

# AGRICULTURAL SECTOR IN INPUT-OUTPUT MATRIX: A MICRODATA APPROACH FOR THE ITALIAN CASE.

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## 1. Introduction

The National Institute of Statistics (ISTAT) compiles periodically input-output tables as an important part of the system of the national accounts, following the principles indicated in the European System of Accounts (ESA) 1995 manual. A deep research work has been done by the Italian Institute after 1995, following the introduction of the new system of accounts, to implement the new principles and rules in ESA95. The realisation of new tables, after last 1992 input-output (I-O) one that followed previous methodology, has been a good occasion to explore innovative possibilities in estimation and new data sources nowadays available.

Despite difficulties in estimation and time required to produce the tables, I-O tables represent a useful tool to study the structure of the Italian, and most European countries, economy and to follow its evolution in this period of Union enlargement and globalisation. An I-O table may be used as a tool both for *economic programming* and for the *analysis of the economic structure*, to give an answer to questions like: which sectors are useful to develop in order to speed up the economic growth of a country? How will new industries affect the activity of those already existing? Will the economic development be sustainable with a reduction of traditional activities as, for example, cultivation and animal breeding?

Agriculture is an important sector in Italian economy and in other central-European countries just entered the Union, with deep and complex linkages with the other sectors that create many difficulties to measurement and estimation.

In this paper the attention is focused on the method to calculate the I-O table from the agricultural sector prospective, making use of new data available from the Italian Business Survey in Agriculture (REA). The particular point of view allows to face the specific problems of relationship between agriculture and the food-industry and light up on the complex industrial relationships that are involved in the economy.

To resume, this work will be carried out according to the following steps: in the next paragraph the general framework of national accounts will be described presenting the methodology of construction of the I-O table, with a quite detailed analysis of its structure and components from the agricultural sector point of view, i.e., intermediate consumption, output and VA added formation; in paragraph 3, data availability will be discussed, always from the agricultural perspectives; paragraph 4 and 5 are devoted to the formalisation and calculation of the supply and use tables while in paragraph 6 a symmetric I-O table, with agricultural and non-agricultural sectors, will be estimate for the Italian economy.

## 2. The I-O table in the framework of national accounts

The I-O table and the related matrices (supply and use tables) are considered as an important part of ESA95 and, as a consequence, they have a common conceptual base with the sequence of national

accounts. All accounts and tables are based on information coming from homogeneous production units classified in terms of economic activities. The local Unit of Economic Activity (UEA) are the elementary units, in statistical terms, with a principal activity in accordance with classification NACE rev. 1.

The Italian I-O table is based on information from these homogeneous production units and on NACE classification of their economic activities. This framework allows to estimate flows between industries but also between production units inside the industries; moreover, it allows to reconcile supply (mainly base on enterprise data) and use side (mainly based on products) estimates.

The same considerations apply to the agricultural sector with some specific problems and measurement solutions. Given the lack of information at the local UEA for this sector, until 2000 the agricultural production was calculated with a price times quantity approach. At the moment there is an effort to estimate flows following a farm (local UEA in agriculture) based approach.

### 3. The data

National accounts figures are obtained by using a large flow of data form statistical surveys on enterprises, institutions, household, etc.. These data sources, in relationship to their nature and quality, are treated by using different methodologies in order to estimate different aggregates.

In Italy, after 1998, a new Business Survey in Agriculture (REA) allows for the first time the estimation of flows from agriculture to the rest of the economy and vice versa from farms defined, in statistical terms, as local UEA<sup>1</sup>. This survey has been an important enhancement in the measurement of the economic activity in the agricultural sector and the industrial flows in Italian economy.

In this work REA data will be used in combination to other national accounts estimates to compile a sequence of supply and use table, to produce a symmetric I-O table.

### 3. The supply table estimates

A supply table shows the supply of goods and services by product and by type of supplier, distinguishing output by domestic industries and imports<sup>2</sup>.

