

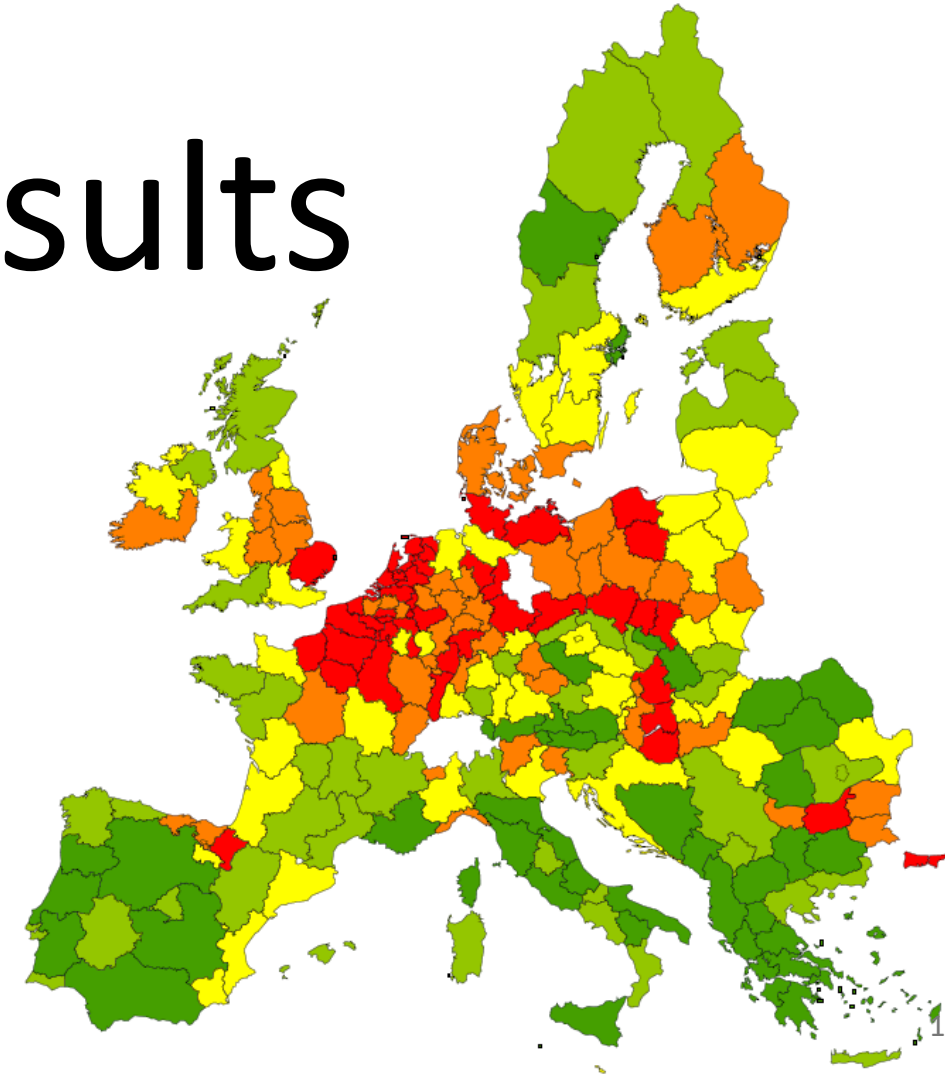


# Analysing CAPRI results

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Thünen Institute of Farm Economics, Braunschweig



- **Running your first simulation**
- **Load the results**
- **Navigate the Result Viewer – choose data to view**
- **Customize Table Views - transpose table dimensions**
- **Compare Relative and Absolute Values**
- **Select Subsets of the Results**
- **Sort the Results**
- **Use Results Outside the GUI**
- **In-depth Exercises**
- **Problems you might encounter**



```
$ ifi %CALC_MTR% = on $batinclude "parameters.def"
$|include definition of regional input data
$ onclude $BASELINE% == on $include "parameters.def"
for current levels for parameters modeling
behavior over iterations
$ --- set start level parameters for current run
* set start level
iterations
$ ifi %BASELINE% == on $include
* set start level
current run
over iterations
```

## 4. Running your first simulation

# Common Agricultural Policy(CAP) overview

The CAP is a common policy for all EU countries. It is managed and funded at European level from the resources of the EU's budget.

## Aims:

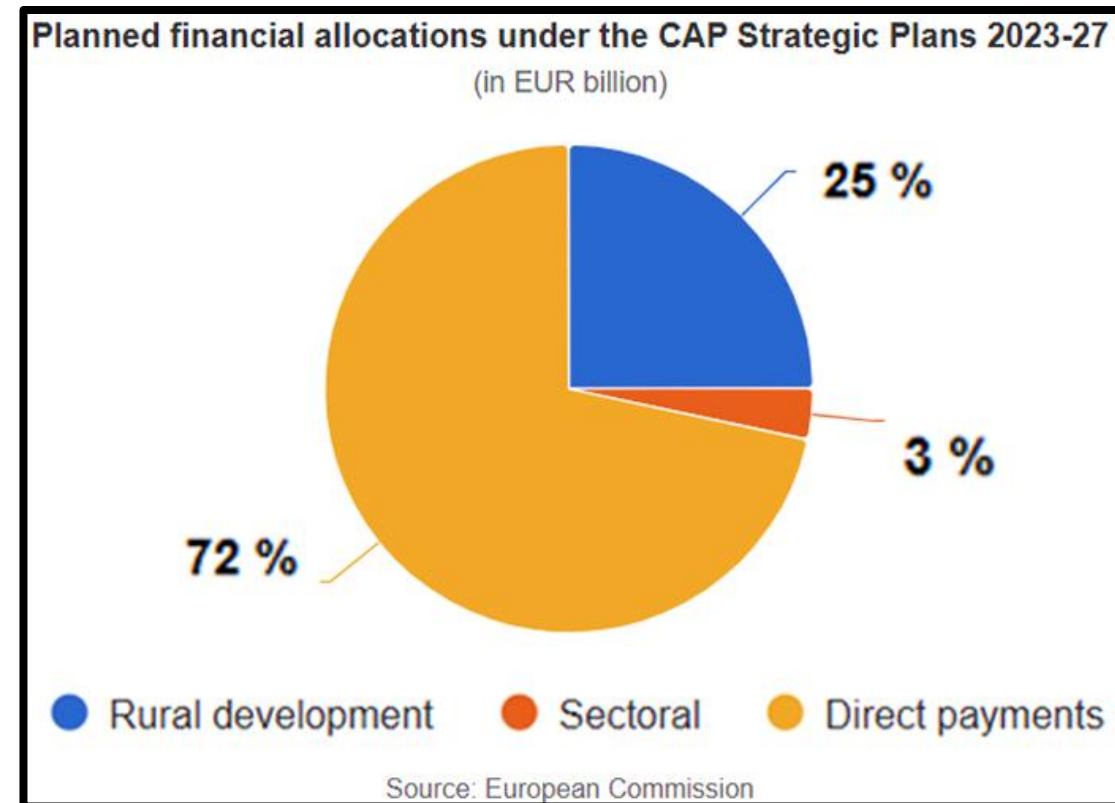
- Support farmers
- Food security
- Environmental protection
- Rural development

## CAP measures:

- Income support (direct payments)
- Market measures
- Rural development

For more information on the CAP read:

Jansson et al. 2021 <https://doi.org/10.1002/aep.13092> ,  
European Commission website ([link](#))



## 1. Define the simulation scenarios

- 1) In GUI select the work step “Run scenario”
- 2) Select the task “Define scenario” (here we are specifying the data/conditions in a .gms file)
  - All scenario files are located in a folder “gams/pol\_input”
  - Instead of defining new scenarios, we will use the existing policy scenarios related to the current CAP (2023-2027), which are located in folder “gams/pol\_input/cap\_after\_2023”

