Coordinated Agriculture Policy Research Initiative

Selective Data and Models Inventory

Description

Updated December 2018

Canada

AGLINK-COSIMO MODEL

DESCRIPTION:

Aglink-Cosimo is a dynamic, partial equilibrium model that is used to analyse world agriculture supply and demand. It is managed by the Secretariats of the Organization for Economic Co-operation and Development (OECD) and the Food and Agriculture Organization (FAO) of the United Nations (UN). *Aglink-Cosimo* is used to generate the OECD-FAO Agricultural Outlook and policy scenario analysis report. Non-agricultural markets are not modelled. The report provides detailed historical data and 10-year projections for select commodities and products (e.g., stocks, production, use, trade, prices, etc.). As a member country of both the OECD and UN, Canada contributes to the medium-term outlook by providing data analysis support.

The Research and Analysis Directorate (RAD) at Agriculture and Agri-Food Canada (AAFC) works closely with the OECD, especially in analyzing international agricultural markets. The Economic Market Analysis (EMA) group at RAD uses the *Aglink-Cosimo* database to model and carry out economic analysis, projections and scenario analysis.

Features of Aglink-Cosimo:
- Provides medium-term projections on the production, consumption and trade of agricultural products
- Sheds light on uses of agricultural products as food and non-food products (e.g., feed and biofuels)
- Provides an outlook of the agricultural land uses at international, national, and regional levels (i.e., EU, OECD, etc.)
- Crops in the model include cereals, cotton, oilseeds, sugar, etc. as well as non-food uses of crops (i.e., biofuels)
- Livestock and dairy sectors include beef and veal, pork, sheep, cheese, supply-managed products (SMP), whey, etc.
- More recently a fish model has been developed by AAFC

PROJECTS OF INTEREST TO AGRICULTURE AND AGRI-FOOD CANADA (AAFC):

- Further enhance AAFC capacity to use the *Aglink-Cosimo* model for stochastic analysis and bilateral methodology
- Scenario type analysis such as environmental issues related to carbon emissions

SKILLS, MODEL AND DATA REQUIREMENTS:

- Knowledge of statistical and econometric techniques
- Knowledge of a statistical package such as Troll
- Knowledge of Excel spreadsheets
- There are no known confidentiality issues that would limit access to use the data

AAFC PRODUCTION ACCOUNT FOR CANADIAN AGRICULTURE

DESCRIPTION:

The **AAFC Production Account for Canadian Agriculture** is constructed using data on 80+ outputs and 50+ inputs. The account is comprised of price index and constant dollar implicit quantity series for gross output and input aggregates. It covers the years 1961-2011 and is limited to Canada (no provincial or regional details). The account is currently being updated to 2016. The data for 1961-2011 is available in the Government's Open Data Portal (https://open.canada.ca/data/en/dataset/6adaeb1f-438b-4d74-b72b-d1b554f3a316).

AAFC production account data is used to:
- Estimate total factor productivity growth for Canadian agriculture
- Decompose net income into price and productivity growth effects
- Study input and output components in depth, for example, operator and unpaid family labour
- Perform international comparisons
- Estimate returns to R&D, public infrastructure investments, etc. as well as effects of weather variability on TFP growth

The AAFC production account data, 1961-2006 version, is presented, in aggregate form, in Cahill, S. A. and T. Rich. 2012. "Measurement of Canadian agricultural productivity growth", in Fuglie, K., S.L. Wang and V.E. Ball (eds), Productivity Growth in Agriculture: An International Perspective, Wallingford: CABI. The data is reported as price and constant dollar quantities. Electronic versions of these data can be provided on request.

