egypt	Egypt
62	ethiopia	Ethiopia
67	finland	Finland
68	france	France
77	german dr	German Democratic Republic
78	germany fed	Federal Republic of Germany
84	greece	Greece
97	hungary	Hunary
100	india	India
101	indonesia	Indonesia
102	iran	Iran
103	iraq	Iraq
104	ireland	Ireland
106	italy	Italy
110	japan	Japan
114	kenya	Kenya
116	korea dpr	Korea DPR
138	mexico	Mexico
143	morocco	Morocco
150	netherlands	Netherlands
156	new zealand	New Zealand
159	nigeria	Nigeria
162	norway	Norway
165	pakistan	Pakistan
170	peru	Peru
171	philippines	Philippines
173	poland	Poland

174	portugal	Portugal
183	romania	Romania
202	south africa	South Africa
203	spain	Spain
206	sudan	Sudan
210	sweden	Sweden
211	switzerland	Switzerland
212	syria	Syria
215	tanzania	Tanzania
216	thailand	Thailand
222	tunisia	Tunisia
223	turkey	Turkey
229	uk	United Kingdom
231	usa	United States of America
228	ussr	Union of Soviet Socialist Republics
236	venezuela	Venezuela
248	yugoslavia	Yugoslavia
777	cmea	Committee for Mutual Economic Cooperation
888	eec	European Communities

APPENDIX E

List of Target Commodities Output from Program AGSUA

NR	COMMODITY	FL	JBAL	IAG	W1	W2
15	wheat		14	1	64.6	1.000
27	rice, paddy	z	14	2	152.0	0.670
44	barley	z	10	3	64.8	1.000
51	beer of barley	p	14	16	224.0	
56	maize	z	10	3	64.6	1.000
66	beer of maize		14	16	224.0	
68	pop corn	p	14	3	62.5	1.000
71	rye		10	3	58.9	1.000
75	oats		10	3	58.8	1.000
79	millet	z	10	3	62.5	1.000
82	beer of millet		14	16	224.0	
83	sorghum	z	10	3	62.5	1.000
86	beer of sorghum		14	16	224.0	
89	buckwheat		10	3	62.5	1.000
92	quinoa	p	10	3	62.5	1.000
101	canary seed	p	15	3	62.5	1.000
103	mixed grain		10	3	62.5	1.000
108	cereals NES	y	14	3	62.5	1.000
116	potatoes		15	11	69.0	
122	sweet potatoes	p	14	11	175.0	
125	cassava		15	11	175.0	
136	taro (coco yam)	p	15	11	175.0	
137	yams	p	15	11	175.0	
149	roots and tubers NES	y	15	11	152.0	
156	sugar cane		a	6	1.0	
157	sugar beets		a	6	1.0	
161	sugar crops NES		a	6	1.0	
164	sugar refined	z	15	6	118.0	1.000
176	beans, dry	p	14	11	200.0	
181	broad beans, dry	p	14	11	107.0	
187	peas, dry	p	14	11	130.0	
191	chick-peas	p	14	11	162.0	
195	cow peas, dry	p	14	11	260.0	
197	pigeon peas	p	14	11	185.0	
201	lentils	p	14	11	185.0	
205	vetches	p	15	11	185.0	
210	lupins	p	10	11	105.0	
211	pulses NES	y	14	11	185.0	

216	brazil nuts	p	14	12	1184.0	
217	cashew nuts	p	14	12	1184.0	
220	chestnuts	p	14	12	1184.0	
221	almonds	p	14	12	1184.0	
222	walnuts	p	14	12	1184.0	
223	pistachios	p	14	12	1184.0	
225	hazelnuts	p	14	12	1184.0	
234	nuts NES	p	14	12	1184.0	
236	soybeans		a	4	1.0	
237	oil of soy beans	x	15	4	273.0	1.000
238	cake of soybeans	x	10	5	95.0	0.406
242	groundnuts in shell		a	4	1.0	
244	oil of groundnuts	x	15	4	355.0	1.000
245	cake of groundnuts	x	10	5	84.0	0.417
249	coconuts		a	4	1.0	
252	oil of coconuts	x	15	4	282.0	1.000
253	cake of coconuts	x	10	5	47.0	0.115
257	palm oil	x	15	4	202.0	1.000
258	oil of palm kernels	x	15	4	309.0	1.000
259	cake of palm kernels	x	10	5	77.0	0.130
260	olives		a	4	1.0	
261	olive oil	x	14	4	675.0	1.000
263	karite nuts (sheanuts)		15	12	131.0	
265	castor beans		a	4	1.0	
266	oil of castor beans	x	15	4	280.0	1.000
267	sunflower seed		a	4	1.0	
268	oil of sunflower seed	x	15	4	270.0	1.000
269	cake of sunflower seed	x	10	5	71.0	0.165
270	rapeseed		a	4	1.0	
271	oil of rapeseed	x	15	4	276.0	1.000
272	cake of rapeseed	x	10	5	65.0	0.356
275	tung nuts		a	4	1.0	
276	tung oil	x	15	4	308.0	1.000
280	safflower seed		a	4	1.0	
281	oil of safflower seed	x	15	4	611.0	1.000
282	cake of safflower seed	x	10	5	38.0	0.139
289	sesame seed		a	4	1.0	
290	oil of sesame seed	x	15	4	655.0	1.000
291	cake of sesame seed	x	10	5	84.0	0.407
292	mustard seed		a	4	1.0	
293	oil of mustard seed	x	15	4	290.0	1.000
296	poppy seed		a	4	1.0	
297	oil of poppy seed	x	15	4	1220.0	1.000
298	cake of poppy seed	x	10	5	100.0	0.216
299	melonseed		15	4	243.0	0.368
331	oil of cotton seed	x	15	4	302.0	1.000
332	cake of cotton seed	x	10	5	67.0	0.211
333	linseed		a	4	1.0	
334	oil of linseed	x	15	4	209.0	1.000
335	cake of linseed	x	10	5	82.0	0.273
336	hempseed		a	4	1.0	
337	oil of hempseed	x	15	4	330.0	1.000
338	cake of hempseed	x	10	5	90.0	0.216

339	oilseeds NES		a	4	1.0	
340	oil of veget origin NES	x	15	4	344.0	1.000
341	cakes of oilseeds NES	x	10	5	77.0	0.188
343	flour/meal of oilseeds	x	10	5	115.0	0.372
358	cabbages	p	14	11	175.0	
366	artichokes	p	14	11	175.0	
367	asparagus	p	14	11	175.0	
372	lettuce	p	14	11	175.0	
373	spinach	p	14	11	175.0	
388	tomatoes	p	14	11	277.0	
393	cauliflower	p	14	11	175.0	
394	pumpkins, squash, gourds	p	14	11	175.0	
397	cucumbers and gherkins	p	14	11	175.0	
399	eggplants	p	14	11	175.0	
401	chillies+peppers, green	p	14	11	163.0	
402	onions+shallots, green	p	14	11	175.0	
403	onions, dry	p	14	11	152.0	
406	garlic	p	14	11	422.0	
414	beans, green	p	14	11	185.0	
417	peas, green	p	14	11	185.0	
420	broad beans, green	p	14	11	185.0	
423	string beans	p	14	11	175.0	
426	carrots	p	10	11	185.0	
446	green corn (maize)	p	14	11	137.0	
449	mushrooms	p	14	11	175.0	
459	chicory roots	p	14	11	175.0	
460	veg prod fresh or dried	p	14	11	369.0	
463	vegetables fresh NES		14	11	152.0	
486	bananas	p	14	12	111.0	
489	plantains	p	14	12	111.0	
490	oranges		14	12	137.0	
495	tang.mand.clement.satsma	p	14	12	137.0	
497	lemons and limes	p	14	12	182.0	
507	grapefruit and pomelo		14	12	182.0	
512	citrus fruit NES		14	12	182.0	
515	apples	p	14	12	159.0	
517	cider	y	14	12	474.0	
521	pears	p	14	12	225.0	
523	quinces	p	14	12	225.0	
526	apricots	p	14	12	225.0	
530	sour cherries	p	14	12	225.0	
531	cherries	p	14	12	225.0	
534	peaches and nectarines	p	14	12	225.0	
536	plums		14	12	225.0	
541	stone fruit NES. fresh	p	14	12	225.0	
544	strawberries	p	14	12	225.0	
547	raspberries	p	14	12	225.0	
549	gooseberries	p	14	12	225.0	
550	currants	p	14	12	225.0	
552	blueberries	p	14	12	225.0	
554	cranberries	p	14	12	225.0	
558	berries NES	p	14	12	225.0	
560	grapes	z	14	12	225.0	