### Two scenarios will be selected:

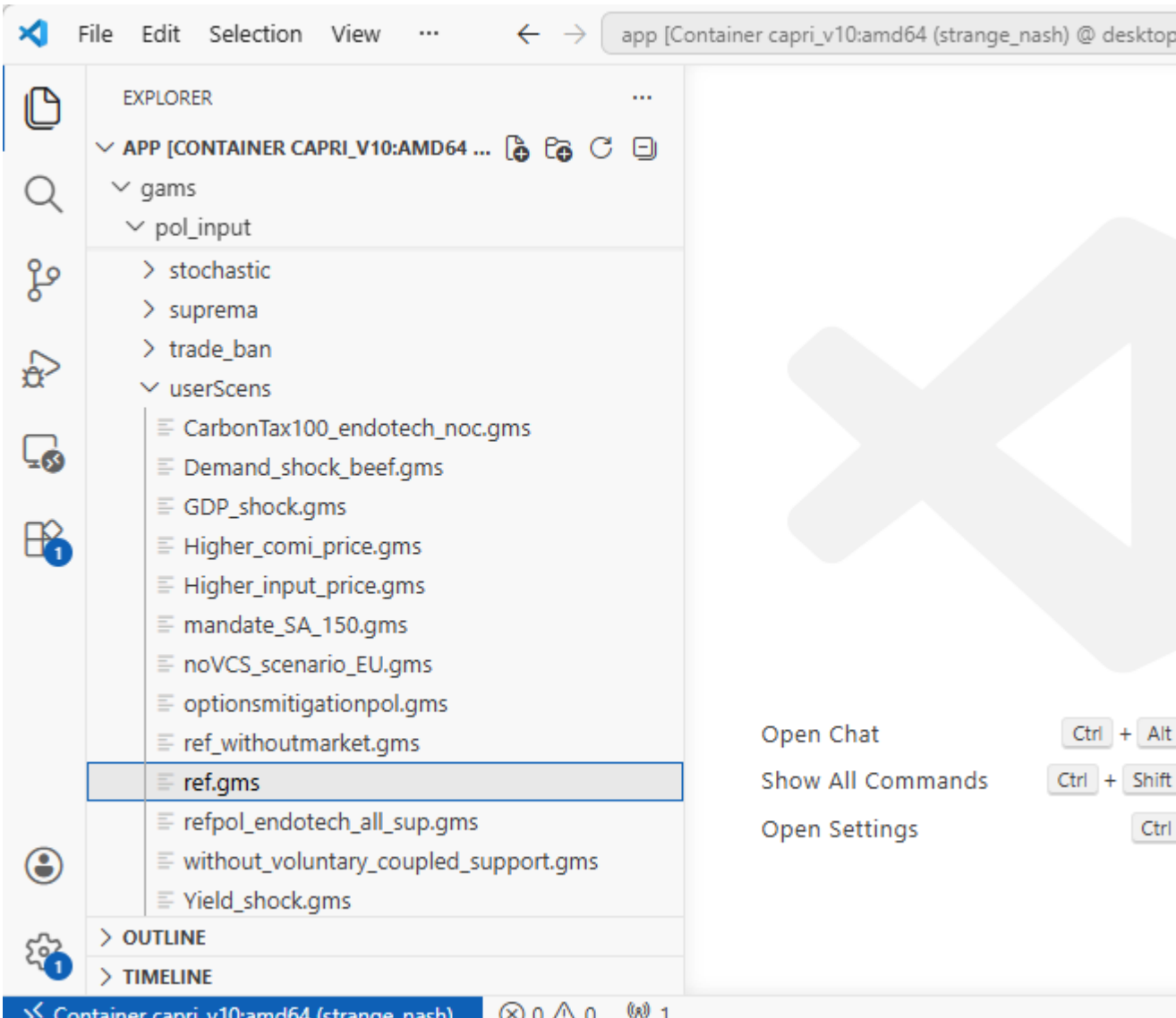
- **Reference scenario (CAPRI Baseline)**: with CAP framework (prevailing in 2023) in file “ref.gms”
- **noVCS scenario EU**: same, but a change is introduced in file “gams/pol\_input/userScens/noVCS\_scenario\_EU.gms”.

*In NoVCS scenario, the voluntary coupled support to specific production activities is removed. Instead, the budget is added to the basic payment scheme that is spread over all eligible ha of agricultural land.*

# Running the simulation



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- All our course scenarios are stored in **gams/pol\_input/userScens**

## Run scenario work step overview

Once the scenarios have been defined, you have options to run them:

- **Run scenario with market model:** *both the supply and market modules are run, in an iterative way. The model accounts for market effects and provides results at the regional level for the EU.*
- **Run scenario without market model:** *only the supply module is run. The model provides detailed results at the regional level, but market effects are not considered.*
- **Run scenario with only market model:** *only the market module is run. The model accounts for market effects but does not provide regional results.*

*Please note that for running a CAPRI scenario you need a valid GAMS licence.*

# 2. Choose scenario settings 1



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1. Run scenario
2. Run scenario with market model
3. General settings
4. Pick a scenario
5. Choose base year 2017
6. Choose simulation year 2035
7. Regional breakdown: NUTS2

Important! Keep the same settings for both scenarios!

The screenshot shows the CAPRI TRUNK software interface. The 'General settings' tab is active, and several settings are highlighted with red circles:

- 'General settings' tab in the top navigation bar.
- 'Dir:' dropdown menu set to 'userScens'.
- 'Files:' dropdown menu set to 'ref'.
- 'Base year' dropdown menu set to '2017'.
- 'Simulation years' list with '2035' selected.
- 'Regional breakdown' dropdown menu set to 'NUTS2'.

The interface also shows a 'Scenario description' section, a 'Regions' list, and a 'Countries' list. At the bottom, there is a console window showing the execution of 'CAPMOD: Generate tables in listing file' with various status messages and a completion time of 01:03:260.

# 2. Choose scenario settings 2



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File Utilities GUI Settings Help

CAPRIGGIG-GUI [app/gams]

General settings Modules and algorithm **Reporting** Algorithmic settings Debug options

CAPRI Reporting

Aggregates for activities and commodities

Environmental indicators

**Life-cycle assessment for energy**

**Multi-functionality indicators**

Iteration tracking

Sensitivity experiments with features in supply model

**Uncheck these boxes**

**Other settings should be left default**

Compile GAMS Start GAMS Stop GAMS Hide/Unhide controls Exploit results

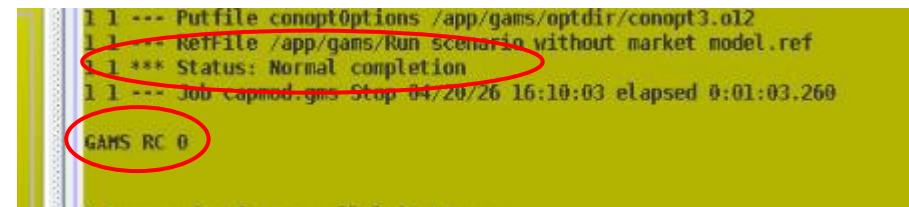
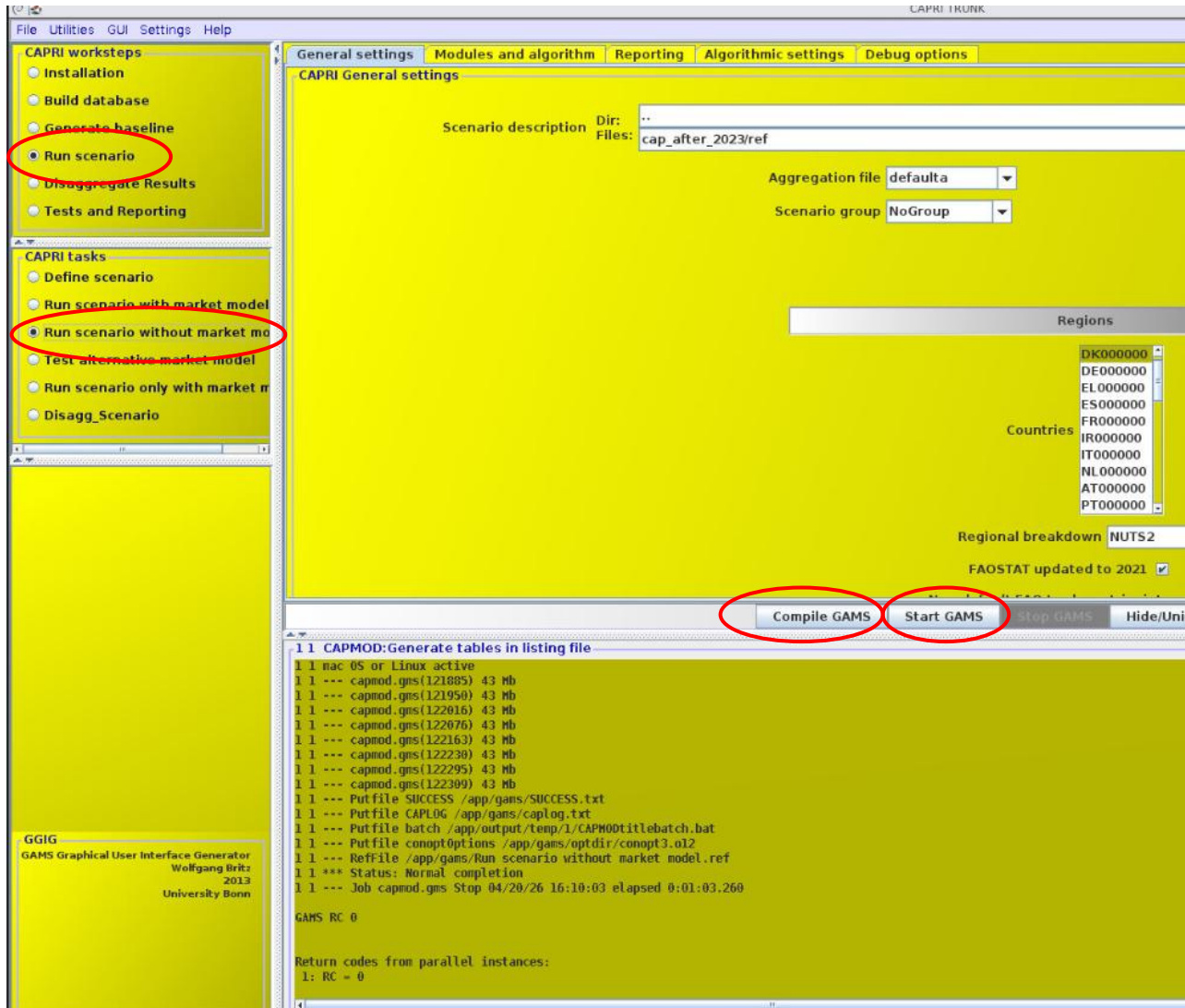
1 1 CAPMOD:Generate tables in listing file (1 min 4 sec)

ini file: /default.ini User name: undefined User type: developer Run scenario: Run scenario with market model

## 3. Run a policy scenario

1. Run scenario
2. Run scenario with market model
3. Compile GAMS (checks for invalid statements in the code)
4. Start GAMS (takes ~30 minutes)

After completion of steps 3 and 4 you should get a message **“Status: Normal Completion”** and **“GAMS RC 0”** in the output window:



## Possible Errors:

If something went wrong during the **Compilation**, the message will be **“Status: Compilation Error”**.