PROJECTS OF INTEREST TO AGRICULTURE AND AGRI-FOOD CANADA (AAFC):
- The data could be used for a wide variety of analysis

SKILLS, MODEL AND DATA REQUIREMENTS:
- There are no known confidentiality issues that would limit access to use the data
- Data is available in Microsoft Excel spreadsheet tables and can be transmitted by email
- A clear understanding of the principles underlying production accounts (e.g., SNA2008), production economics and the underlying uses of KLEMS databases is recommended

CANADIAN AGRICULTURAL DYNAMIC MICROSIMULATION MODEL

DESCRIPTION:

The *Canadian Agricultural Dynamic Microsimulation Model (CADMS)* is a longitudinal farm financial database, which represents all farms in Canada, constructed from:

- *The Farm Financial Survey* - demographics, assets, liabilities, capital investments and non-farm incomes
- *Taxation Data Program* - detailed estimates for revenues and expenses of farms and farm and off-farm income of farm operators and farm families
- *BRM Program Administrative Tax Data* - detailed revenue, expense and inventory data

PROJECTS OF INTEREST TO AGRICULTURE AND AGRI-FOOD CANADA (AAFC):

- Farm-level financial analysis including financial performance by sector, break-even and cost-of-production analysis
- Development of **CADMS** balance sheet forecasting and through information not currently utilised in the forecast model

SKILLS, MODEL AND DATA REQUIREMENTS:

- Due to confidentiality constraints in place, the database must be accessed directly from AAFC and data cannot be shared
- Collaboration could include a researcher working at AAFC, or AAFC economists applying code to data and sharing results
- Skills required would include:
  - Knowledge of econometrics
  - Knowledge of statistical package SAS

CANADIAN REGIONAL AGRICULTURE MODEL

DESCRIPTION:

The **Canadian Regional Agriculture Model (CRAM)** is a sector (i.e., partial) equilibrium static model for Canadian agriculture written in General Algebraic Modeling System (GAMS). It is a non-linear optimization model maximizing producer plus consumer surplus less transport costs. Through a calibration process, the model calibrates exactly to production levels observed in the Census of Agriculture. The model currently reflects the baseline conditions for 2016. The model is disaggregated across both commodities and space (55 crop regions and 10 livestock regions).

CRAM covers all major production activities in the agricultural sector, including:
- Crop production of all major grains and oilseeds, special crops, forage production and pasture use
- Livestock, including beef and hogs, dairy and poultry production
- Some processing activities such as biofuel, oil crushing, red meat slaughter, dairy products
- Potato production

Some of the key features in **CRAM**:
- Can provide a very detailed snapshot of before and after shocks to the model
- Covers both land and water resources and can provide details on agri-environmental impacts of agricultural production practices
- Can provide a detailed regional breakdown of agricultural production allowing for distributional impacts to be examined (i.e., interprovincial trade)
- Offers considerable flexibility for modeling value chains specific to Canadian agriculture

PROJECTS OF INTEREST TO AGRICULTURE AND AGRI-FOOD CANADA (AAFC):

The model can be used to analyse a wide variety of topics including:
- Impacts of changes in the grain handling and transportation system on agricultural production
- Regional impacts and interprovincial trade implications of international trade agreements
- The impact of a change in domestic policy on Canadian food supply chains (i.e., processing and ripple effects back to farms)

SKILLS, MODEL AND DATA REQUIREMENTS:

- Access to **CRAM** is currently limited to AAFC employees and would require the user to be in place at AAFC in Ottawa
- CRAM documentation and a learning version can be provided before the access to the full model is granted
- The essential knowledge and skills required to use **CRAM** include:
    - Knowledge of microeconomics theory and preferably in optimization theory
    - Familiarity with GAMS

FOOD AND AGRICULTURE REGIONAL MODEL

DESCRIPTION:

The **Farm and Agriculture Regional Model (FARM)** is an econometric model that is used to produce the projection for domestic crops and livestock markets as part of the Medium Term Outlook (MTO). The MTO provides detailed historical data and 10-year projections for each commodity and product (i.e., stocks, production, use, trade, prices, etc.).

The **FARM** model incorporates data and information from multiple sources, such as, Statistics Canada, Organization of Economic Co-operation and Development (OECD), and the US Department of Agricultural (USDA). Crops in the **FARM** model include wheat, coarse grains (corn, barley, oats, etc.), oilseeds (canola, soybeans, etc.), and special crops (lentils, field peas, etc.). Livestock and dairy sectors are important components, the **FARM** model includes beef, pork, chicken, sheep, turkey, egg, milk, cheese and other dairy products.