564	wine		14	16	371.0	
567	watermelons	p	14	12	225.0	
568	melons incl cantaloupes	p	14	12	225.0	
569	figs		14	12	225.0	
571	mangoes	p	14	12	225.0	
572	avocados	p	14	12	225.0	
574	pineapples		14	12	225.0	
577	dates	p	14	12	225.0	
603	fruit tropical fresh NES		14	12	225.0	
619	fruit fresh NES	y	14	12	225.0	
633	beverages non-alcoholic	y	14	12	9.5	
634	beverages dist alcoholic	y	14	16	1206.0	
656	coffee, green		14	14	830.0	1.000
658	coffee subst cont coffee		14	14	1447.0	1.000
661	cocoa beans		14	15	727.0	
667	tea	p	14	15	931.0	
671	mate	p	14	15	931.0	
677	hops	p	15	18	2105.0	
687	pepper,white/long/black	p	14	11	690.0	
689	pimento, allspice	p	14	11	690.0	
692	vanilla	p	14	11	10760.0	
693	cinnamon (canella)	p	14	11	921.0	
698	cloves, whole+stems	p	14	11	2814.0	
702	nutmeg, mace, cardamons	p	14	11	1857.0	
711	anise, bacian, fennel	p	14	11	319.0	
723	spices NES	p	14	11	738.0	
748	peppermint	p	14	15	931.0	
754	pyrethrum		15	18	1962.0	
766	seed cotton		15	17	180.0	
770	cotton linter		15	17	134.0	
771	flax fibre raw		15	18	257.0	
773	flax fibre and tow		15	18	420.0	
777	hemp fibre and tow		15	18	236.0	
780	jute		15	18	221.0	
782	jute-like fibres		15	18	221.0	
788	ramie		15	18	444.0	
789	sisal		15	18	129.0	
800	agave fibres NES		15	18	129.0	
809	abaca (manila hemp)		15	18	254.0	
821	fibre crops NES		15	18	162.0	
826	tobacco leaves		15	18	1763.0	
864	calves		a	7	200.0	
866	cattle		a	7	800.0	
867	beef and veal		14	7	931.0	1.000
868	offals of cattle, edible	p	14	7	524.0	1.000
869	fat of cattle	x	15	20	187.0	1.000
882	cow milk, whole, fresh		14	10	131.0	1.000
919	cattle hides, fresh		15	26	396.0	
927	skins fresh of calves		15	26	779.0	
946	buffaloes		a	7	1000	
947	buffalo meat	p	14	7	931.0	1.000
948	offals of buffalo, edible	p	14	7	524.0	1.000
949	fat of buffalo	x	15	20	187.0	0.930

951	buffalo milk		14	10	131.0	1.000
957	buffalo hides, fresh		15	26	570.0	
974	lambs		a	7	40.0	
976	sheep		a	7	100.0	
977	mutton and lamb	p	14	7	530.0	1.000
978	offals of sheep, edible	p	14	7	826.0	1.000
979	fat of sheep	x	15	20	187.0	0.930
982	sheep milk		14	10	131.0	1.000
987	wool, greasy		15	26	934.0	
994	grease incl lanolin wool	p	15	20	429.0	1.000
995	sheepskins, fresh		15	26	613.0	
999	skin with wool sheep	p	15	26	932.0	
1007	wool shoddy	p	15	26	530.0	
1008	hair carded or combed	p	15	26	1634.0	
1009	wool hair waste	p	15	26	765.0	
1014	kids		a	7	40.0	
1016	goats		a	7	100.0	
1017	goat meat	p	14	7	531.0	1.000
1018	offals of goats, edible	p	14	7	524.0	1.000
1019	fat of goats	x	15	20	187.0	0.930
1020	goat milk		14	10	131.0	1.000
1025	goatskins, fresh		15	26	1434.0	
1034	pigs		a	8	1000.0	
1035	pigmeat		14	8	888.0	1.000
1036	offals of pigs, edible	p	14	8	470.0	1.000
1037	fat of pigs		14	21	187.0	0.890
1044	pigskins, fresh		15	27	297.0	
1057	chickens		a	9	0.0	
1058	chicken meat		14	9	667.0	0.123
1059	offals liver of chickens	p	14	9	667.0	0.197
1062	hen eggs		14	9	590.0	0.110
1065	fat of poultry		15	22	560.0	0.930
1068	ducks		a	9	0.0	
1072	geese		a	9	0.0	
1079	turkeys		a	9	0.0	
1089	poultry t (excl hen)	p	14	9	667.0	0.120
1091	eggs,excluding hen eggs	p	14	9	590.0	0.148
1096	horses		a	7	1.0	
1097	horsemeat	p	14	7	459.0	1.000
1100	hair of horses		15	26	1676.0	
1102	horse hides, fresh		15	26	347.0	
1107	asses		a	7	800.0	
1110	mules		a	7	1000.0	
1126	camels		a	7	1100.0	
1127	meat of camels	p	14	7	931.0	1.000
1128	offals of camel, edible	p	14	7	524.0	1.000
1129	fat of camels	x	15	20	187.0	0.930
1130	camel milk	p	14	10	131.0	1.000
1133	camel hides, fresh		15	26	570.0	
1163	game meat	p	14	7	1476.0	1.000
1166	meat NES		14	7	591.0	1.000
1167	offals NES	p	14	7	164.0	1.000
1168	animal oils and fats NES	x	15	20	171.0	1.000

1171	live animals NES		a	7	0.0	
1173	meat meal		10	24	105.0	0.642
1174	fish meal		10	25	153.0	0.555
1182	honey		14	6	334.0	1.000
1186	silk, raw and waste	x	15	26	9566.0	
1187	cocoons, unreelable	x	15	26	2634.0	
1213	hides+skins NES. fresh		15	26	1309.0	
1218	hair fine animal	y	15	26	1946.0	
1219	hair coarse NES	y	15	26	440.0	
1221	lard stearine oil	x	15	21	187.0	1.000
1222	degras	x	15	20	187.0	1.000
1223	oils fish mar mamm	x	15	23	179.0	1.000
1225	tallow	x	15	20	177.0	1.000
1242	margarine + shortening	x	14	4	275.0	1.000
1274	oils boiled etc	x	15	4	209.0	1.000
1275	oils hydrogenated	x	15	4	275.0	1.000
1501	freshwater diadrom fresh	z	14	13	554.0	0.109
1514	demersl marine fish fresh	z	14	13	554.0	0.083
1527	pelagic marine fish fresh	z	14	13	554.0	0.126
1540	marine fish NES fresh	z	14	13	813.0	0.103
1553	crustaceans fresh	z	14	13	813.0	0.093
1562	mlluscs excl cephlp fresh	z	14	13	813.0	0.023
1570	cephcpods fresh		14	13	554.0	0.153
1579	aquatic mammals	z	14	13	554.0	0.214
1587	aquatic animals NES fresh	z	15	13	554.0	0.126
1594	aquatic plants		15	13	10.0	0.028

APPENDIX F

List of Commodities with Two Joint Derived Products

In the list below all commodities are reported which follow the rules given in chapter 2.3, i.e. the joint product case where the intermediate consumption item is input to two derived products. The respective target commodities are marked with the letter "T". As has been explained in the text for oil crops, the target commodities are always oils and cakes.

COM	PRIMARY	COM	DERIVED	COM	DERIVED
71T	rye	72	flour	rye	73
89T	buckwheat	90	flour buckwh	91	bran buckwht
103T	mixed grain	104	flour mix gr	105	bran of mix
236	soybeans	237T	oil soybean	238T	cake soybean
256	palm kernels	258T	oil,palm ker	259T	cake,palm ke
267	sunflwr seed	268T	oil sunf sd	269T	cake sunf sd
270	rapeseed	271T	oil rapeseed	272T	cake rapesee
333	linseed	334T	oil linseed	335T	cake linseed
336	hempseed	337T	oil hempsd	338T	cake hempsd
339	oilseeds NES	340T	oil vg or ns	341T	cake oilsd ns

APPENDIX G

List of Commodities with Alternative Derived Products

In the list below all commodities are reported which follow the rules given in chapter 2.2, i.e. the intermediate consumption item of the primary commodity is split to serve as input to various alternative derived products. This also covers the case of a single derived product.

COM	PRIMARY	COM	DERIVED
75	oats	76	oats,rolled
125	cassava	126	flour of cassava
		127	cassava tapioca
149	roots and tubers NES	150	flour of roots and tuber
		151	roots and tubers dried
211	pulses NES	212	flour of pulses
263	karite nuts (sheanuts)	264	butter of karite nuts
265	castor beans	266	oil of castor beans
275	tung nuts	276	tung oil
292	mustard seed	293	oil of mustard seed
388	tomatoes	390	juice of tomatoes
		391	tomato paste
		392	peeled tomatoes
463	vegetables fresh NES	464	vegetables dried NES
		465	vegetables canned ns
		466	juice of vegetables NES
		469	vegs.dehydrated
		471	vegs pr by vinegar
		472	vegs pr NES
		473	vegetables frozen
		474	vegs in temp preservative
490	oranges		491
507	grapefruit and pomelo	509	grapefruit juice
512	citrus fruit NES	513	citrus fruit juice NES
536	plums	537	plums, dried (prunes)
569	figs	570	figs, dried
574	pineapples	575	pineapples, canned
		576	pineapple juice
603	fruit tropical fresh NES	604	fruit tropical dried NES
619	fruit fresh NES	620	fruit dried NES
		622	fruit juice NES
		623	fruit prep NES
		624	flour of fruit
656	coffee, green	657	coffee roasted

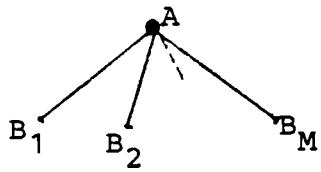
		659	coffee extracts
754	pyrethrum	755	pyrethrum extract
773	flax fibre and tow	774	flax tow waste
826	tobacco leaves	828	cigarettes
		829	cigars cheroots
		831	tobacco products NES
867	beef and veal	872	beef dried salt smoked
		873	meat extracts
		874	sausages beef and veal
		875	beef preparations
		876	beef canned
987	wool, greasy	988	wool, scoured
1020	goat milk	1021	cheese of goat milk
1035	pigmeat	1039	bacon-ham of pigs
		1041	sausages pig meat
		1042	meat preparations pigs
1037	fat of pigs	1043	lard
1058	chicken meat	1060	meat preparations chick
		1061	meat canned chicken
1062	hen eggs	1063	eggs liquid hen
		1064	eggs dry whole yolks hen
1065	fat of poultry	1066	fat of poultry rendered
1166	meat NES	1164	meat, dried, NES
		1172	meat prepared NES
1185	cocoons, reelable	1186	silk, raw and waste
1501	freshwater diadrom fresh	1502	freshwater frozen whole
		1503	freshwater fillets
		1504	freshwater frozen fillet
		1505	freshwater cured
		1506	freshwater canned
		1507	freshwater prep NES
1514	demersal marine fish frsh	1515	demersal frozen whole
		1516	demersal fillets
		1517	demersal frozen fillets
		1518	demersal cured
		1519	demersal canned
		1520	demersal prep NES
1527	pelagic marine fish frsh	1528	pelagic frozen whole
		1529	pelagic fillets
		1530	pelagic frozen fillets
		1531	pelagic cured
		1532	pelagic canned
		1533	pelagic prep NES
1540	marine fish NES fresh	1541	marine NES frozen whole
		1542	marine NES fillets
		1543	marine NES frozen fillet
		1544	marine NES cured
		1545	marine NES canned
		1546	marine NES prep NES
1553	crustaceans fresh	1554	crustaceans frozen
		1555	crustaceans cured
		1556	crustaceans canned
		1557	crustaceans prep NES