- The type of error will be specified, but can be difficult to understand if you are not familiar with GAMS
- Check that you filled in all the GUI settings and all the scenario settings

If something went wrong during the **Execution**, the message will be **“Status: Execution error”**

- Can be due to missing data (when you downloaded the results)

If it still doesn't work, contact the course team

## 4. Run a policy reform scenario

Once the Reference scenario (ref.gms) was run successfully, run the Policy Reform scenario (**noVCS\_scenario\_EU.gms**) in the same way. You only must change the scenario file.



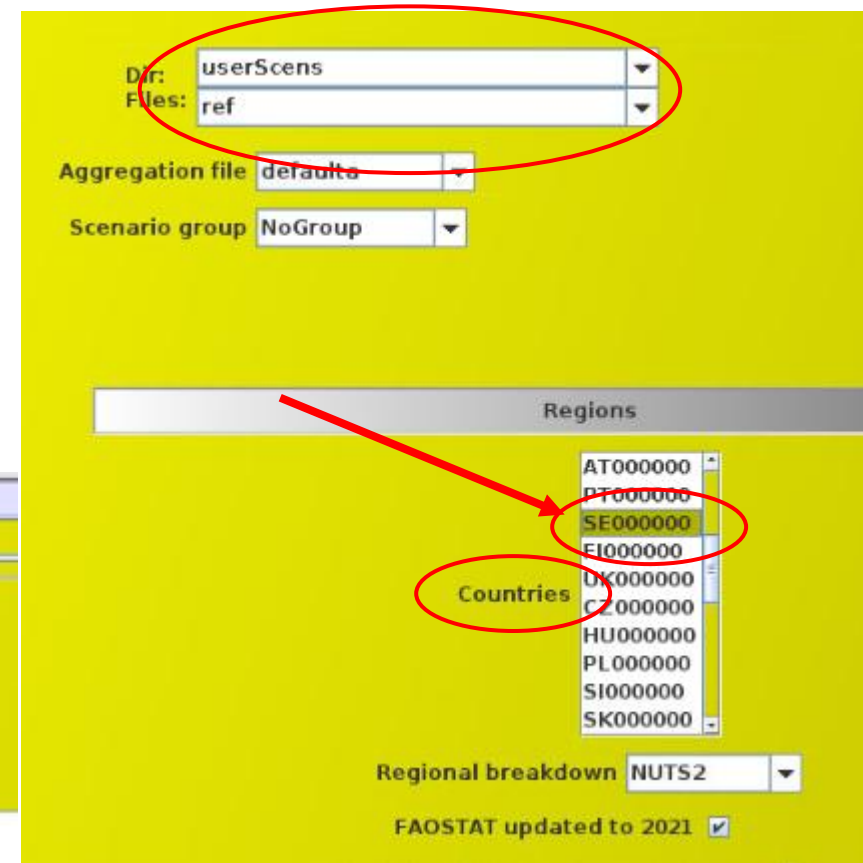
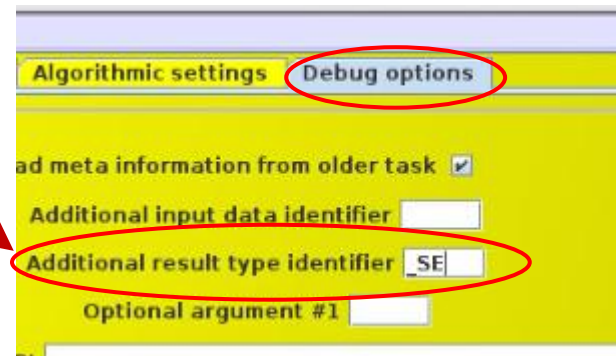
Run Scenario>>Run Scenario with market model

You should get a message **“Status: Normal Completion”**

## 5. Run scenarios without the market model (Sweden)

1. Run scenario (**ref**, then **noVCS\_scenario\_EU**)
2. Run scenario **without** market model (only supply module) **faster**
3. Pick **Sweden** in the list of countries (**SE000000**)
4. In 'Debug options' tab put an 'Additional result type identifier'. Type: **"\_SE"**.
5. Compile GAMS
6. Start GAMS

This will add an **"\_SE"** identifier to your results file (protects from overwriting the existing result files)





# Analysing CAPRI results

To analyse model results, we will use the scenarios you have already run in your first simulation.

Scenarios:

1. “ref”
2. “noVCS\_scenario\_EU”

They were run **with market model** and, therefore, include all countries and market feedbacks from the CAPRI market module.



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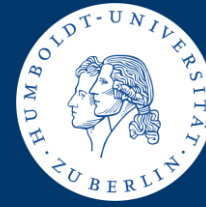


# Load the Results

# Load the Results



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Run scenario>>Run scenario with market model>>Exploit results

All the results from the different tasks in CAPRI can be viewed in the GUI through the **general settings panel** for each task.

The screenshot displays the CAPRI GUI interface. On the left sidebar, under 'CAPRI worksteps', 'Run scenario' is circled in red. Under 'CAPRI tasks', 'Run scenario with market model' is also circled in red. A red arrow points from the text 'general settings panel' to the 'Exploit results' button in the bottom right corner of the main settings panel, which is also circled in red. The word 'click' is written next to this button. The main settings panel shows 'General settings' with fields for 'Scenario description', 'Dir', 'Files', 'Aggregation file', 'Scenario group', 'Base year', 'Simulation years', 'Regions', 'Countries', 'Regional breakdown', and 'FAOSTAT updated to 2021'. The bottom status window shows the following text:

```
1 1 CAPMOD:Generate tables in listing file
1 1 mac OS or Linux active
1 1 --- capnod.gns(121885) 43 Mb
1 1 --- capnod.gns(121950) 43 Mb
1 1 --- capnod.gns(122016) 43 Mb
1 1 --- capnod.gns(122076) 43 Mb
1 1 --- capnod.gns(122163) 43 Mb
1 1 --- capnod.gns(122239) 43 Mb
1 1 --- capnod.gns(122295) 43 Mb
1 1 --- capnod.gns(122399) 43 Mb
1 1 --- Putfile SUCCESS /app/gans/SUCCESS.txt
1 1 --- Putfile CAPLOG /app/gans/caplog.txt
1 1 --- Putfile batch /app/output/temp/1/CAPMODtitlebatch.bat
1 1 --- Putfile conoptoptions /app/gans/optdir/conopt3.o12
1 1 --- Reffile /app/gans/Run scenario without market model.ref
1 1 *** Status: Normal completion
1 1 --- Job capnod.gns Stop 04/20/26 16:10:03 elapsed 0:01:03.260

GAMS RC 0

Return codes from parallel instances:
1: RC = 0
```

A new window will open 16

## Choose results files

1

- Country selection: "All" (default).
- Regional level: "2".
- Base year: "2017".
- Simulation year: "2035"

2

- Choose the corresponding simulation results files from the drop-down lists. (\output\results\capmod).
- You can choose as many as you wish, but the Viewer may slow or stop if you choose too many.*
- Good idea to name your scenarios.

3

- Click 'Show Results'

Result exploitation

Scenario 1 res\_2\_1735UserScens\_refdefaulta Reference

Scenario 2 res\_2\_1735UserScens\_noVCS\_scenario\_EUdefaulta Policy

Scenario 3

Scenario 4

Scenario 5

Scenario 6

Scenario 7

Scenario 8

Scenario 9

Scenario 10

Scenario 11

Scenario 12

Scenario 13

Scenario 14

Scenario 15

Scenario 16

Scenario 17

Scenario 18

Scenario 19

Scenario 20

Select scenarios

Show meta Show results Load content of files into GDx viewer Return

Click (might take some time)



## Problems you might encounter

- It may take some time to load your results before the result viewer is opened.
- Sometimes the files are not loaded. It might be enough to press “Show results” again.
- It might also be necessary to restart the GUI. In this case, you do not need to re-run your simulation, only try to reload your results.