A supply table by industries and products for the Italian economy, from the agricultural sector point of view is the following:

**Tab. 1.1 - A supply table from the agricultural industry prospective for the Italian economy - Year 2000**

SUPPLIES	Industries		Rest of the world (importation)	TOTAL SUPPLY
	Agriculture	Rest of the economy		
<b>Products from agriculture:</b>				
Goods	X11	X12	X13	X1.
Services	X21	X22	X23	X2.
<b>Products from the rest of the economy:</b>				
Goods	X31	X32	X33	X3.
Services	X41	X42	X43	X4.
<b>TOTAL ECONOMY</b>	<b>X.1</b>	<b>X.2</b>	<b>X.3</b>	<b>X..</b>

<sup>1</sup> Pizzoli (2002).

<sup>2</sup> Eurostat (1996).

In this table the agricultural industries are separated from the non-agricultural industries of the rest of the economy, with indication of main products flows from and to agriculture. It is possible to compile the table with information from REA survey as in its questionnaire there are two main parts on revenues by commodities outputs and costs by kind of input. Two specific parts are on self-consumption of their products by the farm and variations of their stocks always by kind of products. With this information it is possible to estimate production in agriculture, at market and basic prices, by destination (agricultural and non-agricultural sectors).

#### 4. The use table estimates

A use table shows the use of goods and services by product and by type of use, i.e. as intermediate consumption (by industry), final consumption, gross capital formation or exports. Furthermore, the table shows the components of gross value added, i.e. compensation of employees, other taxes less subsidies on production, net mixed income, net operating surplus and consumption of fixed capital<sup>3</sup>. In a similar way then the supply table, a use table is compiled for the Italian economy, with a main focus on the agricultural sector.

**Tab. 1.2 - A use table from the agricultural industry prospective for the Italian economy - Year 2000**

USES	Industries		Rest of the world (export)	Final cons.	Gross capital form.	TOTAL USE
	Agriculture	Rest of the economy				
<b>Products from agriculture:</b>						
Goods	Y11	Y12	Y13	Y14	Y15	Y1.
Services	Y21	Y22	Y23	Y24	Y25	Y2.
<b>Products from the rest of the economy:</b>						
Goods	Y31	Y32	Y33	Y34	Y35	Y3.
Services	Y41	Y42	Y43	Y44	Y45	Y4.
<b>TOTAL</b>	<b>Y.1</b>	<b>Y.2</b>	<b>Y.3</b>	<b>Y.4</b>	<b>Y.5</b>	<b>Y..</b>
<b>Components of value added:</b>						
Agriculture	Y51	Y52				
Rest of the economy products	Y61	Y62				
<b>TOTAL ECONOMY</b>	<b>Y1</b>	<b>Y2</b>				

Data from REA allows the compilation of this use table, making use of collected information from farms costs, supplies, investments in fixed capital formation. These information allows the calculation of intermediate consumption, value added, labour cost and mixed income of the agricultural sector.

<sup>3</sup> Eurostat (1996).

## 5. The symmetric input-output table

A symmetric I-O table is a product by product or an industry by industry matrix describing the domestic production processes and the transactions in products of the national economy in detail<sup>4</sup>. A simplified symmetric I-O table, industry by industry, is constructed for the Italian economy, making use of information from supply and use table in previous paragraph:

**Tab. 1 - An input-output (I-O) table, industry by industry, from the agricultural industry perspective for the Italian economy - Year 2000**

	Industries		Final cons.	Gross capital form.	TOTAL USE
	Agriculture	Rest of the economy			
<b>Industries</b>					
Agriculture	Z11	Z12	Z13	Z14	Z1
Rest of the economy	Z21	Z22	Z23	Z24	Z2
TOTAL	Z.1	Z.2	Z.3	Z.4	
<b>Components of value added:</b>					
Rest of the world	Z31	Z32			
<b>TOTAL SUPPLY</b>	<b>Z1</b>	<b>Z2</b>			<b>Z</b>

## 6. Conclusion

The analysis of the methodology of construction carried out in this paper allows to affirm with a reasonable degree of confidence that a two sectors I-O table of the Italian economy can be constructed making use of REA survey data nowadays available. A table from this particular point view allows to understand the industrial relationship between agriculture and the rest of the economy, with important implication for structural and policy analysis. In the near future a series of table of this form will be estimated and made available to users by ISTAT for deeper studies and economic policy simulations.

<sup>4</sup> Eurostat (1996).

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