1562	mlluscs excl cephlp frsh	1563	molluscs frozen
		1564	molluscs cured
		1565	molluscs canned
1570	cephlpods fresh	1571	cephalopods frozen
		1572	cephalopods cured
		1573	cephalopods canned
		1574	cephalopods prep NES
1579	aquatic mammals	1580	aquatic mammals meat
		1583	aquatic mammals prepnes
1587	aquatic animals NES frsh	1588	aquatic animals cured
1590	aquatic animals prep NES		
1594	aquatic plants	1595	aquatic plants dried
		1596	aquatic plants prep NES

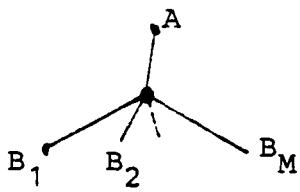
In the case of fishery production fish, oil and fish meal of the various categories (commodities 1509, 1510, 1511, 1521, 1522, 1523, 1524, 1534, 1535, 1536, 1537, 1547, 1548, 1549, 1550, 1558, 1559, 1566, 1567, 1575, 1576, 1581, 1582, 1584, 1589, 1591) have been taken out. Instead the aggregate commodities of oils fish (1223) and fish meal (1174) have been used.

APPENDIX H

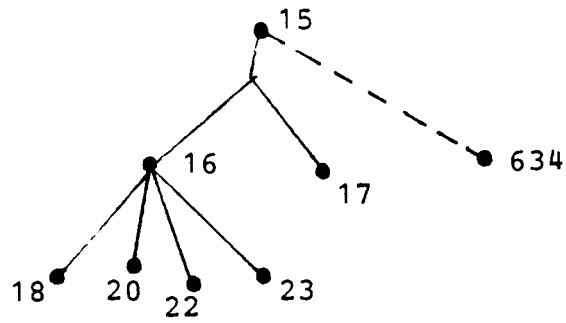
It has been said before that there is a considerable number of commodities for which the tree structure is a fairly complex one. It has, however, also been explained how these trees are treated by appropriately dividing them into subtrees which finally lead to the basic trees explained in the text. In the following we present the more complex structures which we have assumed to hold together with some remarks on the exceptions which have been detected. The target commodities are shown in italics. The calculation involved for wheat and wheat products is explained in detail to give an example of the steps involved in the back-calculations of complex commodity trees. The notation used to represent a commodity A having alternative derived commodities B_j, $j = 1,\ldots,M$, is



and for jointly derived products:



1. **Wheat**



15 *Wheat*
16 flour of wheat
17 bran of wheat
18 macaroni
20 bread
22 pastry
23 wheat starch
634 beverages from distilled alcohol

The difference between processing of wheat and inputs to flour and bran is subtracted from production of wheat and kept as possible input to beverages from distilled alcohol. To account for qualitative differences in bran and wheat we used a weighted scheme to transform flour and bran to wheat. We thought the caloric contents were appropriate. The weights used (given in kcal/100g) are:

wheat:	$W_{15} = 334$
flour:	$W_{16} = 364$
bran:	$W_{17} = 257$

As in other cases, the weight for bran is calculated, while the weights for wheat and flour are taken from FAO. As explained earlier in this paper, we use for consistency reasons the relationship

$$W_{15} = W_{16} * e_{16} + W_{17} * e_{17}$$

which yields

$$W_{17} = \frac{W_{15} - W_{16} * e_{16}}{e_{17}}$$

In the above, e and W denote extraction rates and weights respectively. The back-calculation proceeds such that first the possible input to commodity 634 is subtracted from wheat production and the relevant items of commodities 18 to 23 are converted to flour and added to the

respective items of commodity 16. Then the weighted scheme is used to transform 16 and 17 into wheat. Finally, the balancing mechanism is applied.

In a more formal notation, we do the following

$$D = X_{15,13} - X_{16,3} \tag{1}$$

where D = input of wheat into commodity 634

$$X-_{15,5} = X_{15,5} - D$$

$$X-_{16,j} = X_{16,j} + \sum_{i \in I} X_{i,j} / X_{i,4} \qquad \text{where } I = 18,20,22,23 \tag{2}$$

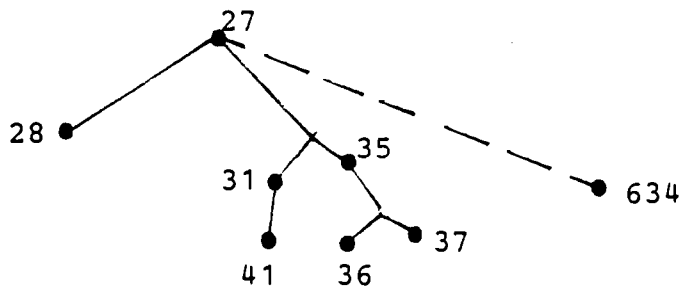
$$X-_{17,j} = X_{17,j}$$

$$X-_{15,j} = X_{15,j} + \sum_{i=16}^{17} X-_{i,j} * \left[\frac{W_i}{X_{16,4} * W_{16} + X_{17,4} * W_{17}} \right] \tag{3}$$

apply balancing mechanism $X-_{15}$ (4)

In the above, the subscript j covers the treated items,
i.e. j = 6,7,8,9,10,11,12,14,15

2. Rice

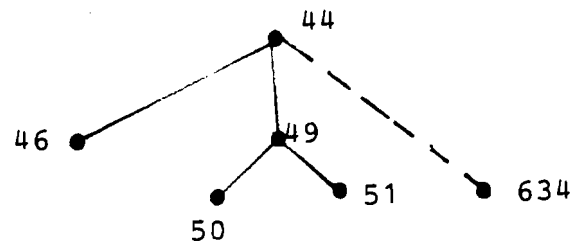


27 ***rice, paddy***
28 **rice, husked**
31 **rice, milled**
35 **bran of rice**
36 **oil of rice bran**
37 **cake of rice bran**
41 **breakfast cereals**
634 **beverages from distilled alcohol**

Potential inputs to commodity 634 are treated as in the case of wheat. To account for the fact that oil is sometimes further processed, the balancing mechanism has been used to calculate production of rice, paddy. Again, weights have been used to back-calculate bran and milled rice (kcal/100 gr):

"rice, paddy"	372
"rice, milled"	360
bran of rice	397

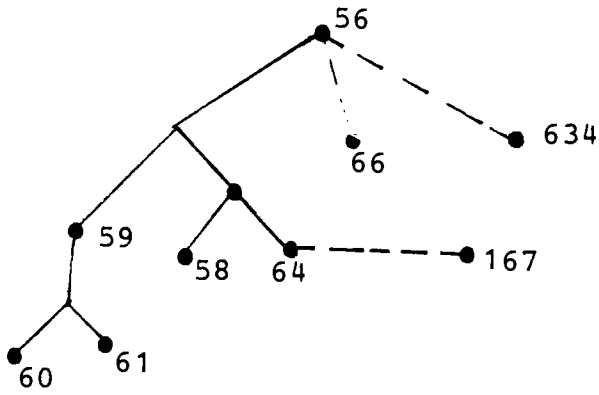
3. Barley



44	***barley***
46	barley, pearled
49	malt of barley
50	malt extracts
51	***beer of barley***
634	beverages from distilled alcohol

Potential inputs to commodity 634 are treated as discussed before. Due to the FAP commodity classification where alcoholic beverages appear as a separate commodity, beer had to be kept to ensure proper aggregation. Inputs to beer have been converted to barley and subtracted from production.

4. Maize



58 *maize*
58 flour of maize
59 bran of maize
60 oil of maize
64 starch of maize
66 *beer of maize*
167 sugar NES
634 beverages from distilled alcohol

Maize had to be handled with special care for several reasons:

- part of maize production is used for beer production (see barley above)
- intermediate consumption of oil reappears in derived oil products
- starch of maize is usually processed to sugar NES
- part of production goes to alcoholic beverages

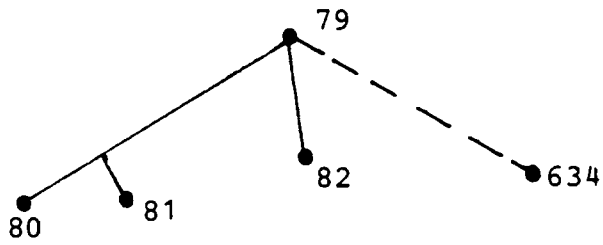
To account for all these problems, the relevant items excluding input to beer and processing of oil and starch have been converted to maize and added to the respective items. Then the balancing mechanisms were used to compute production. The following weights have been used in the back calculation (given in kcal/100g):

maize	**356**
flour maize	**363**
bran maize	**316**
oil maize	**884**
cake maize	**168**
starch maize	**362**

The procedure used is somewhat problematic, but we feel that it suits our purposes very well. The left parts of the above tree are to be interpreted such that maize is processed to jointly yield bran on one hand and flour or starch on the other hand. This latter fact is indicated by the

unlabeled node.