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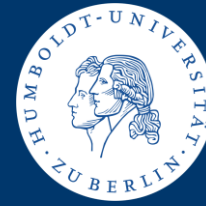


# Navigate the Result Viewer

# Navigate the Result Viewer

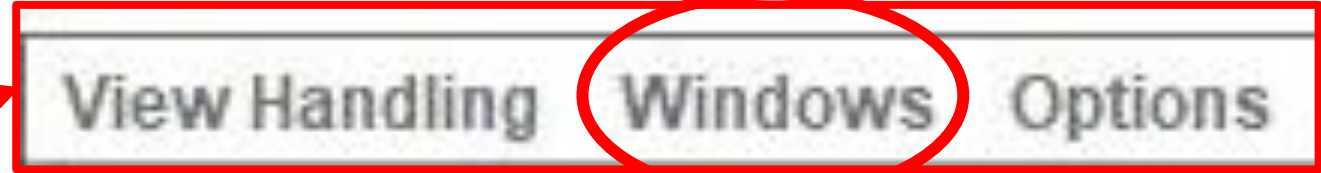


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## Result Viewer

- In the result viewer one or several data view windows can be seen.
- By clicking **Windows** in the list, you can choose which data view window to view among your open ones.
- If no data view windows are visible, click **View handling>> New data view**.
- To go back to the work steps and close result: **View handling>>Exit**.

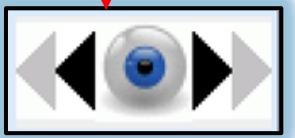
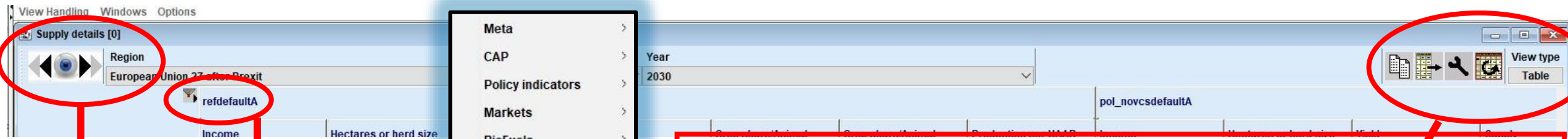


	Income [Euro/ha or head]	Hectares or herd size [1000 ha or hds]	Yield [kg, Const EU or 1/1000 head/ha]	Supply [1000 t, 1000 ha or Mio Const EU]	Crop share/Anim al density [% or 0.01 animals/ha]	Crop share/Anim al density, per arable land [% or 0.01 animals/ha]	Production per UAAR [kg, 1/1000 head or Const EU/ha]	Income [Euro/ha or head]	Hectares or herd size [1000 ha or hds]	Yield [kg, Const EU or 1/1000 head/ha]	Supply [1000 t, 1000 ha or Mio Const EU]	Crop share, densit [% or anima]
Utilized agricultural area	2373.10	162514.95	1346.97	218902.58	100.00	145.83	1346.97	2352.41	162396.73	1344.59	218357.52	
Cereals	905.87	48566.63	867.12	42113.21	29.88	43.58	259.13	895.42	48375.53	864.54	41822.59	
Oilseeds	850.77	12100.25	1015.73	12290.62	7.45	10.86	75.63	838.48	12030.98	1017.89	12246.26	
Other arable crops	3670.95	5542.89	4008.10	22216.43	3.41	4.97	136.70	3721.63	5337.92	4128.67	22038.54	
Vegetables and Permanent crops	6929.68	20025.30	5914.48	118439.15	12.32	17.97	728.79	6919.25	20018.34	5915.38	118416.06	
Fodder activities	3.29	69541.09	342.86	23843.16	42.79	62.40	146.71	-0.25	69555.79	342.66	23834.04	
Set aside and fallow land	350.22	6738.79			4.15	6.05		348.66	7078.17			
All cattle activities	1905.69	51135.41	1751.72	89574.91	31.47	45.89	551.18	1903.16	50493.98	1763.00	89020.91	
Beef meat activities	411.33	14697.05	991.42	14570.96	9.04	13.19	89.66	387.04	14307.16	1006.17	14395.40	
All Dairy	2508.42	36438.36	2058.38	75003.95	22.42	32.70	461.52	2502.59	36186.81	2062.23	74625.52	
Other animals	1363.10	52982.60	1518.78	80469.02	32.60	47.54	495.15	1357.36	52818.72	1521.59	80368.35	
Utilized agricultural area	2373.10	162514.95	1346.97	218902.58	100.00	145.83	1346.97	2352.41	162396.73	1344.59	218357.52	
Cereals	905.87	48566.63	867.12	42113.21	29.88	43.58	259.13	895.42	48375.53	864.54	41822.59	
Soft wheat	1051.02	20150.93	6372.10	128403.77	12.40	18.08	790.10	1049.83	20157.86	6371.08	128427.32	
Durum wheat	898.31	2117.89	3913.50	8288.34	1.30	1.90	51.00	848.95	1909.97	3978.14	7598.13	
Rye and Meslin	338.83	1855.70	4208.65	7809.97	1.14	1.67	48.06	336.76	1862.30	4191.54	7805.92	
Barley	709.99	9709.10	5359.39	52034.86	5.97	8.71	320.19	708.65	9663.97	5359.21	51791.28	
Oats	315.61	3769.15	3370.38	12703.46	2.32	3.38	78.17	312.85	3778.00	3350.47	12658.06	
Grain Maize	1328.78	7716.64	8384.20	64697.82	4.75	6.92	398.10	1305.67	7691.74	8369.74	64377.90	
Other cereals	397.80	2933.84	4777.26	14015.73	1.81	2.63	86.24	383.86	3007.80	4751.51	14291.60	
Paddy rice	2492.56	313.38	7824.51	2452.06	0.19	0.28	15.09	2230.29	303.89	7837.48	2381.74	
Oilseeds	850.77	12100.25	1015.73	12290.62	7.45	10.86	75.63	838.48	12030.98	1017.89	12246.26	
Rape	674.00	6246.05	3323.74	20760.26	3.84	5.60	127.74	666.47	6248.74	3326.66	20787.40	
Sunflower	1082.81	4595.42	2619.51	12037.76	2.83	4.12	74.07	1060.29	4649.96	2602.02	12099.27	
Soya	969.64	883.25	3068.38	2710.15	0.54	0.79	16.68	990.93	756.75	3280.14	2482.26	
Other oils	671.81	375.53	1378.34	517.60	0.23	0.34	3.18	646.86	375.53	1378.34	517.60	
Other arable crops	3670.95	5542.89	4008.10	22216.43	3.41	4.97	136.70	3721.63	5337.92	4128.67	22038.54	
Pulses	601.26	1707.91	2029.12	3465.56	1.05	1.53	21.32	479.18	1529.46	2024.23	3095.98	
Potatoes	7942.10	962.87	41222.07	39691.39	0.59	0.86	244.23	7915.53	960.27	41256.52	39617.57	
Sugar Beet	1693.62	1396.75	77215.71	107851.09	0.86	1.25	663.64	1624.33	1369.20	77765.45	106476.68	
Flax and hemp	2593.72	409.08	3218.88	1316.79	0.25	0.37	8.10	2588.66	412.71	3199.21	1320.36	
Tobacco	8042.42	34.99	2456.82	85.95	0.02	0.03	0.53	8044.65	34.98	2456.99	85.95	

# Navigate the Result Viewer

## Options in the Result Viewer

You can choose which kind of data to view and which of the loaded scenarios to compare. **Symbols for the functions available for the data manipulation:**



**Eye symbol:**  
Open menu to choose which data to view



**Selection dialog:**  
Choose a subset of elements to show.

- Meta
- CAP
- Policy indicators
- Markets
- BioFuels
- Trade
- Farm**
- Farm - totals
- Farm EU
- Fertilizer
- Environment
- Multi-Functionality
- Energy
- Feed
- Welfare
- Prices
- Pesticides
- Supply model analysis
- Swiss focus
- No table

	Copy	Copy the values shown.
	Export	Export results to a file.
	Customize	Choose which data to view, how to view it, etc.
	Pivot	Choose which dimension to place where.
	<b>View type</b> Table	Choose if the data should be shown as a table, a graph, or something else.

# Navigate the Result Viewer



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## Farm theme>> Supply details

To start looking at results  
click at the

**Eye symbol**



Then choose:

**Farm>> Supply details**

*you will see a table with  
the results for crop areas  
and production volumes,  
etc.*

View Handling Windows Options

Supply details [0]

					Year
er Brexit					2030
defaultA					
	ome ro/ha or head]	Hectares or herd size [1000 ha or hds]	Yield [kg, Const EU or 1/1000 head/ha]	Supply [1000 t, 1000 ha or Mio Const EU]	Crop sh density [% or 0.]

Utilize

Cerea

Oilsee

Other

Veget

Fodde

Set as

All cat

Beef n

All Dai

Other

Utilize

Cerea

Soft w

Durum

Rye ar

Barley

Oats

- Meta
- CAP
- Policy indicators
- Markets
- BioFuels
- Trade
- Farm**
- Farm - totals
- Farm EU
- Fertilizer
- Environment
- Multi-Functionality
- Energy
- Feed
- Welfare
- Prices
- Pesticides
- Supply model analysis
- Swiss focus
- No table

- Supply details
- Main crop areas
- Main crop area pie map
- Supply details, mapping view
- Supply details, cluster view
- Income Indicators
- Income indicators, mapping view
- Income indicators across Member States
- Labour use per activity
- Labour use per activity, multiplied with activity levels [hence: unit=(unit/unit of level)\*(unit of level)]
- Land supply and use
- Supply details, irrigation
- Income break down
- Sugar

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## Data dimensions

In CAPRI we can show data with many dimensions. Depending on which table you view (chosen data), the elements in the rows and columns might differ (some might be shown in drop-down lists at the top of the window).