Some of the key features of **FARM** include:
- Provides medium term projections on the production, consumption and trade of agricultural products
- Sheds light on the food and non-food (e.g., feed, and biofuels) uses of agricultural products
- Provides an outlook of agricultural land uses at national and regional levels (i.e., western and eastern Canada)

Using **FARM**, the Economic Market Analysis (EMA) group produces a baseline annually which takes into account the international and domestic market conditions as well as macro-economic factors. The baseline generated in the **FARM** model is used as a benchmark for scenario analysis (e.g., extreme weather, global price volatility, exchange rates, etc.).

PROJECTS OF INTEREST TO AGRICULTURE AND AGRI-FOOD CANADA (AAFC):

- Scenario-type analysis such as an extreme weather event, changes to macro-economic conditions or trade related impacts on the Canadian agricultural sector

SKILLS, MODEL AND DATA REQUIREMENTS:

- Knowledge of statistical and econometric techniques
- Knowledge of a statistical package such as Troll
- Knowledge of Excel spreadsheets
- There are no known confidentiality issues that would limit access to use the data

FARM FINANCIAL SURVEY

DESCRIPTION:

The **Farm Financial Survey (FFS)** is a joint project of AAFC and Statistics Canada which has been underway since 1981.

The **FFS** collects a very wide range of information including:
- Farm operator characteristics such as age, education, number of family members, experience in managing farm business
- Physical characteristics of the farm including size of land operated, land owned or rented from others, etc.
- Farm Financial information such as:
  - Detailed farm balance sheet figures (e.g., short-term and long term farm assets and liabilities)
  - Farm capital purchases and sales
  - Details of some farm revenues and expenses
  - Participation and non-participation in government programs
- Sources of off-farm income of the farm family

The survey is based on a large sample which allows the data collected to be broken down by farm type, size, provinces and other customized groupings. The wide range of information collected allows for a better understanding of farm performance and structure. For instance, many of the financial ratios including liquidity, cash flow and debt ratios can be estimated with **FFS** data.

PROJECTS OF INTEREST TO AGRICULTURE AND AGRI-FOOD CANADA (AAFC):

- Characteristics of Business Risk Management (BRM) program participants vs non-participants
- Profile of young and retiring producers
- Analysis of farm financial stress

SKILLS, MODEL AND DATA REQUIREMENTS:

- Data sharing agreement with Statistics Canada specifies under which conditions a researcher may have access to the data including the appropriate security clearance (AAFC employees can have access to the **FFS** microdata)
- Basic manipulation of the dataset requires:
  - Basic statistical concepts
  - Knowledge of a statistical package such as SPSS or SAS

AGGREGATE FARM INCOME STATISTICS

DESCRIPTION:

AAFC's tools for analysing and forecasting aggregate farm income, including domestic agricultural production, include the ***Farm Income and Government* Expenditures (FIGE)** database and supporting analytical commodity files maintained in the Farm Income and Inputs Section. Commodity P and Q files combine data from numerous market outlook reports that form the basis of forecast assumptions and projections. Historical data in **FIGE** are based on Statistics Canada's Agriculture Economic Statistics series, which includes a set of integrated accounts that form the basis of net farm income, in particular:

- The net farm income accounts measure the returns to operators of agricultural businesses from the production and marketing of agricultural commodities
    - Three measures of net farm income at the provincial and national levels - net cash income, realized net income and total net income - are based on integration of production, value and inventories of farm production with expenses and depreciation
- Farm cash receipts represent the cash income received from the sale of agricultural commodities as well as direct program payments. Farm market receipts are cash receipts from the sales of grain and field crops, fruits, vegetables, floriculture and nursery products, maple and forest products, livestock, milk, poultry, eggs, fur and honey. Farm cash receipts do not include farm-to-farm transactions within the same province (for example, grain sold to another farm for feed).
- Direct program payments to producers include most payments made directly to agriculture producers under federal and provincial agriculture programs, as well as payments made under private programs such as private hail insurance and private livestock insurance programs
- Farm operating expenses represent the business costs incurred by farm operators for goods and services used in the production of agricultural commodities (includes depreciation charges to account for economic depreciation or the loss in fair market value of capital assets). Similar to farm cash receipts, farm to farm sales within the same province are excluded.
- The agriculture value added account is a measure of the value of income generated from the production of agricultural goods and services, reported by source and by economic allocation