5. Millet

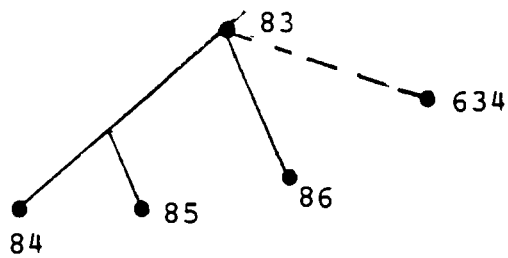


79 *millet*
80 flour of millet
81 bran of millet
82 *beer of millet*
634 beverages from distilled alcohol

Beer and potential input to alcoholic beverages are treated as outlined above. Weights used in back-transformation of bran and flour are (given in kcal/100g):

millet	330
flour of millet	340
bran of millet	240

6. Sorghum

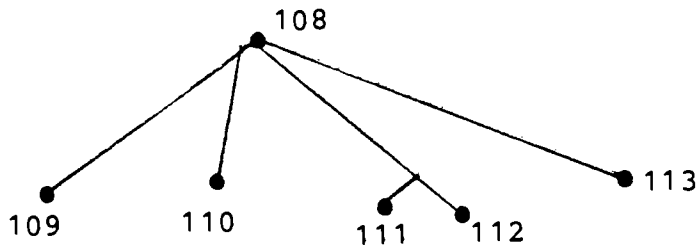


83 *sorghum*
84 flour of sorghum
85 bran of sorghum
86 *beer of sorghum*
634 beverages from distilled alcohol

The principles used are the same as for millet. Weights applied here (in kcal/100g):

sorghum	335
flour of sorghum	343
bran of sorghum	263

7. Cereals NES

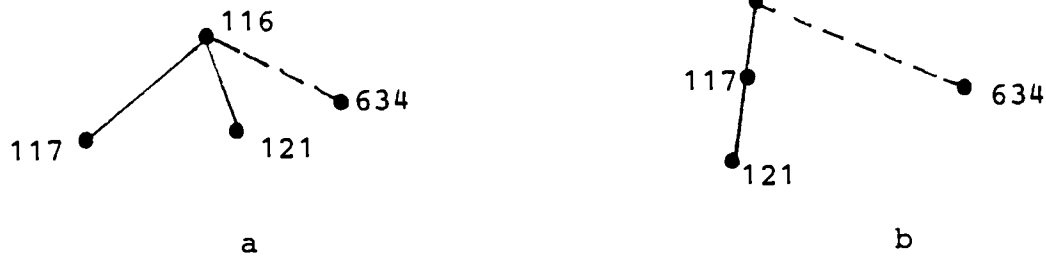


108 *cereals NES*
109 infant food
110 wafers
111 flour of cereals
112 bran of cereals
113 cereals prepared NES

As for other residual commodities, inputs to the various derived commodities also come from some of the previous commodities. There is, however, no double counting involved, since processing items which exceed the usage within our assumed tree structures are subtracted from the respective production. The following weights have been used (kcal/100g):

cereals	340
flour of cereals NES	364
bran of cereals NES	204

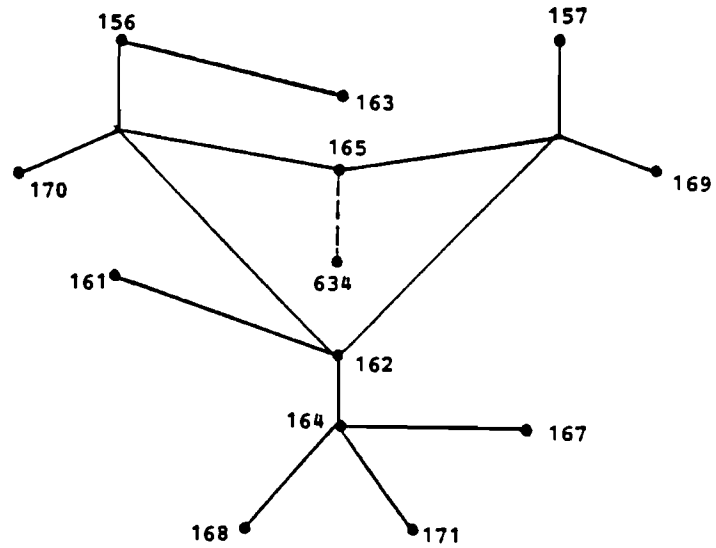
8. Potatoes



116 *potatoes*
117 flour of potatoes
121 potato tapioca
634 beverages from distilled alcohol

For some countries the inputs to commodity 117 and 121 do not sum up to processing of commodity 116. Our assumption is that the remainder goes to alcoholic beverages and therefore is subtracted from production of potatoes. Tree (a) can be applied to all countries except Austria and Denmark, where (b) applies. In Japan an essential part of the input to 117 comes from sweet potatoes, which is explicitly treated in our program.

9. Sugar



161 sugar crops*

*Only available for Japan with no significance for sugar production

162 sugar centrifugal, raw
163 sugar noncentrifugal
164 *sugar refined*
165 molasses
167 sugar + syrups NES*
168 sugar confectionery
169 beet pulp
170 bagasse
634 beverages from distilled alcohol

156 sugar cane
157 sugar beets

Since our target commodity is sugar refined (164), the aggregation poses several problems:

- the input comes from different sources,
- bagasse, beet pulp and molasses have to be accounted for in an appropriate way,
- molasses is further processed into alcoholic beverages,
- the origin of sugar NES (167) is not always clear but usually from maize starch.

To solve these problems in a satisfactory way we decided to aggregate in terms of calories those parts of the tree structure where joint products appear.

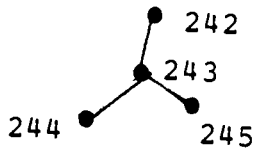
Weights applied:

sugar centrifugal, raw	373
molasses	232
beet pulp	18
bagasse	7

To determine national sugar production we proceed in such a way that we transform all relevant items of higher and lower level commodities to sugar refined and add them to the respective items. The balancing mechanism is then used to determine production.

*Origin not clear but probably from maize starch, etc.

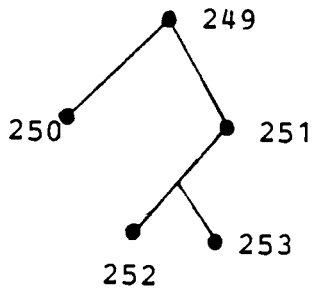
10. Groundnuts



242 groundnuts
243 groundnuts, shelled
244 *oil of groundnuts*
245 *cake of groundnuts*

As explained in the text the FAP commodity classification implies separate treatment of oil and cake. Calculations proceed in a straightforward manner.

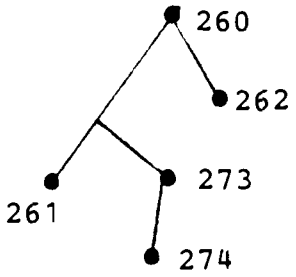
11. Coconuts



249 coconuts
250 coconuts, dessicated
251 copra
252 *oil of coconuts*
253 *cake of coconuts*

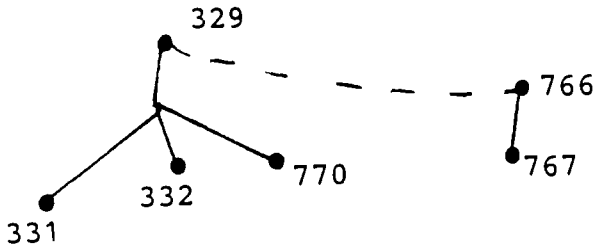
Relevant items of commodity 250 are converted to respective items of commodity 249 and afterwards treated according to our general rules.

12. Olives



260 olives
261 *olive oil*
262 olives preserved
273 olive residues
274 oil of olive residues

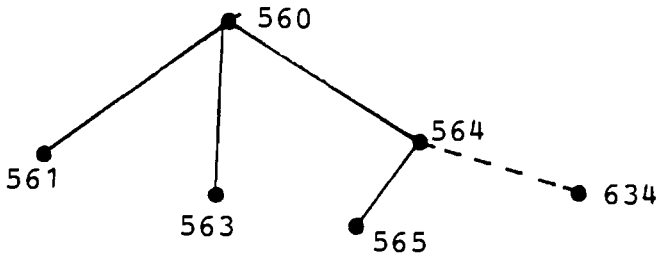
13. Cotton



329 cottonseed
331 *oil of cottonseed*
332 *cake of cottonseed*
766 *seed cotton*
767 cotton lint
770 cotton linter

The multiple usage of cotton is already reflected in the SUA commodity list. As an exception to the general rule items of commodity 329 have only been converted to oil and cake. Although the reason for doing this was a pragmatic one, we feel that the assumption is legitimate also from a theoretical point of view.

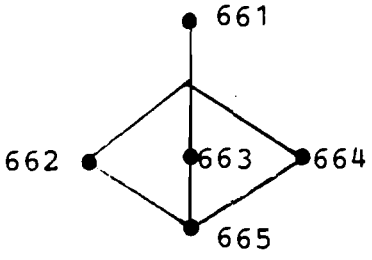
14. Grapes



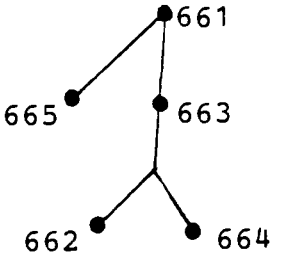
560 *grapes*
561 raisins
563 must of grapes
564 *wine*
565 vermouths and similar
634 beverages from distilled alcohol

Here we had to face the usual complication with inputs to commodity 634. Treatment is according to our general rules.