**Regions** might not always cover the same set of regions:

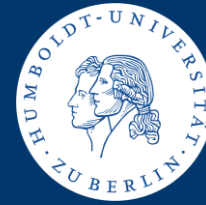
- **NUTS2 regions** are shown when relevant (typically for results from the supply module),
- some views show **all world regions**, but not NUTS2 (typically for results from the market module).

Example on the next slide>>

# Navigate the Result Viewer



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View Handling Windows Options

Supply de... [Region: European Union 27 after Brexit] [Year: 2035] [Scenario: noVCS\_scenario\_EUdefaulta]

	Income [Euro/ha or head]	Hectares or herd size [1000 ha or hds]	Yield [kg, Const EU or 1/1000 head/ha]	Supply [1000 t, 1000 ha or Mio Const EU]	Crop share/Animal density [% or 0.01 animals/ha]	Crop share/Animal density, per arable land [% or 0.01]	Production per UAAR [kg, 1/1000 head or Const EU/ha]	Income [Euro/ha or head]	Hectares or herd size [1000 ha or hds]	Yield [kg, Const EU or 1/1000 head/ha]	Supply [1000 t, 1000 ha or Mio Const EU]	Crop share, densit [% or anima]
Utilized agricultural area	2373.10	162514.95	1346.97	218902.58	100.00	145.83	1346.97	2352.41	162396.73	1344.59	218357.52	
Cereals	905.87	48566.63	867.12	42113.21	29.88	43.58	259.13	895.42	48375.53	864.54	41822.59	
Oilseeds	850.77	12100.25	1015.73	12290.62	7.45	10.86	75.63	838.48	12030.98	1017.89	12246.26	
Other arable crops	3670.95	5542.89	4008.10	22216.43	3.41	4.97	136.70	3721.63	5337.92	4128.67	22038.54	
Vegetables and Permanent crops	6929.68	20025.30	5914.48	118439.15	12.32	17.97	728.79	6919.25	20018.34	5915.38	118416.06	
Fodder activities	3.29	69541.09	342.86	23843.16	42.79	62.40	146.71	-0.25	69555.79	342.66	23834.04	
Set aside and fallow land	350.22	6738.79										
All cattle activities	1905.69	51135.41	1751.72									
Beef meat activities	411.33	14697.05	991.42									
All Dairy	2508.42	36438.36	2058.38									
Other animals	1363.10	52982.60	1518.78									
Utilized agricultural area	2373.10	162514.95	1346.97									
Cereals	905.87	48566.63	867.12									
Soft wheat	1051.02	20150.93	6372.10									
Durum wheat	898.31	2117.89	3913.50									
Rye and Meslin	338.83	1855.70	4208.65									
Barley	709.99	9709.10	5359.39									
Oats	315.61	3769.15	3370.38									
Grain Maize	1328.78	7716.64	8384.20									
Other cereals	397.80	2933.84	4777.26									
Paddy rice	2492.56	313.38	7824.51									
Oilseeds	850.77	12100.25	1015.73									
Rape	674.00	6246.05	3323.74									
Sunflower	1082.81	4595.42	2619.51									
Soya	969.64	883.25	3068.38									
Other oils	671.81	375.53	1378.34									
Other arable crops	3670.95	5542.89	4008.10									
Pulses	601.26	1707.91	2029.12									
Potatoes	7942.10	962.87	41222.07									
Sugar Beet	1693.62	1396.75	77215.71									
Flax and hemp	2593.72	409.08	3218.88	1316.79	0.25	0.37	8.10	2588.66	412.71	3199.21	1320.36	

## Data Dimensions:

- Scenario
- Data item (e.g. "Income")
- Region
- Year
- Agricultural activity

# Navigate the Result Viewer



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## Try to find this yourself (example)

### Dimensions:

- **Regions:** “Germany”
- **Year:** 2035
- **Scenario:** Reference
- **Data item:** Hectares
- **Agr. Activity:** Soft wheat

You can see that the area of soft wheat in Germany in 2035 is projected to be **2,896,430 hectares** in the Reference scenario.

	Income [Euro/ha or head]	Hectares or herd size [1000 ha or hds]	Yield [kg, Const EU or 1/1000 head/ha]	Supply [1000 t, 1000 ha or Const EU]
Utilized agricultural area	2896.69	16914.46	1582.05	267
Cereals	1024.93	5696.00	1010.58	57
Oilseeds	742.64	1733.92	1183.59	20
Other arable crops	5651.75	733.67	7424.13	54
Vegetables and Permanent crops	10041.60	1100.37	8292.09	91
Fodder activities	-115.04	7247.45	604.32	43
Set aside and fallow land	1087.82	403.06		
All cattle activities	2326.44	7675.37	2021.63	155
Beef meat activities	549.46	1392.64	1417.58	19
All Dairy	2720.33	6282.73	2155.52	135
Other animals	1300.81	7082.66	1716.05	121
Utilized agricultural area	2896.69	16914.46	1582.05	267
Cereals	1024.93	5696.00	1010.58	57
Soft wheat	1148.39	2896.43	7962.76	230
Durum wheat	564.39	23.12	6253.31	1
Rye and Meslin	637.37	533.82	5401.53	28
Barley	998.31	1300.53	7224.93	93
Oats	719.69	187.11	4746.44	8
Grain Maize	1163.60	406.65	10140.51	41
Other cereals	724.29	348.32	6113.07	21
Paddy rice				25
Oilseeds	742.64	1733.92	1183.59	20
Rape	747.71	1696.80	3403.55	57

## Exercise 9: Find these

- a) Number of hectares of cereals in Sweden in 2035 for the Reference scenario.
- b) Farm income (Euro/head) from all cattle activities in Ireland in 2035 for the Reference scenario.
- c) Number of hectares of wine production in France in 2035 for the Reference scenario.
- d) To find other themes, click the eye symbol and go through the menu.

## Exercise 10: Find the table Product balances, detailed

Write the path (in the context menu) to where you find the table Product balances, detailed.

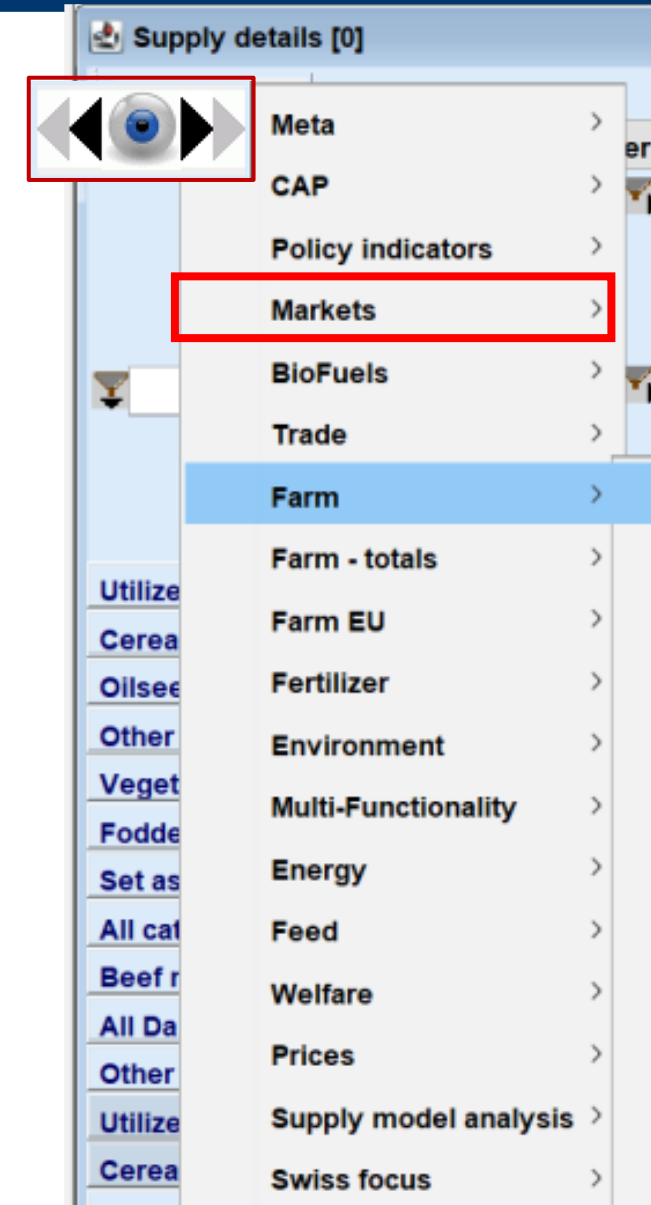
## Markets theme

It shows data on **production**, **consumption** and **trade** among other things.

Go to **Markets>>Product Balances**, market model. Here you can see data like Net production and Human consumption plus losses.

If you compare the **regions**, you can find world regions such as “Brazil” in this table, but not NUTS2 regions such as “Sydsverige” as in the previous table.

Further, **agricultural activities** cannot be found, but instead you see products (for example “Beef” but not “Other Cows”).