This program draws upon core agricultural economic statistics, which allows for broad coverage of the value of agricultural outputs and inputs, for time series analysis and market performance analysis. This program is particularly amenable to conducting detailed regional commodity market forecasts using price and production data for agricultural commodities, inputs and inventories; program payments; value added and data from key market outlook reports. Results from this program provide key inputs for program expenditure forecasts at the program level by region and support the development of farm-level estimates of income in the ***Canadian Agricultural Dynamic Microsimulation Model (CADMS)***.

PROJECTS OF INTEREST TO AGRICULTURE AND AGRI-FOOD CANADA (AAFC):

- Macroeconomic trends: update or expand on weather or market scenarios to support future policy analysis
- Farm Input markets: trend analysis for key pesticide, fertilizer and fuel products to support analysis of biannual outlook publications
- Supply management trends: trend analysis to support trade policy analysis
- Livestock market trends: trends in herd size in response to market interruptions to support analysis for biannual outlook
- Ongoing reporting and analysis of grain market dynamics
- Testing the effectiveness of remote sensing data as a source of crop production data for use in grain market forecasts

- Performance indicator development for the agriculture and agri-food sector
- Reviewing series on **FIGE** and uploading analysis or historical series to facilitate trend analysis and integration

SKILLS, MODEL AND DATA REQUIREMENTS:

- Data access for aggregate statistics and working commodity files would be negotiated, as these resources are accessible only via AAFC internal networks
- The technical skills required include experience with data manipulation, candidates should have:
  - Knowledge of basic statistical concepts
  - Knowledge of basic concepts for relational databases
  - Basic knowledge of macroeconomics and commodity markets
  - Excellent proficiency with Microsoft Excel and PowerPoint and some knowledge of statistical software such as SAS would be an asset
- Other analytical skills may be required depending on the project undertaken (i.e., econometrics, etc.)

FARM MANAGEMENT SURVEY

DESCRIPTION:

The **Farm Management Survey (FMS)** is a joint project of AAFC and Statistics Canada. It is a continuation and modification to the past Farm Environmental Management Survey (FEMS). Recently, FEMS has initiated a sector approach whereby separate questionnaires are being developed for dairy, beef, pig, poultry, annual field crops, perennial forages, and horticulture crops.

The **FMS** collects a very wide range of information on different subjects including:
- Feeding practices: composition, quantity, grazing management
- Housing management: building design, bedding, management
- Manure: storage, treatment, land application
- Management style and innovation: labour, custom operations, computer use, new or significantly improved products, practices or processes
- Crop management: crop rotation, tillage, nutrient management, fertilizer management, pest management, land management practices, harvesting, wetlands, etc.

PROJECTS OF INTEREST TO AGRICULTURE AND AGRI-FOOD CANADA (AAFC):

- Canadian Nutrient and Manure Management Practices on Cropland from the Farm Environmental Management Survey (FEMS) 2011 and **FMS** 2018
- Manure Storage on Canadian Farms from the Farm Environmental Management Survey (FEMS) 2011 and **FMS** 2018
- Estimation of various environmental indicators (e.g., residual soil nitrogen)
- Evaluation of agriculture and its impact on the environment
- Best farm practices and innovation

SKILLS, MODEL AND DATA REQUIREMENTS:

- Data sharing agreement with Statistics Canada specifies under which conditions a researcher may have access to the data including the appropriate security clearance (AAFC employees can have access to the **FMS** microdata)
- Basic manipulation of the dataset requires:
    - Basic statistical concepts
    - Knowledge of a statistical package such as SPSS or SAS

FOOD PROCESSING INFORMATION SYSTEM

DESCRIPTION:

The **Food Processing Information System (FPIS)** is a database containing numerous key Canadian food processing industry economic indicators. The data comes from various surveys and includes customized datasets not readily available elsewhere. Data is available for various geographic regions and the level of detail varies by dataset (i.e., the frequency of the data, the level of industry detail, etc.). Data for various industries is included depending on the source. In some cases, data on primary agriculture is available.