15. Cocoa



a

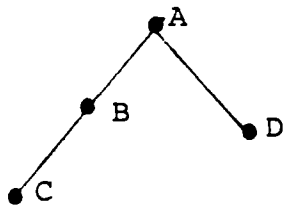


b

661 *cocoa beans*
662 cocoa powder
663 cocoa paste
664 cocoa butter
665 chocolate products NES

Since the input to commodity 665 is not clear except for a few countries, we have used the calorie content of commodities 661 and 665 as given by FAO to back-calculate commodity 665 directly to commodity 661, using an extraction rate of 82%, which was implied by the figures on calorie contents given by FAO. For all countries except Brazil tree structure (a) has been used.

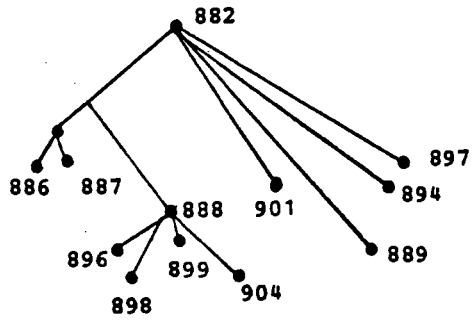
16. Skins and Hides



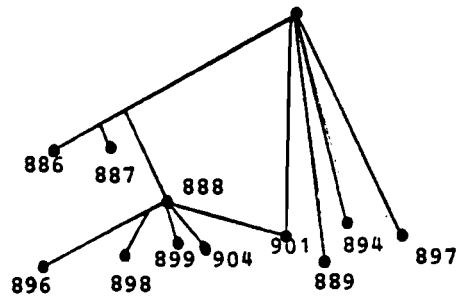
We used this structure as a general rule, since we felt that potential errors which might have been introduced by doing so are of minor importance in our context. It should also be noted that data in the SUA are sometimes incomplete or inconsistent, which also seems to justify our procedure. In the subsequent table the respective commodity numbers are listed.

	A fresh	B wet-salted	C dry-salted	D unspecified
cattle	919	920	921	922
calves	927	928	929	930
buffaloes	957	958	959	-
sheep	995	996	997	998
goats	1025	1026	1027	1028
pigs	1044	1045	1046	1047
horses	1102	1103	1104	1105
camels	1133	1134	1135	1136
NES	1213	1214	1215	1216

17. Cow Milk



a



b

882 *cow milk, whole, fresh*
886 butter of cow milk
887 ghee (from cow milk)
888 skim milk of cows
889 whole milk, condensed
894 whole milk, evaporated
896 skim milk, condensed
897 dry whole cow milk
898 dry skim cow milk
899 dry buttermilk
901 cheese (whole cow milk)
904 cheese (skim cow milk)
917 casein

The two tree structures differ in the origin of inputs to commodity 901. Structure (b) applies to quite a few of the major milk producers in Western Europe. For these countries the percentage of skim milk is 25-40% of total input to commodity 901. Nevertheless, only structure (a) has been used for back-calculations because

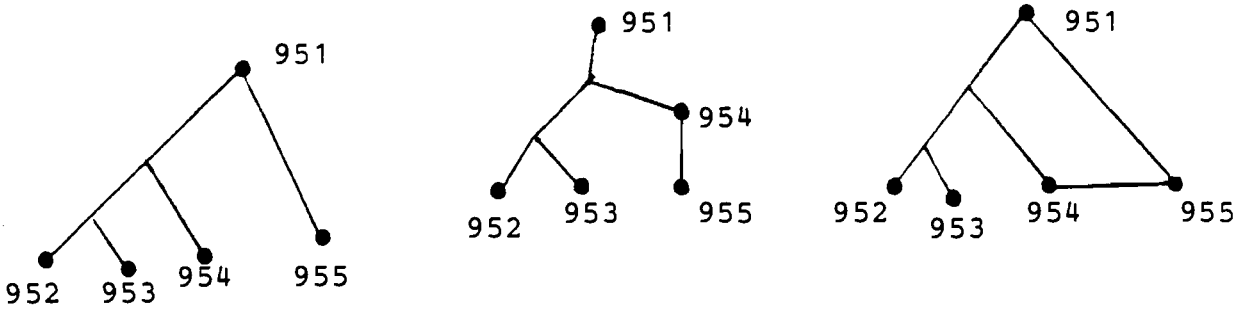
- significant parts of cheese are traded and export destination or import origin are not given in the SUA. This could lead to a different treatment of identical products in different countries (exporter, importer);
- there is no double counting, since the respective part of cheese is converted directly to whole milk instead of skim milk first and whole milk later;
- only an aggregate extraction rate is given for cheese production;

- for some countries like Italy, France and Yugoslavia, milk from sheep, goats and buffaloes goes to commodity 901 (or 889, 894, 897);
- the left part of the tree which shows the joint products ghee and butter on one hand and skim milk on the other hand is back-transformed using protein content as weights. This leads to minor distortions in any case;
- for some countries (Belgium-Luxembourg, France, Italy, Sweden) there are already imbalances in the original SUA. These are in the range of up to 4% of the total milk production of these countries.

We felt that all these problems in the milk accounts of the SUA justify the procedure we applied. The following weights have been used for back-calculating joint products (in kcal/100 gr):

milk, whole, fresh	65
butter of cow milk	716
ghee	879
skim milk of cows	39

18. Buffalo Milk



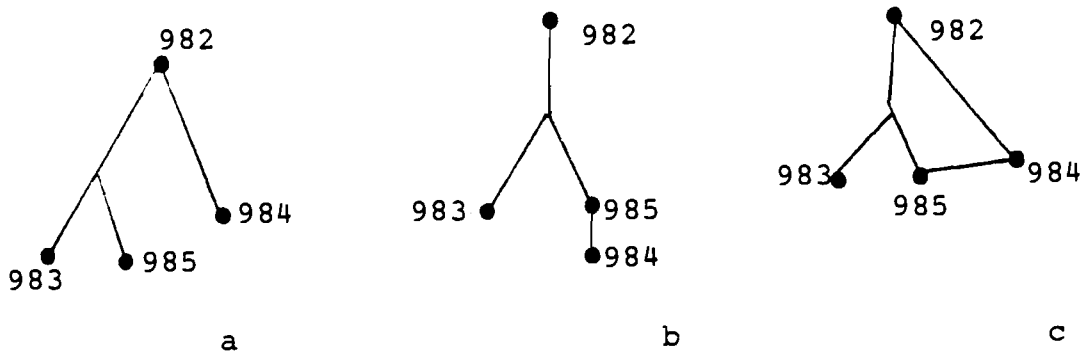
951 ***buffalo milk***
952 butter of buffalo milk
953 ghee (from buffalo milk)
954 skim milk of buffalo
955 cheese of buffalo milk

Three different tree structures (again due to inputs to cheese) have been detected in the accounts of the 56 countries considered in our work. Tree (b) applies only to China and was explicitly accounted for. Structure (c) applies only to Egypt. The considerations mentioned for cow milk are also valid for buffalo milk. Therefore, we used only structure (a) for all countries except for China. The processing item of buffalo milk in Italy has been subtracted from production to avoid double counting (this reappears in cow milk accounts).

Weights used (in kcal/100 gr):

buffalo milk	101
butter of buffalo milk	716
ghee	879
skim milk of buffalo	42

19. Sheep Milk



982 *sheep milk*

983 butter and ghee (from sheep milk)

984 cheese of sheep milk

985 skim sheep milk

Again different structures have been found in the accounts. Tree (b) applies to Iran and Morocco, whereas (c) applies to Syria. For all countries except Iran and Morocco, structure (a) has been used as a general rule. Furthermore, the production in Italy, France and Yugoslavia has been adjusted for processing to avoid double counting (this processing reappears in cow milk accounts).

weights used (in kcal/100 gr):

sheep milk	99
butter and ghee	716
skim milk	48

APPENDIX I

List of Commodities without Derived Products

This is a list of commodities which have been assumed to have no derived products, i.e. the commodity tree is a single node. Although it is obvious that some of the commodities are themselves derived products and some of them have derived commodities, there were three major reasons to treat them as we did:

(a) The FAP commodity classification did not allow for back calculation (e.g. in the case of beer and wine).

(b) Inputs to the commodity were unclear or not available (e.g. cider, secondary oils and fats).

(c) Destination of intermediate consumption was unclear or varying by countries.

This usually applies to commodities which in some countries supply to processed products of the "NES" categories, (e.g. fruits and vegetables).

Furthermore the secondary oils and fats have been converted to oil equivalent.