## Exercise 11

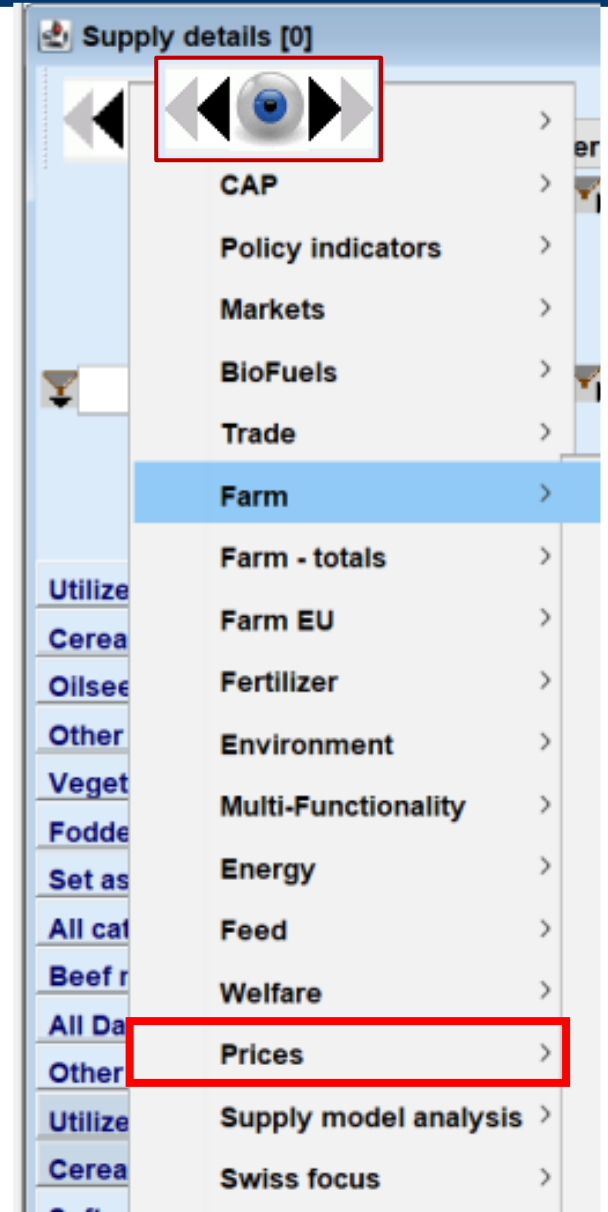
Find the quantity of human consumption plus losses of rice in China in 2035 for the Reference scenario.

## Prices theme

- Go to **Prices>> Prices market model**. This shows **prices in the market-model regions** for agricultural products.

The dimensions are similar to those in the Product balances market model.

- Go to **Prices>> Prices**. Here **prices for regions in the supply module** are shown. **Only prices for the NUTS2 regions are shown**, not for the regions outside. Both prices for products and shadow prices for inputs such as fodder are shown.





## Exercise 12: Find values in the GUI

- a) The producer price of rapeseed in USA in 2035 for the Reference scenario.
- b) The producer price of rapeseed in the aggregate for all regions in North America in 2035 for the Reference scenario.
- c) The producer price of the aggregate for all oilseeds in USA in 2035 for the Reference scenario.

## Exercise 13: Producer price of fodder maize

Find the Producer price of fodder maize in Mellersta Norrland (a Swedish NUTS2 region) and Sweden in 2035 for the Reference scenario.

## Environment theme

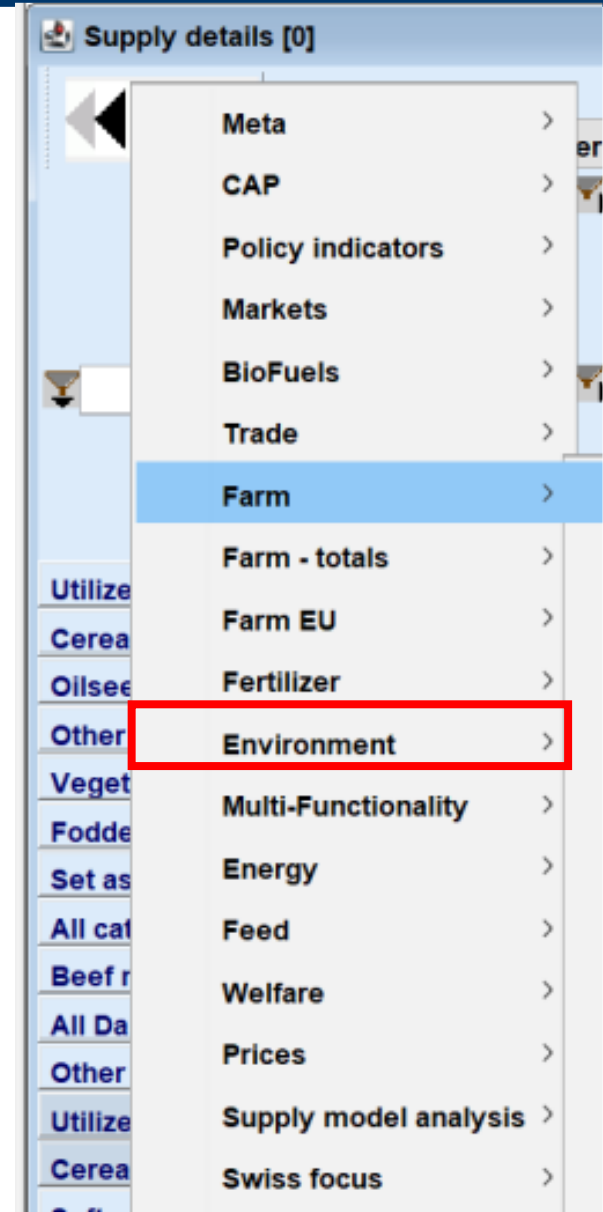
Includes results for various environmental indicators.

Go to **Environment>>Environmental indicators**.

Here, total emissions of ammonium and greenhouse gases for each region in the supply module are shown.

You can also view the emissions per hectare of agricultural land.

“Global warming potential from agriculture” sums the emissions of the greenhouse gases methane and nitrous oxide using Global Warming Potential coefficients.





## Exercise 14: Total GHG emissions

Find the total emissions of greenhouse gases in Global Warming Potential (in 1000t CO<sub>2</sub> eq) for Sweden in 2035 for the Reference scenario



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# Customize Table Views

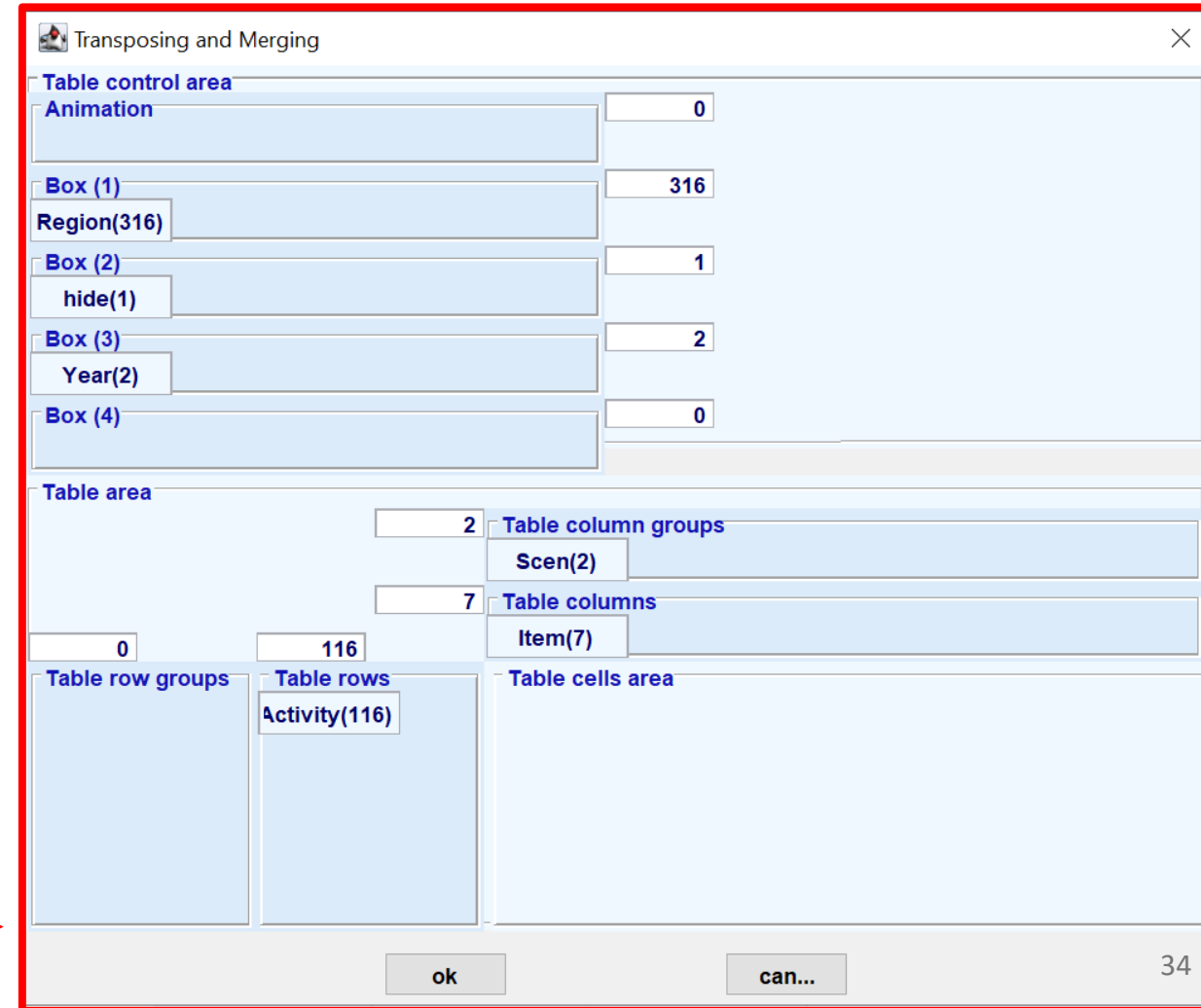
## Transpose table dimensions

Changing the dimensions of the table can be helpful to get an overview of the results.