The **FPIS** contains a wide range of information from Statistics Canada including data on:
- *Labour/Employment* - estimates of employment, unemployment, hours worked and earnings
- *GDP* - national, provincial and territorial levels covering all industries
- *Manufacturing* – information such as revenue, expenses, wages and inventories
- *Capital and Repair Expenditures* - expenditures on construction, machinery and equipment
- *Balance of Payments* - foreign direct investment in Canada

The **FPIS** is an important data source for the analysis of the Canadian food processing industry and has been used over the years for research and policy analysis.

PROJECTS OF INTEREST TO AGRICULTURE AND AGRI-FOOD CANADA (AAFC):

- A comparative analysis of the Canadian food processing industry to the manufacturing industry
- Analysis on employment, value added and profitability in the food processing industry
- Value-chain analysis in conjunction with other data sources

SKILLS, MODEL AND DATA REQUIREMENTS:

- Statistics Canada suppresses all confidential data so AAFC employees can access the FPIS database
- The skills required to manipulate the **FPIS** data depend on the analytical project to be undertaken and may require knowledge of a statistical software package such as STATA
- The basic manipulation of the dataset requires:
  - Basic statistical concepts
  - Knowledge of spreadsheets and databases

GOVERNMENT EXPENDITURES

DESCRIPTION:

The **Government Expenditures (GE)** project is a federal-provincial initiative. GE estimates show how much governments spend in support of the Canadian agriculture and agri-food sector (primary agriculture, agricultural input industries and food and beverage processing) in a given fiscal year. Data is available from 1985 onwards and by province.

A methodology and a classification system have been developed to monitor and analyze government spending over time in a consistent way. Categories in which the **GE** data can be broken down include:

- Source of funding - Federal or Provincial
- Main Categories - Operating, Capital, Program, Tax, Recoveries
- Sub-categories (14) - Income Support & Stabilization, Insurance & Compensation, Research, Safety and Control Measures, Market Development, Innovative Practices/Products, Education, Extension, etc.
- Labels - Sector (Primary/Processing), Direct/Indirect, Environment, Departments (Agriculture/Others)

Data reported in the **GE** is based on public account budget estimates/actuals for each year. As much as possible, the information reported in GE is broken down by program to allow a better classification. However, information by program is not publicly available.

PROJECTS OF INTEREST TO AGRICULTURE AND AGRI-FOOD CANADA (AAFC):

- Link between policy objectives and the level and composition of **GE** support to the agriculture and agri-food sector

SKILLS, MODEL AND DATA REQUIREMENTS:

- **GE** data is available according to the characteristics described above
- Basic manipulation of the dataset requires:
    - A good understanding of the GE methodology, concepts and classification system
    - Knowledge of Excel spreadsheets and the use of pivot tables

LIVESTOCK MARKET INTERRUPTION STRATEGY MODEL

DESCRIPTION:

The **Livestock Market Interruption Strategy (LMIS)** model is designed to provide support in the event of a crisis such as the outbreak of an animal disease affecting Canada's livestock industry (hog and cattle). It aims to explore cost-efficient solutions for dealing with excess inventory created as a result of sudden trade-disrupting events. It is an operational model rather than an economic one in the sense that it does not measure consumer/producer surpluses but solely focuses on the costs the industry will face during a market interruption.

Solutions are found through a three-step process:
1. Determine ideal inventories during the crisis and establish adjustments required
2. Optimally reallocate resources within the provinces to meet any excess demand
3. Deal with any excess inventory after reallocation through other available options

The **LMIS** model is excel-based and is currently under development.