51	beer of barley
66	beer of maize
68	pop corn
82	beer of millet
86	beer of sorghum
92	quinoa
101	canary seed
122	sweet potatoes
136	taro (coco yam)
137	yams
176	beans, dry
181	broad beans, dry
187	peas, dry
191	chick-peas
195	cow peas, dry
197	pigeon peas
201	lentils
205	vetches
210	lupins
216	brazil nuts
217	cashew nuts
220	chestnuts
221	almonds
222	walnuts

223 pistachios
225 hazelnuts (hazelnuts)
234 nuts NES
257 palm oil
299 melonseed
343 flour/meal of oilseeds
358 cabbages
366 artichokes
367 asparagus
372 lettuce
373 spinach
393 cauliflower
394 pumpkins, squash, gourds
397 cucumbers and gherkins
399 eggplants
401 chillies+peppers, green
402 onions and shallots, green
403 onions, dry
406 garlic
414 beans, green
417 peas, green
420 broad beans, green
423 string beans
426 carrots
446 green corn (maize)
449 mushrooms
459 chicory roots
460 veg. prod. fresh or dried
486 bananas
489 plantains
495 tang. mand. clement. satsma
497 lemons and limes
515 apples
517 cider
521 pears
523 quinces
526 apricots
530 sour cherries
531 cherries
534 peaches and nectarines
541 stone fruit NES fresh
544 strawberries
547 raspberries
549 gooseberries
550 currants
552 blueberries
554 cranberries
558 berries NES
567 watermelons
568 melons incl. cantaloupes
571 mangoes
572 avocados
577 dates

633 beverages non-alcoholic
634 beverages dist. alcoholic
658 coffee subst. cont. coffee
667 tea
671 mate
677 hops
687 pepper,white/long/black
689 pimento, allspice
692 vanilla
693 cinnamon (canella)
698 cloves, whole+stems
702 nutmeg, mace, cardamons
711 anise, bacian, fennel
723 spices NES
748 peppermint
770 cotton linter
771 flax fibre raw
777 hemp fibre and tow
780 jute
782 jute-like fibres
788 ramie
789 sisal
800 agave fibres NES
809 abaca (manila hemp)
821 fibre crops NES
865 veal
868 offals of cattle, edible
869 fat of cattle
947 buffalo meat
948 offals of buffalo, edible
949 fat of buffalo
975 lamb meat
977 mutton and lamb
978 offals of sheep, edible
979 fat of sheep
994 grease incl. lanolin wool
999 skin with wool sheep
1007 wool shoddy
1008 hair carded or combed
1009 wool hair waste
1015 kids meat
1017 goat meat
1018 offals of goats, edible
1019 fat of goats
1036 offals of pigs, edible
1059 offals liver of chickens
1089 poultry t (excl. hen)
1091 eggs, excluding hen eggs
1097 horsemeat
1100 hair of horses
1127 meat of camels
1128 offals of camel, edible
1129 fat of camels

1130 camel milk
1163 game meat
1167 offals NES
1168 animal oils and fats NES
1173 meat meal
1174 fish meal
1182 honey
1187 cocoons, unreelable
1218 hair fine animal
1219 hair coarse NES
1221 lard stearine oil
1222 degras
1223 oils fish mar mamm
1225 tallow
1242 margarine and shortening
1274 oils boiled etc.
1275 oils hydrogenated