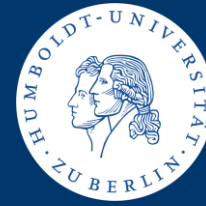
Go back to the table **Farm >> Supply details**.

By clicking the **Pivot** up in the right corner, rows and columns will change places.

By clicking on Pivot with the right mouse button you will open a window called **Transposing and Merging**. Here, you can choose freely how to organize your data table by moving around the dimensions Region, Scen, Year, Item and Activity, and similarly for other themes.



# Customize Table Views



Transposing and Merging

**Table control area**

Animation	0
Box (1) Region(316)	316
Box (2) hide(1)	1
Box (3) Year(2)	2
Box (4)	0

**Table area**

2	Table column groups
	Scen(2)
7	Table columns
	Item(7)
0	Table row groups
116	Table rows
	Activity(116)
	Table cells area

- **Table control area** – defines how the table and the data are organized.
- **Animation** – can be used to play up items in one dimension, showing data for one item at a time.
- **Box (1-4)** – corresponds to the drop-down lists in the top row of your data view window.
- **Table columns and Table rows** – corresponds to columns and rows.
- **The Table rows, and Table columns groups** – make it possible to show data with e.g., regions (Table rows group), and for each region all products (Table rows), in the rows.
- **In Table area** – you can adjust the data dimension by dragging the dimensions to the different places, depending on what information you want to study. If you put two dimensions in the same place, it will be like putting one of them in the groups, but more difficult to rearrange.

## Exercise 15: Change the table view

- Go back to the table **Farm >> Supply details**.
- Change the table view so that you have Activities in columns, Items in rows and Scen, Years and Regions in the drop-down lists.
- Chose the **Scen>>Policy scenario**, **Years>>2035** and **Regions>> Finland** in the drop-down list.



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# Compare Relative and Absolute Values

# Compare Relative and Absolute Values



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Clicking on “**Customize**” in the right upper corner, you can make several choices about what data to show and how.



**Values format.** Click on the Comparison output drop-down list to choose between absolute values, percentages, only values, or differences to the chosen scenario.

## Choose:

- **Comparison output:** “Values and percentage difference”.
- **Data dimension used for comparisons:** “Scen”.
- **Element for comparison Scen:** “Reference”.

*Your results should now be shown for the Policy scenario in absolute values and percentage differences to the Reference scenario.*

Customize view

Dialog  Only monospaced 12 plain

Fraction digits and decimal separator 2 .

Separator between merged data dimensions  Fill up merged Dims

Selection for : Activity Selection for : Scen Selection for : Item

Column width 113 Row width 247

Hide empty rows  Hide empty columns

Cut off limit to determine empty cells 0

Use default pivoting for tables  Show histogram  Use classification colors for tables

Show only selected items Long texts only

Comparison output Values and percentage difference

Comparison threshold to hide values 0

Data dimensions used for comparisons

Region  
Activity  
Item  
Year  
Scen

Element used for comparisons Scen Reference

ok define colors define statistics store settings load settings



## Exercise 16: Compare relative and absolute values

- a) **Compare scenario results.** What is the percentage difference for farm income for Cereals in Spanish agriculture in the Policy scenario compared to the Reference?
- b) **Now compare results in different regions.** What is the absolute difference for prices of oats in USA compared to Sweden, in the Reference scenario?



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# Select Subsets of the Results

# Select Subsets of the Results



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In a large data set, finding the results you need can be tedious and difficult. Choosing a subset of results can therefore be helpful.

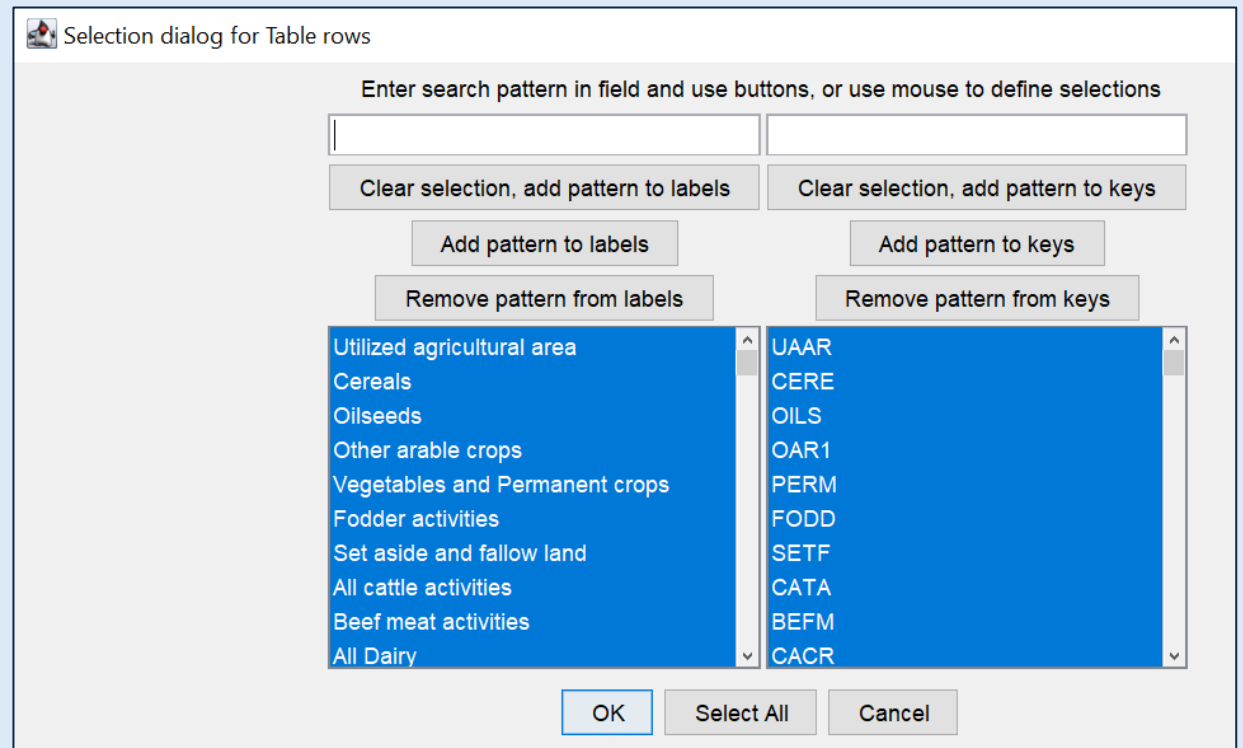
Double clicking on the **funnel** above the column/rows heading, you can choose which activities you want to view.



A dialog window will open. Here, you choose what items you would like to view.

(hold down the **ctrl key** to choose several items).

- **The right box** in the dialog shows the CAPRI codes for the activities/items/scenarios etc.



## Exercise 17: Select sub-sets of the results

- a) Create a **subset** showing only values **Yield** and **Supply** for cereals (soft wheat, durum wheat, rye and meslin, barley, oats, grain maize, other cereals, and paddy rice) for Germany in the Reference scenario.
- b) Create a subset showing only **Income** [Euro/ha or head] in Spain, Italy, and Germany, for oilseeds (rapeseed, sunflower, soya, and other oils) for both the Reference and the Policy scenarios. (Hint: You may need to use Pivot again to move countries from the drop-down menu.)



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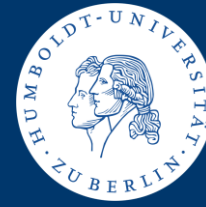


# Sort the Results

# Sort the Results



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- The rows are sorted according to a **predefined order** (e.g. first some larger crop groups, then the positions of each large group).
- You can **sort the data** by largest or smallest value, or the difference to the Reference scenario.
- By clicking on a **specific column header**, the values in the columns are sorted by either smallest or largest numbers. **Clicking again** reverses the order.
- If you have several columns, the data for all columns will be **sorted according** to the column of interest.
- If only **absolute values** are shown, the sorting will be based on this. But if you have chosen to e.g., compare by percentage difference, the sorting will be **based on these differences**.