PROJECTS OF INTEREST TO AGRICULTURE AND AGRI-FOOD CANADA (AAFC):

- Determination of production, transportation and marketing costs for the Canadian livestock industry
- Scenario analysis to quantify direct and indirect economic losses due to disease outbreak and other market disrupting events

SKILLS, MODEL AND DATA REQUIREMENTS:

- The majority of the input data comes from Statistics Canada (which may be publicly available), AAFC's in-house models (accessible by AAFC employees) and expert opinion.
- Using the **LMIS** tool requires:
  - Advanced Microsoft Excel programming skills (e.g., VBA)
  - Basic understanding of operations management concepts
  - Knowledge of livestock production cycles

POLICY EVALUATION MODEL

DESCRIPTION:

The Organization for Economic Co-operation and Development (OECD) **Policy Evaluation Model (PEM)** is a partial equilibrium model that was developed to bridge the gap between the Producer Support Estimate (PSE) information and the impacts of PSE policies on production, trade, prices, income and welfare. The **PEM** incorporates PSE data with basic information on production technology and assumptions about elasticities of supply and demand (based on literature reviews) to form factor demand and supply equations.

PEM model features include:

- *Eight-Country Coverage -* Canada, the European Union (EU), Japan, Mexico, Switzerland, the United States (US), Korea, China and rest of world (RW)
- *Commodities -* contains representations of markets for the commodities wheat (common and durum), coarse grains (maize, barley, oats, sorghum), oilseeds (soybeans, rapeseed, sunflower), rice (all), beef (all) and milk (fluid, manufacturing)
- *Markets -* representations of factor markets including land, labour, purchased inputs, and farm capital
- *Factor Demand and Supply Coverage -* includes farm owned factors (e.g., land, cows, etc.) and purchased factors (e.g., fertilizer, energy, feed, machinery, etc.)
- *Data Sources -* Input data include OECD Aglink, Statistics Canada, OECD PSE database, FAOSTAT and other data (e.g., literature reviews, etc.)

The model is calibrated to match observed production and trade in a specific base period (which may be any year included in the PSE database – 1986–2016) and makes use of estimates of supply and demand responsiveness in each market (elasticities of demand and supply), information on the production technology (elasticity of substitution of factors of production) and information on relative factor intensity.

PROJECTS OF INTEREST TO AGRICULTURE AND AGRI-FOOD CANADA (AAFC):

- The relative impacts of different PSE policy categories in terms of their effects on production and trade, and their effectiveness in increasing the income of recipients of transfers
- The relative impacts of specific policy reforms and their effectiveness in improving farm incomes
- Assessment of the impacts of individual parameters of the model on overall results

SKILLS, MODEL AND DATA REQUIREMENTS:

- Remote access to the PEM through an OECD portal and knowledge of GAMS platform
- The skills required to manipulate the PEM tool depend on the analytical project to be undertaken
- Basic manipulation of the dataset requires:
  - Knowledge of the structure of commodity markets
  - Knowledge of GAMS

TRADE DATA RETRIEVAL SYSTEM

DESCRIPTION:

The **Trade Data Retrieval System (TDRS)** is a database of detailed monthly trade data for commodities falling under the 99 chapters of the Harmonized System (HS), essentially covering all of Canada's trade in commodities over the years 1988 to present. Import data is available at several levels of HS code aggregation, including HS10 (most detailed) down to HS2 while export statistics are available from HS8 (most detailed) down to HS2. Other aggregations include trade by North American Industrial Classification System (System) industry at the 3, 4 and 5 digit levels, trade in Bulk, Intermediate and Consumer Oriented goods (BICO), and trade by AAFC commodity groups and subgroups. All of the aggregations other than HS are custom built to meet AAFC specifications and validated using control subtotals.

The data is sourced from the Statistics Canada Canadian International Merchandise Trade (CIMT) database and is customized for AAFC. In addition to the custom aggregations, the **TDRS** facility also computes price and quantity indexes (month-over-month, quarter-over-quarter and annual) for AAFC groups and total trade with all countries (i.e. only for all exports and all imports, not by region).