APPENDIX J

Control Cards Used for Back-Calculation of SUA

Below all the control cards used as input to program AGSUA are listed. For a description of the various commands the reader is referred to Chapter 3 of this paper.

```
rg 0015 0023
fc 0016 0364 0017 257.
co 0018 06 07 08 09 10 11 12 14 15
cc 0018 5 9999 4
ad 0016
co 0020 06 07 08 09 10 11 12 14 15
cc 0020 5 9999 4
ad 0016
co 0022 06 07 08 09 10 11 12 14 15
cc 0022 5 9999 4
ad 0016
co 0023 06 07 08 09 10 11 12 14 15
cc 0023 5 9999 4
ad 0016
co 0016 06 07 08 09 10 11 12 14 15
ccf0016 5 0017 1 9999 4
ad 0015
co 0017 06 07 08 09 10 11 12 14 15
ccf0017 5 0016 1 9999 4
ad 0015
wr 0015 14
rg 0027 0041
wra0027 00
fc 0031 0360 0035 0397 0036 0884 0037 0314
co 0041 06 07 08 09 10 11 12 14 15
cc 0041 5 9999 4
ad 0031
co 0036 06 07 08 09 10 11 12 14 15
ccf0036 5 0037 1 9999 4
ad 0035
co 0037 06 07 08 09 10 11 12 14 15
ccf0036 5 0037 1 9999 4
ad 0035
co 0031 06 07 08 09 10 11 12 14 15
ccf0031 5 0035 1 9999 4
ad 0027
co 0035 06 07 08 09 10 11 12 14 15
```

```
ccf0031 5 0035 1 9999 4
ad 0027
co 0028 06 07 08 09 10 11 12 14 15
cc 0028 5 9999 4
ad 0027
rg 0044 0051
wra0044 00
co 0050 06 07 08 09 10 11 12 14 15
cc 0050 5 9999 4
co 0051 06 07 08 09 10 11 12 13 14 15
cc 0051 5 99994
ad 0049
co 0049 06 07 08 09 10 11 12 14 15
cc 0049 5 9999 4
ad 0044
co 0046 06 07 08 09 10 11 12 14 15
cc 0046 5 9999 4
ad 0044
wrz0044 10
wrp0051 14
rg 0056 0066
wra0056
fc 0058 0363 0059 0316 0060 0884 0061 0161 0064 0362
co 0060 06 07 08 09 10 11 12 14 15
ccf0060 5 0061 1 9999 4
ad 0059
co 0061 06 07 08 09 10 11 12 14 15
ccf0060 5 0061 1 9999 4
ad 0059
co 0059 06 07 08 09 10 11 12 14 15
ccf0059 5 0058 1 9999 4
co 0066 06 07 08 09 10 11 12 13 14 15
cc 0066 5 9999 4
ad 0056
co 0058 06 07 08 09 10 11 12 14 15
ccf0059 5 0058 1 9999 4
ad 0056
co 0064 06 07 08 09 10 11 12 14 15
ccf0059 5 0064 1 9999 4
ad 0056
wrz0056 10
wr 0066 14
rg 0068 0073
wrp0068 14
fc 0072 0341 0073 0194
co 0072 06 07 08 09 10 11 12 14 15
ccf0072 5 0073 1 9999 4
ad 0071
co 0073 06 07 08 09 10 11 12 14 15
ccf0072 5 0073 1 9999 4
ad 0071
wr 0071 10
rg 0075 0076
```

```
co 0076 06 07 08 09 10 11 12 14 15
cc 0076 5 9999 4
ad 0075
wr 0075 10
rg 0079 0082
wra0079 00
fc 0080 0340 0081 0240
co 0080 06 07 08 09 10 11 12 14 15
ccf0080 5 0081 1 9999 4
co 0082 06 07 08 09 10 11 12 13 14 15
cc 0082 5 9999 4
ad 0079
co 0081 06 07 08 09 10 11 12 14 15
ccf0080 5 0081 1 9999 4
ad 0079
wrz0079 10
wr 0082 14
rg 0083 0086
wra0083 00
fc 0084 0343 0085 0263
co 0084 06 07 08 09 10 11 12 14 15
ccf0084 5 0085 1 9999 4
ad 0083
co 0085 06 07 08 09 10 11 12 14 15
ccf0084 5 0085 1 9999 4
co 0086 06 07 08 09 10 11 12 13 14 15
cc 0086 5 9999 4
ad 0083
wr 0083 10
wr 0086 14
rg 0089 0091
fc 0090 0344 0091 0297
co 0090 06 07 08 09 10 11 12 14 15
ccf0090 5 0091 1 9999 4
ad 0089
co 0091 06 07 08 09 10 11 12 14 15
ccf0090 5 0091 1 9999 4
ad 0089
wr 0089 10
rg 0092 0105
wrp0092 10 0101 15
fc 0104 0364 0105 0204
co 0104 06 07 08 09 10 11 12 14 15
ccf0104 5 0105 1 9999 4
ad 0103
co 0105 06 07 08 09 10 11 12 14 15
ccf0104 5 0105 1 9999 4
ad 0103
wr 0103 10
rg 0108 0113
fc 0111 0364 0112 0204
co 0109 06 07 08 09 10 11 12 14 15
cc 0109 5 9999 4
```

```
ad 0108
co 0110 06 07 08 09 10 11 12 14 15
cc 0110 5 9999 4
ad 0108
co 0111 06 07 08 09 10 11 12 14 15
ccf0111 5 0112 1 9999 4
ad 0108
co 0112 06 07 08 09 10 11 12 14 15
ccf0111 5 0112 1 9999 4
ad 0108
co 0113 06 07 08 09 10 11 12 14 15
cc 0113 5 9999 4
ad 0108
wra0108
wry0108 14
rg 0116 0122
co 0117 06 07 08 09 10 11 12 14 15
cc 0117 5 9999 4
ad 0116
co 0121 06 07 08 09 10 11 12 14 15
cc 0121 5 9999 4
ad 0116
wr 0116 15
wrp0122 14
rg 0125 0129
co 0126 06 07 08 09 10 11 12 14 15
cc 0126 5 9999 4
ad 0125
co 0127 06 07 08 09 10 11 12 14 15
cc 0127 5 0129 1 0126 3 9999 4
ad 0125
co 0129 06 07 08 09 10 11 12 14 15
cc 0127 5 0129 1 0126 3 9999 4
ad 0125
wr 0125 15
rg 0136 0137
wrp0136 15 0137 15
rg 0149 0151
co 0150 06 07 08 09 10 11 12 14 15
cc 0150 5 9999 4
ad 0149
co 0151 06 07 08 09 10 11 12 14 15
cc 0151 5 9999 4
ad 0149
wra0149
wry0149 15
rg 0156 0171
wra0156 00 0157 00 0161 00
fc 0162 373. 0165 232. 0169 018. 0170 007.
co 0163 06 07 08 09 10 11 12 14 15
cc 0163 5 9999 4
ad 0156
co 0156 06 07 08 09 10 11 12 14 15
```

```
cc 0162 5 9999 3
ad 0162
co 0156 06 07 08 09 10 11 12 14 15
cc 0165 5 9999 3
adx0165
co 0156 06 07 08 09 10 11 12 14 15
cc 0170 5 9999 3
adx0170
co 0157 06 07 08 09 10 11 12 14 15
cc 0162 5 9999 3
ad 0162
co 0157 06 07 08 09 10 11 12 14 15
cc 0165 5 9999 3
adx0165
co 0157 06 07 08 09 10 11 12 14 15
cc 0169 5 9999 3
adx0169
co 0165 06 07 08 09 10 11 12 14 15
cc 0162 5 9999 3
ccf0165 5 0162 1 0169 1 9999 4
ad 0162
co 0169 06 07 08 09 10 11 12 14 15
cc 0162 5 9999 3
ccf0165 5 0162 1 0169 1 9999 4
ad 0162
co 0170 06 07 08 09 10 11 12 14 15
cc 0162 5 9999 3
ccf0162 5 0165 1 0170 1 9999 4
ad 0162
co 0161 06 07 08 09 10 11 12 14 15
cc 0162 5 9999 3
ad 0162
co 0162 06 07 08 09 10 11 12 14 15
cc 0164 5 9999 3
ad 0164
co 0167 06 07 08 09 10 11 12 14 15
ad 0164
co 0168 06 07 08 09 10 11 12 14 15
cc 0168 5 9999 4
ad 0164
co 0171 06 07 08 09 10 11 12 14 15
cc 0171 5 9999 4
ad 0164
wrz0164 15
rg 0176 0210
wrp0176 14 0181 14 0187 14 0191 14 0195 14 0197 14 0201 14 0205 15 0210 10
rg 0211 0212
co 0212 06 07 08 09 10 11 12 14 15
cc 0212 5 9999 4
ad 0211
wra0211
wry0211 14
rg 0216 0234
```

```
wrp0216 14 0217 14 0220 14 0221 14 0222 14 0223 14 0225 14 0234 14
rg 0236 0238
wra0236 00
co 0236 06 07 08 09 10 11 12 14 15
cc 0237 5 9999 3
adx0237
co 0236 06 07 08 09 10 11 12 14 15
cc 0238 5 9999 3
adx0238
co 0236
ccx0238 5 0237 7 9999 3
ad 0237
co 0236
ccx0237 5 0238 7 9999 3
ad 0238
wrx0237 15 0238 10
rg 0242 0245
wra0242 00
co 0242 06 07 08 09 10 11 12 14 15
cc 0243 5 9999 3
ad 0243
co 0243 06 07 08 09 10 11 12 14 15
cc 0244 5 9999 3
adx0244
co 0243
ccx0245 5 0244 7 9999 3
ad 0244
co 0243 06 07 08 09 10 11 12 14 15
cc 0245 5 9999 3
adx0245
co 0243
ccx0244 5 0245 7 9999 3
ad 0245
wrx0244 15 0245 10
rg 0249 0253
wra0249 00
co 0250 06 07 08 09 10 11 12 14 15
cc 0250 5 9999 4
ad 0249
co 0249 06 07 08 09 10 11 12 14 15
cc 0251 5 9999 3
ad 0251
co 0251 06 07 08 09 10 11 12 14 15
cc 0252 5 9999 3
adx0252
co 0251
ccx0253 5 0252 7 9999 3
ad 0252
co 0251 06 07 08 09 10 11 12 14 15
cc 0253 5 9999 3
adx0253
co 0251
ccx0252 5 0253 7 9999 3
```

```
ad 0253
wrx0252 15 0253 10
rg 0256 0259
co 0256 06 07 08 09 10 11 12 14 15
cc 0258 5 9999 3
adx0258
co 0256
ccx0259 5 0258 7 9999 3
ad 0258
co 0256 06 07 08 09 10 11 12 14 15
cc 0259 5 9999 3
adx0259
co 0256
ccx0258 5 0259 7 9999 3
ad 0259
wrx0257 15 0258 15 0259 10
rg 0260 0274
wra0260
co 0262 06 07 08 09 10 11 12 14 15
cc 0262 5 9999 4
ad 0260
co 0260 06 07 08 09 10 11 12 14 15
cc 0261 5 9999 3
ad 0261
co 0260 06 07 08 09 10 11 12 14 15
cc 0273 5 9999 3
adx0273
co 0273 06 07 08 09 10 11 12 14 15
cc 0274 5 9999 3
ad 0274
co 0274 06 07 08 09 10 11 12 14 15
ad 0261
co 0264 06 07 08 09 10 11 12 14 15
cc 0264 5 9999 4
ad 0263
co 0265 06 07 08 09 10 11 12 14 15
cc 0266 5 9999 3
ad 0266
co 0267 06 07 08 09 10 11 12 14 15
cc 0268 5 9999 3
adx0268
co 0267
ccx0269 5 0268 7 9999 3
ad 0268
co 0267 06 07 08 09 10 11 12 14 15
cc 0269 5 9999 3
adx0269
co 0267
ccx0268 5 0269 7 9999 3
ad 0269
co 0270 06 07 08 09 10 11 12 14 15
cc 0271 5 9999 3
adx0271
```

```
co 0270
ccx0272 5 0271 7 9999 3
ad 0271
co 0270
ccx0271 5 0272 7 9999 3
ad 0272
co 0270 06 07 08 09 10 11 12 14 15
cc 0272 5 9999 3
adx0272
wrx0261 14
wr 0263 15
wra0265 00
wrx0266 15
wra0267 00
wrx0268 15 0269 10
wra0270 00
wrx0271 15 0272 10
rg 0275 0276
co 0275 06 07 08 09 10 11 12 14 15
cc 0276 5 9999 3
ad 0276
wra0275 00
wrx0276 15
rg 0280 0282
co 0280 06 07 08 09 10 11 12 14 15
cc 0281 5 9999 3
adx0281
co 0280
ccx0282 5 0281 7 9999 3
ad 0281
co 0280 06 07 08 09 10 11 12 14 15
cc 0282 5 9999 3
adx0282
co 0280
ccx0281 5 0282 7 9999 3
ad 0282
wra0280 00
wrx0281 15 0282 10
rg 0289 0291
co 0289 06 07 08 09 10 11 12 14 15
cc 0290 5 9999 3
adx0290
co 0289
ccx0291 5 0290 7 9999 3
ad 0290
co 0289 06 07 08 09 10 11 12 14 15