View Handling Windows Options

Supply details [0]

Region: European Union 27 after Brexit | Year: 2035

Columns: refdefaulta, Income [Euro/ha or head], Hectares or herd size [1000 ha or hds], Yield [g, Const EU or 1/1000 head/ha]

	Income [Euro/ha or head]	Hectares or herd size [1000 ha or hds]	Yield [g, Const EU or 1/1000 head/ha]
All agricultural activities	385663.97	266632.97	1458.73
Pig fattening	121.91	233039.55	90.43
Utilized agricultural area	2373.10	162514.95	1346.97
Utilized agricultural area	2373.10	162514.95	1346.97
Arable land	1945.82	111438.45	1868.02
Fodder activities	3.29	69541.09	342.86
Fodder activities	3.29	69541.09	342.86
Milk Ewes and Goat	80.13	56417.27	82.71
Milk Ewes and Goat	80.13	56417.27	82.71
Other animals	1363.10	52982.60	1518.78
Other animals	1363.10	52982.60	1518.78
All cattle activities	1905.69	51135.41	1751.72
All cattle activities	1905.69	51135.41	1751.72
Pasture	-16.52	51076.50	210.14
Cereals	905.87	48566.63	867.12
Cereals	905.87	48566.63	867.12
All Dairy	2508.42	36438.36	2058.36
All Dairy	2508.42	36438.36	2058.36
Sheep and Goat fattening	80.18	32329.86	13.20
Sheep and Goat fattening	80.18	32329.86	13.20
Gras and grazings extensive	55.67	25538.27	14085.35
Gras and grazings intensive	-88.72	25538.23	32645.22
Soft wheat	1051.02	20150.93	6372.10
Vegetables and Permanent crops	6929.68	20025.30	5914.48
Vegetables and Permanent crops	6929.68	20025.30	5914.48
Beef meat activities	411.33	14697.05	991.42
Beef meat activities	411.33	14697.05	991.42
Fodder other on arable land	18.88	12757.04	25742.55
Oilseeds	850.77	12100.25	1015.73



## Practice sorting

Go back to **Farm >> Supply details**.

- Place **Activities** in the rows and data items in the columns.
- Choose **EU27 after Brexit** in the drop-down menu.
- Click on the **Hectares** column.

*The results should now be sorted in the order starting from the lowest (or highest) value. Try clicking on the other columns as well and see how the order of the data changes.*

## Exercise 18: Sort results

- a) Sort the data so that the **largest values** for head/hectares for European Union West in the Policy scenario are **at the top**. Which aggregated land use activity (Cereals, Oilseeds, Other arable crops, Vegetables and permanent crops, Fodder activities, or Set aside and fallow land) uses the largest area? How large is it? Which individual land use activity (Barley, Maize,) uses the largest area?
- b) Sort the data so that the **smallest percentage change** in area used for agricultural activities in Sweden is shown, i.e., between the Policy and the Reference scenario. Which aggregate land use activity (Cereals, Oilseeds, Other arable crops, Vegetables and permanent crops, Fodder activities, or Set aside and fallow land) has the smallest percentage change? How small?



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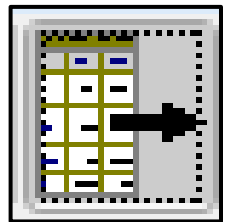
# Use Results Outside the GUI

There are different ways to export your results so that you can use them outside the GUI

1) The first option is to copy the values in the table by using the **Copy symbol** or by right clicking on the table and choosing Copy to Clipboard. By using Copy selected cells to clipboard you can copy a selection. When you paste the data into a spreadsheet, labels and settings will also be shown.



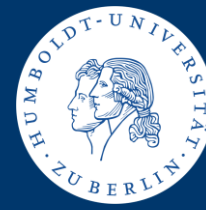
2) The other option is to use **Export symbol**, by clicking the symbol or right-clicking. With this you can chose to export the table into an existing file, and you are given the possibility to choose which data to include.



# Use Results Outside the GUI



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## Exercise 19:

Try copying freely chosen results from the GUI into a datasheet.

*It should look something like that:*

Clipboard

Edit clipboard content in the textarea below.

2710.15	0.54	0.79	16.68	990.93	
756.75	3280.14	2482.26	0.47	0.68	
15.29					
Other oils	671.81	375.53	1378.34		
517.60	0.23	0.34	3.18	646.86	375.53
1378.34	517.60	0.23	0.34	3.19	

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	
1	Supply details [0]																	
2	#####																	
3																		
4																		
5	Region	European Union 27 after Brexit																
6	hide	Aggregate																
7	Year	2035																
8																		
9	Columns: Scen																	
10	Columns: Item																	
11																		
12	Rows: Activity																	
13		refdefaulta																
14		noVCS_scenario_EUdefaulta																
15	Utilized ag	2373.1	162515	1346.97	218902.6	100	145.83	1346.97	2352.41	162396.7	1344.59	218357.5	100	145.89	1344.59			
16	Cereals	905.87	48566.63	867.12	42113.21	29.88	43.58	259.13	895.42	48375.53	864.54	41822.59	29.79	43.46	257.53			
17	Oilseeds	850.77	12100.25	1015.73	12290.62	7.45	10.86	75.63	838.48	12030.98	1017.89	12246.26	7.41	10.81	75.41			
18	Other aral	3670.95	5542.89	4008.1	22216.43	3.41	4.97	136.7	3721.63	5337.92	4128.67	22038.54	3.29	4.8	135.71			
19	Vegetable	6929.68	20025.3	5914.48	118439.2	12.32	17.97	728.79	6919.25	20018.34	5915.38	118416.1	12.33	17.98	729.18			
20	Fodder ac	3.29	69541.09	342.86	23843.16	42.79	62.4	146.71	-0.25	69555.79	342.66	23834.04	42.83	62.49	146.76			
21	Set aside	350.22	6738.79			4.15	6.05		348.66	7078.17			4.36	6.36				
22	All cattle	1905.69	51135.41	1751.72	89574.91	31.47	45.89	551.18	1903.16	50493.98	1763	89020.91	31.09	45.36	548.17			
23	Beef meat	411.33	14697.05	991.42	14570.96	9.04	13.19	89.66	387.04	14307.16	1006.17	14395.4	8.81	12.85	88.64			



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# In-depth Exercises

## Exercise 20: Compare the Policy to the Reference scenario in Sweden in 2035

- a) What is the relative change in number (heads) for the aggregate Beef meat activities?
- b) For which “component” of Beef meat activities (Other cows, Heifers fattening low weight, Heifers fattening high weight, Male adult cattle low weight or Male adult cattle high weight) is the absolute change (in numbers of heads) largest? How large?
- c) In which of the Swedish regions (Stockholm, Oestra mellansverige, Sydsverige, Norra mellansverige, Mellersta Norrland, Oevre Norrland, Smaland med Oearna or Vaestsverige) is the relative change smallest for Beef meat activities (in number of heads)? How large? For the absolute change?
- d) What are the prices of Beef in Sweden in the Reference and in the Policy scenario? Attach a screenshot of a spreadsheet or a table showing these and only these prices.

## Exercise 21: how results differ between using the market module and the supply module

*In this exercise you will look at how results differ between using the market module and the supply module.*

**Step 1:** First, go through the exercises looking at the result files that you already loaded (with market model). **Look at the Policy scenario for France.**

- a) Find the activity with the largest absolute and the activity that has the largest percentage change in income (Except all agricultural activities and utilized agricultural area).
- b) For both of these activities, in which of the French regions are the changes largest?
- c) Which of the products show the highest price change (in producer prices)? In absolute values? And in percentage? How much?
- d) How large are the changes in GHG emissions (in Global Warming Potentials) in all of France? In which of the French regions is the changes largest?

**Step 2:** Now you will run a new scenario. Exit the result viewer: View handling>>Exit.

- Go back to **Run scenario>>Run scenario without market model.**
- Run the Reference scenario and the Policy scenario for **France** (with ending \_FR in Additional result type identifier). *\*Remember to select Regional breakdown=NUTS2.*
- Load the result files. These will be in the same result directory, but the files will end by \_FR (ref\_FR and pol\_novcs\_FR).

Do the same exercises as in Step 1:

- a) Find the activity with the largest absolute and the activity that has the largest percentage change in income (Except all agricultural activities and utilized agricultural area).
- b) For both of these activities, in which of the French regions are the changes largest?
- c) Which of the products show the highest price change (in producer prices)? In absolute values? And in percentage? How much?
- d) How large are the changes in GHG emissions (in Global Warming Potentials) in all of France? In which of the French regions is the changes largest?

**What differences can you see between the results? Why results differ?**



# Problems you might encounter

- Sometimes your sorting can disappear for no reason, you cannot see the tools etc. First just try again! Either try to change the rows and columns, expand the window to full screen, or open a new data view window.
- Sometimes it will be impossible to close a window. First try to close other windows, then close the GUI and restart.
- Be careful when clicking on the area above the drop-down menus before exporting results, to make sure that you have the data you wanted, and not, e.g., income instead of hectares.

# Recap



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You learned how to:

- ✓ Load the results into the viewer
- ✓ Find selected tables in the result viewer
- ✓ Customize result tables by transposing rows and columns
- ✓ Compare relative and absolute values
- ✓ Select sub-sets of the results
- ✓ Sort results