Basic IELab Information

What does IELab do?

The IELab produces an multi-region input-output (MRIO) table with satellite extensions (e.g. environmental or social data). It does this by solving the constrained optimisation problem presented by the need to include multiple, incomplete and conflicting datasets. The primary tool used for this processing is called 'AISHA' -a Matlab-based software package designed to perform the methodology to construct a series of contingency tables.

The various data sources used to build the continuously-improving MRIO are 'fed' into the IELab computational engine using 'datafeeds'. A datafeed imports, cleans and rearranges the dataset into a format the IELab can use, and also provides the IELab with metadata about how the additional data referenced by the datafeed related to the existing MRIO data and structure. The metadata information is known as an ALANG command, and consists of 8 components.

IELab can be filled with data from any country or region. It was built with Australian data first and some of the description below refers to the Australian IELab.

Within the IELab, there are 3 levels of detail ('classifications') at which data can exist:

- Root Classification: A very detailed, universal regional and sectoral classification (which is not storable due to its immense size).
- Base Table: A fully populated and memory-storable MRIO table (for a class of research questions). A base table is a direct output of an AISHA run.
- Branch Table: A branch table is everything else. Hence, a Branch table can be based on a Base table, or on a different Branch table. For example, a Branch table may be derived from a Base table by aggregation and/or hybridisation for specific analytical tasks such as Life-Cycle Assessment (LCA) or Computable General Equilibrium (CGE) modelling.

The root classification for Australia consists of:

- 1,284 industries and 1,284 products (ABS IOPC2009, i.e. Input-Output Product Classification) covering all economic output for Australia.
- 2,214 spatial units (ABS SA2 2011, i.e. Statistical Area Level 2) which cover, in total, all of Australia.

Considering that each of these aspects applies both across rows and down columns, a MRIO table constructed using the root classification would have $(1{,}284 * 2) * 2{,}214 = 5.7$ mill rows and 5.7 mill columns, or approximately 32 trillion data points. Such a large table is not storable, but is a useful basis on which to define and address incoming data.

The scope of the MRIO base table that the IELab produces on each execution is defined by the IELab user in terms of 4 key aspects:

- Industry/product classification
- Spatial unit classification

- Year
- Which (if an) 'satellite' (e.g. environmental) extensions are required

What type of information is generated?

The data is organised in a Supply and Use Table format, i.e. you have n sectors for industries and n sectors for products. Table 1 presents a basic layout of them. A good guide to supply and use table is:

Eurostat (2008) Eurostat Manual of Supply, Use and Input-Output Tables, 2008 edition. Methodologies and Working Papers. Office for Official Publications of the European Communities, Luxembourg. http://ec.europa.eu/eurostat

Figure 1: Basic layout of a one-region Supply and Use Table

IO data could provide information (Australian Dollars) on different price types (basic, producer and purchaser prices). IELab gives information of basic prices and also on all the margins, taxes, and subsidies. Results are presented in different files for every price layers. To generate different prices one must add the corresponding files (i.e. markup001 + markup002). Information on what does each markup correspond to is available in Table 1. Results for monetary transactions are produced in 1.000.000 AUS$. A more detailed description of markups, can be found on the ABS IO Tables website (Catalogue no. 5209: http://www.abs.gov.au).

Table 1: The valuation sheets and markup numbers

Economic information	Markup sheet
Basic price sheet in the MRIO (Markup001)	1
Wholesale margin (Markup002)	2
Retail margin (Markup003)	3
Restaurants, Hotels and Clubs margin(Markup004)	4
Road Transport margin (Markup005)	5
Rail Transport margin (Markup006)	6
Pipeline Transport margin (Markup007)	7
Water Transport margin (Markup008)	8
Air Transport margin (Markup 009)	9
Port Handling margin (Markup 010)	10

Marine insurance margin (Markup 011)   11
Gas margin (Markup 012)   12
Electricity margin (Markup 013)   13
Sales tax (Markup 014)   14
Goods and Services Tax (Markup 015)   15
Duty on Products (Markup 016)   16
Taxes on Products (Markup 017)   17
Subsidies on Products (Markup 018)   18

Satellite accounts provide information of different nature on environmental, economic and social indicators. Current satellite accounts in IELab include greenhouse gas emissions, energy use, raw material extractions, waste and employment. Due to the open nature of IELab, satellites will be continuously added. Units for satellite accounts depend on the chosen account.

IELab results refer to one financial year (i.e. from July to June). For example, results labeled with 2009 refer to the financial year 2008-2009.