cc 0291 5 9999 3
adx0291
co 0289
ccx0290 5 0291 7 9999 3
ad 0291
wra0289 00
wrx0290 15 0291 10
```

```
rg 0292 0293
co 0292 06 07 08 09 10 11 12 14 15
cc 0293 5 9999 3
ad 0293
wra0292 00
wrx0293 15
rg 0296 0298
co 0296 06 07 08 09 10 11 12 14 15
cc 0297 5 9999 3
adx0297
co 0296
ccx0298 5 0297 7 9999 3
ad 0297
co 0296 06 07 08 09 10 11 12 14 15
cc 0298 5 9999 3
adx0298
co 0298
ccx0297 5 0298 7 9999 3
ad 0298
wra0296 00
wrx0297 15 0298 10
rg 0299 0299
wr 0299 15
rg 0329 0332
co 0329 06 07 08 09 10 11 12 14 15
cc 0331 5 9999 3
adx0331
co 0329
ccx0332 5 0331 7 9999 3
ad 0331
co 0329 06 07 08 09 10 11 12 14 15
cc 0332 5 9999 3
adx0332
co 0329
ccx0331 5 0332 7 9999 3
ad 0332
wrx0331 15 0332 10
rg 0333 0335
co 0333 06 07 08 09 10 11 12 14 15
cc 0334 5 9999 3
fdx0334
co 0333
ccx0335 5 0334 7 9999 3
ad 0334
co 0333 06 07 08 09 10 11 12 14 15
cc 0335 5 9999 3
adx0335
co 0333
ccx0334 5 0335 7 9999 3
ad 0335
wra0333 00
wrx0334 15 0335 10
rg 0336 0338
```

```
co 0336 06 07 08 09 10 11 12 14 15
cc 0337 5 9999 3
adx0337
co 0336
ccx0338 5 0337 7 9999 3
ad 0337
co 0336 06 07 08 09 10 11 12 14 15
cc 0338 5 9999 3
adx0338
co 0336
ccx0337 5 0338 7 9999 3
ad 0338
wra0336 00
wrx0337 15 0338 10
rg 0339 0341
co 0339 06 07 08 09 10 11 12 14 15
cc 0340 5 9999 3
adx0340
co 0339
ccx0341 5 0340 7 9999 3
ad 0340
co 0339 06 07 08 09 10 11 12 14 15
cc 0341 5 9999 3
adx0341
co 0339
ccx0340 5 0341 7 9999 3
ad 0341
wra0339 00
wrx0340 15 0341 10
rg 0343 0373
wrx0343 10
wrp0358 14 0366 14 0367 14 0372 14 0373 14
rg 0388 0392
co 0390 06 07 08 09 10 11 12 14 15
cc 0390 5 9999 4
ad 0388
co 0391 06 07 08 09 10 11 12 14 15
cc 0391 5 9999 4
ad 0388
co 0392 06 07 08 09 10 11 12 14 15
cc 0392 5 9999 4
ad 0388
wrp0388 14
rg 0393 0397
wrp0393 14 0394 14 0397 14
rg 0399 0461
wrp0399 14 0401 14 0402 14 0403 14 0406 14 0414 14 0417 14
wrp0420 14 0423 14 0426 10 0446 14 0449 14 0459 14 0460 14
rg 0463 0474
co 0464 06 07 08 09 10 11 12 14 15
cc 0464 5 9999 4
ad 0463
co 0465 06 07 08 09 10 11 12 14 15
```

```
cc 0465 5 9999 4
ad 0463
co 0466 06 07 08 09 10 11 12 14 15
cc 0466 5 9999 4
ad 0463
co 0469 06 07 08 09 10 11 12 14 15
cc 0469 5 9999 4
ad 0463
co 0471 06 07 08 09 10 11 12 14 15
cc 0471 5 9999 4
ad 0463
co 0472 06 07 08 09 10 11 12 14 15
cc 0472 5 9999 4
ad 0463
co 0473 06 07 08 09 10 11 12 14 15
cc 0473 5 9999 4
ad 0463
co 0474 06 07 08 09 10 11 12 14 15
cc 0474 5 9999 4
ad 0463
wr 0463 14
rg 0486 0489
wrp0486 14 0489 14
rg 0490 0491
co 0491 06 07 08 09 10 11 12 14 15
cc 0491 5 9999 4
ad 0490
wr 0490 14
rg 0495 0497
wrp0495 14 0497 14
rg 0507 0509
co 0509 06 07 08 09 10 11 12 14 15
cc 0509 5 9999 4
ad 0507
wr 0507 14
rg 0512 0513
co 0513 06 07 08 09 10 11 12 14 15
cc 0513 5 9999 4
ad 0512
wr 0512 14
rg 0515 0517
wrp0515 14
wry0517 14
rg 0521 0534
wrp0521 14 0523 14 0526 14 0530 14 0531 14 0534 14
rg 0536 0537
co 0537 06 07 08 09 10 11 12 14 15
cc 0537 5 9999 4
ad 0536
wr 0536 14
rg 0541 0558
wrp0541 14 0544 14 0547 14 0549 14 0550 14 0552 14 0554 14 0558 14
rg 0560 0565
```

```
wra0560 00
co 0561 06 07 08 09 10 11 12 14 15
cc 0561 5 9999 4
ad 0560
co 0563 06 07 08 09 10 11 12 14 15
cc 0563 5 9999 4
ad 0560
co 0565 06 07 08 09 10 11 12 14 15
cc 0565 5 9999 4
ad 0564
wrz0560 14
wr 0564 14
rg 0567 0568
wrp0567 14 0568 14
rg 0569 0570
co 0570 06 07 08 09 10 11 12 14 15
cc 0570 5 9999 4
ad 0569
wr 0569 14
rg 0571 0572
wrp0571 14 0572 14
rg 0574 0576
co 0575 06 07 08 09 10 11 12 14 15
cc 0575 5 9999 4
ad 0574
co 0576 06 07 08 09 10 11 12 14 15
cc 0576 5 9999 4
ad 0574
wr 0574 14
rg 0577 0600
wrp0577 14
rg 0603 0604
co 0604 06 07 08 09 10 11 12 14 15
cc 0604 5 9999 4
ad 0603
wr 0603 14
rg 0619 0634
co 0620 06 07 08 09 10 11 12 14 15
cc 0620 5 9999 4
ad 0619
co 0623 06 07 08 09 10 11 12 14 15
cc 0623 5 9999 4
ad 0619
co 0624 06 07 08 09 10 11 12 14 15
cc 0624 5 9999 4
ad 0619
wra0619
wry0619 14
wry0633 14
wry0634 14
rg 0656 0659
co 0657 06 07 08 09 10 11 12 14 15
cc 0657 5 9999 4
```

```
ad 0656
co 0659 06 07 08 09 10 11 12 14 15
cc 0659 5 9999 4
ad 0656
wr 0656 14 0658 14
rg 0661 0665
fc 0662 0261 0663 0347 0664 0711
co 0662 06 07 08 09 10 11 12 14 15
ccf0662 5 0663 1 0664 1 9999 4
ad 0661
co 0663 06 07 08 09 10 11 12 14 15
ccf0662 5 0663 1 0664 1 9999 4
ad 0661
co 0664 06 07 08 09 10 11 12 14 15
ccf0662 5 0663 1 0664 1 9999 4
ad 0661
co 0665 06 07 08 09 10 11 12 14 15
cc 0665 5 9999 4
ad 0661
wr 0661 14
rg 0667 0748
wrp0667 14 0671 14 0677 15 0687 14 0689 14
wrp0692 14 0693 14 0698 14 0702 14 0711 14 0723 14 0748 14
rg 0754 0755
co 0755 06 07 08 09 10 11 12 14 15
cc 0755 5 9999 4
ad 0754
wr 0754 15
rg 0766 0770
co 0767 06 07 08 09 10 11 12 14 15
cc 0767 5 9999 4
ad 0766
wr 0766 15 0770 15
rg 0771 0774
wr 0771 15
co 0774 06 07 08 09 10 11 12 14 15
cc 0774 5 9999 4
ad 0773
wr 0773 15
rg 0777 0821
wr 0777 15 0780 15 0782 15 0788 15 0789 15 0800 15 0809 15 0821 15
rg 0826 0831
co 0828 06 07 08 09 10 11 12 14 15
cc 0828 5 9999 4
ad 0826
co 0829 06 07 08 09 10 11 12 14 15
cc 0829 5 9999 4
ad 0826
co 0831 06 07 08 09 10 11 12 14 15
cc 0831 5 9999 4
ad 0826
wr 0826 15
rg 0864 0876
```

```
wra0864 00
wrp0865 14
wra0866 00
co 0870 06 07 08 09 10 11 12 14 15
cc 0870 5 9999 4
ad 0867
co 0872 06 07 08 09 10 11 12 14 15
cc 0872 5 9999 4
ad 0867
co 0873 06 07 08 09 10 11 12 14 15
cc 0873 5 9999 4
ad 0867
co 0874 06 07 08 09 10 11 12 14 15
cc 0874 5 9999 4
ad 0867
co 0875 06 07 08 09 10 11 12 14 15
cc 0875 5 9999 4
ad 0867
co 0876 06 07 08 09 10 11 12 14 15
cc 0876 5 9999 4
ad 0867
wr 0867 14
wrp0868 14
wrx0869 15
rg 0882 0917
fc 0886 0716 0887 0879 0888 0039
co 0896 06 07 08 09 10 11 12 14 15
cc 0896 5 9999 4
ad 0888
co 0898 06 07 08 09 10 11 12 14 15
cc 0898 5 9999 4
ad 0888
co 0899 06 07 08 09 10 11 12 14 15
cc 0899 5 9999 4
ad 0888
co 0904 06 07 08 09 10 11 12 14 15
cc 0904 5 9999 4
ad 0888
co 0917 06 07 08 09 10 11 12 14 15
cc 0917 5 9999 4
ad 0888
co 0888 06 07 08 09 10 11 12 14 15
ccf0886 5 0888 1 9999 4
ad 0882
co 0886 06 07 08 09 10 11 12 14 15
ccf0886 5 0888 1 9999 4
ad 0882
co 0887 06 07 08 09 10 11 12 14 15
ccf0887 5 0888 1 9999 4
ad 0882
co 0901 06 07 08 09 10 11 12 14 15
cc 0901 5 9999 4
ad 0882
```

```
co 0889 06 07 08 09 10 11 12 14 15
cc 0889 5 9999 4
ad 0882
co 0894 06 07 08 09 10 11 12 14 15
cc 0894 5 9999 4
ad 0882
co 0897 06 07 08 09 10 11 12 14 15
cc 0897 5 9999 4
ad 0882
wr 0882 14
rg 0919 0930
co 0921 06 07 08 09 10 11 12 14 15
cc 0921 5 9999 4
ad 0920
co 0920 06 07 08 09 10 11 12 14 15
cc 0920 5 9999 4
ad 0919
co 0922 06 07 08 09 10 11 12 14 15
cc 0922 5 9999 4
ad 0919
co 0929 06 07 08 09 10 11 12 14 15
cc 0929 5 9999 4
ad 0928
co 0928 06 07 08 09 10 11 12 14 15
cc 0928 5 9999 4
ad 0927
co 0930 06 07 08 09 10 11 12 14 15
cc 0930 5 9999 4
ad 0927
wr 0919 15 0927 15
rg 0946 0949
wra0946 00
wrp0947 14
wrp0948 14
wrx0949 15
rg 0951 0955
fc 0952 0716 0953 0879 0954 0042
co 0955 06 07 08 09 10 11 12 14 15
cc 0955 5 9999 4
ad 0951
co 0952 06 07 08 09 10 11 12 14 15
ccf0952 5 0954 1 9999 4
ad 0951
co 0954 06 07 08 09 10 11 12 14 15
ccf0952 5 0954 1 9999 4
ad 0951
co 0953 06 07 08 09 10 11 12 14 15
ccf0953 5 0954 1 9999 4
ad 0951
wr 0951 14
rg 0957 0959
co 0958 06 07 08 09 10 11 12 14 15
cc 0958 5 9999 4
```

```
ad 0957
co 0959 06 07 08 09 10 11 12 14 15
cc 0958 5 0959 3 9999 4
ad 0957
wr 0957 15
rg 0974 0979
wra0974 00
wrp0975 14
wra0976 00
wrp0977 14
wrp0978 14
wrx0979 15
rg 0982 0985
fc 0983 0716 0985 0048
co 0984 06 07 08 09 10 11 12 14 15
cc 0984 5 9999 4
ad 0982
co 0983 06 07 08 09 10 11 12 14 15
ccf0983 5 0985 1 9999 4
ad 0982
co 0985 06 07 08 09 10 11 12 14 15
ccf0983 5 0985 1 9999 4
ad 0982
wr 0982 14
rg 0987 0988
co 0988 06 07 08 09 10 11 12 14 15
cc 0988 5 9999 4
ad 0987
wr 0987 15
rg 0994 1009
wrp0994 15
co 0996 06 07 08 09 10 11 12 14 15
cc 0996 5 9999 4
ad 0995
co 0997 06 07 08 09 10 11 12 14 15
cc 0997 5 0996 3 9999 4
ad 0995
co 0998 06 07 08 09 10 11 12 14 15
cc 0998 5 9999 4
ad 0995
wr 0995 15
wrp0999 15 1007 15 1008 15 1009 15
rg 1014 1019
wra1014 00
wrp1015 14
wra1016 00
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