TDRS extractions are used to:
- Provide trade information for various requests
- Determine trade orientation of NAICS industries
- Measure output and input prices using import and export unit values
- Separate trade value into volume and price components

PROJECTS OF INTEREST TO AGRICULTURE AND AGRI-FOOD CANADA (AAFC):

- Indicators of import competition and export performance
- Link between **TDRS** and NAICS industry codes in order to create a more comprehensive picture of industry performance
- Armington-type demand model analysis, and cointegration tests
- Generate trade charts as part of AAFC publications (e.g., An Overview of the Canadian Agriculture and Agri-Food System)
- Develop export and product similarity indexes to assess trade diversification

SKILLS, MODEL AND DATA REQUIREMENTS:

- Access to **TDRS** is currently only available to AAFC staff internally
- Basic manipulation of the data requires:
  - Basic knowledge of file systems and archive structures
  - Familiarity with Microsoft Excel data manipulation and pivot tables

OECD-METRO MODEL

DESCRIPTION:

The Organization for Economic Co-operation and Development ModElling TRade model **(OECD-METRO)** is a whole-economy, global trade model, which can be used to analyze the potential economic impacts of changes in policy, technology and other factors. **METRO** is a static Computable General Equilibrium (CGE) model with bilateral trade flows and production values denominated in U.S. dollars. The **METRO** model shows how different sectors inside an economy are linked, including agriculture and food processing, how multiple economies are connected to each other, and how resources such as labour, capital and natural resources are best allocated across all economic activities. In addition, **METRO** allows users to analyse global value chains as the model draws on the OECD-WTO's Trade in Value Added (TiVA) database.

The **METRO** model is based on the GTAP database and covers 57 economic sectors, including 22 agriculture and food processing sectors, and 61 economies. The trade data in the model reflects 2011 values whereas the economic structure reflects that of a mix of countries and the base year data may vary amongst these different countries. The model will be updated to 2014 soon.

The model is written in the General Algebraic Modeling System (GAMS); however the OECD has developed a graphical user interface (GUI) to facilitate use of the model.

Some of the key features in **METRO**:
- It has bilateral tariffs and bilateral trade flows between all regions in the model
- It can provide a very detailed snapshot of before and after shocks to the model
- It can provide detailed results of impacts of the shock across countries and sectors
- It can provide value chain impacts, within and across countries

PROJECTS OF INTEREST TO AGRICULTURE AND AGRI-FOOD CANADA (AAFC):

- Global value chain analysis
- Potential impacts of bilateral and regional trade agreements

SKILLS, MODEL AND DATA REQUIREMENTS:

- Access to **METRO** requires a licence for the GTAP database which may require the user to be in place at AAFC in Ottawa
- **METRO** documentation and a learning version can be provided before the access to the full model is granted
- The essential knowledge and skills required to use **METRO** include:
    - Knowledge of computable general equilibrium models
    - Knowledge of trade data and theory
    - Familiarity with GAMS

AGRICULTURE WATER SURVEY

DESCRIPTION:

The Agriculture Water Survey (AWS) is part of the Canadian Environmental Sustainability Indicators (CESI) program. The data collected is used in CESI's reporting activities and to inform water use policy and development of programs for Canadian irrigators.

The target population for the AWS are the Canadian agricultural operations that irrigate. The survey frame is created using information collected as part of the Census of Agriculture (CEAG). The AWS is conducted every two years by Statistics Canada, and the latest version is 2016.

The AWS contains information on: area of cropland irrigated; Irrigation methods and volume; water sources for irrigation; and on-farm conservation management practices.

PROJECTS OF INTEREST TO AGRICULTURE AND AGRI-FOOD CANADA (AAFC):

- Trends in agricultural irrigation water use, irrigation method, and on-farm conservation management practice in the context of climate change
- Potential impacts of drought and other severe climate events on irrigation and agriculture water use

SKILLS, MODEL AND DATA REQUIREMENTS:

- Basic manipulation of the dataset requires:
  - Basic statistical concepts
  - Knowledge of a statistical package such as STATA, SPSS or SAS