

# OLAP Cube. User manual

Connecting through Microsoft Excel 2010 and ESRI ArcGIS



# Index

- [What is Olap?](#)
- [How to use the cube?](#)
- [Connecting to the OFFLINE Cube with Microsoft Excel 2003](#)
- [Connecting to the OFFLINE Cube with Microsoft Excel 2010](#)
- [Working with the Cube with Microsoft Excel 2003](#)
- [Working with the Cube with Microsoft Excel 2010](#)
- [Practical Info](#)
- [Connecting through ESRI ArcGIS](#)

# What is Olap?

- OLAP (Online Analytical processing) is a category of software tools designed to help you to extract **information** from your **data** to support better **decision-making**.

## DATA

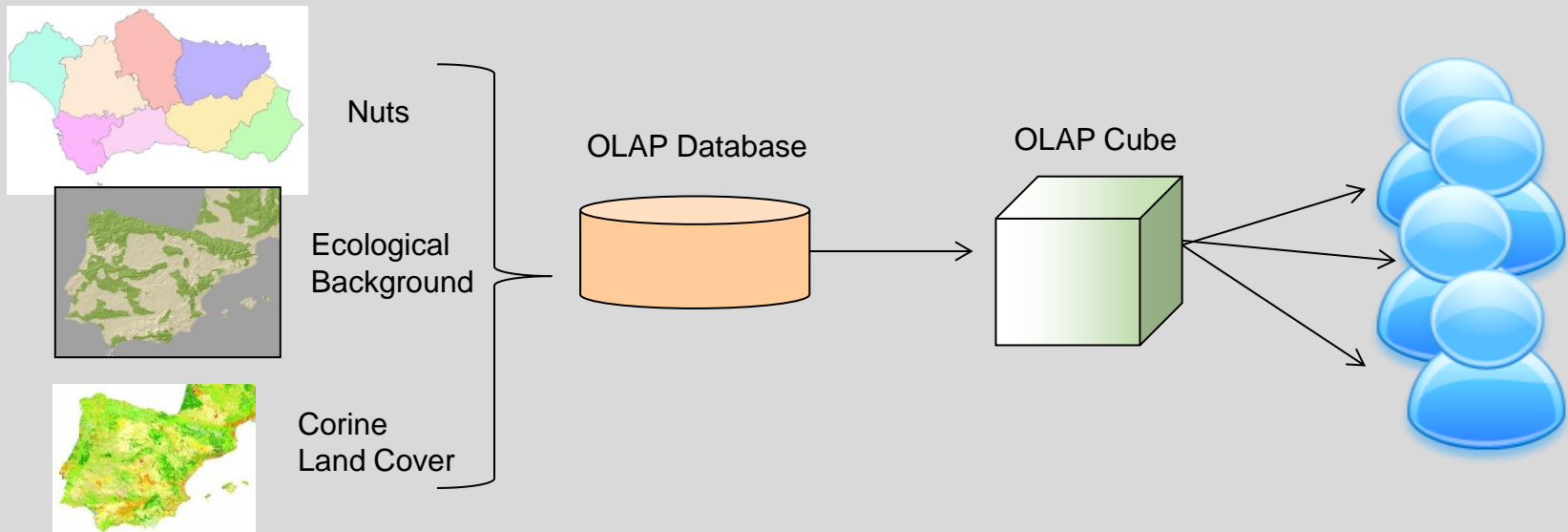
Raw material, plain facts

## INFORMATION

Data processed, structured or presented in a given context so as to make them useful.

# What is Olap?

- Most operational databases (OLTP- Online Transaction Processing) are designed to store your data, not to help you analyze it as OLAP does. For that reason it is called Online **Analytical** processing.
- OLAP allows users to analyse database information from multiple sources at one time.



# What is Olap?

- While relational databases are considered to be two-dimensional, OLAP is **multidimensional**, meaning the information can be compared in many different ways.
- The **OLAP Cube** consists on some countable variables (measures) such as ha. aggregated by a set of **dimensions**:
  - **Spatial** dimensions (e.g. NUTS regions).
  - **Thematic** dimensions (e.g. land cover).
  - **Temporal** dimensions.

# What is Olap?

Dimensions: Represents the themes of interest for a user.

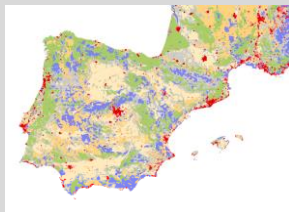
**Geospatial:** Nuts



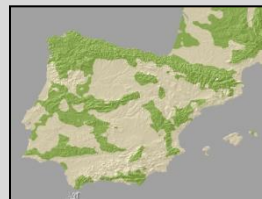
**Temporal:** Years 90-00-06



**Thematic :** Land use changes



Dominant landcover types



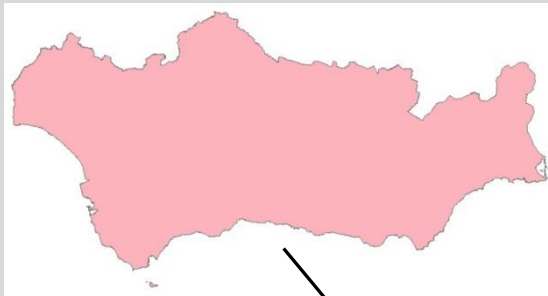
Ecological Background



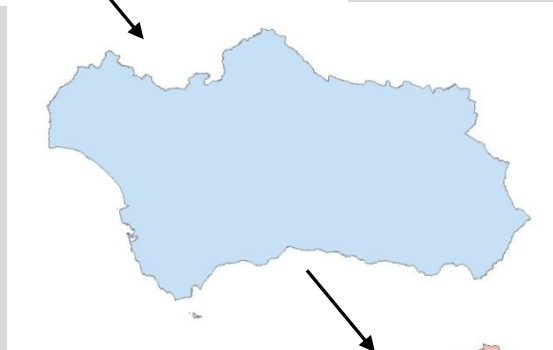
Corine Land Cover

# What is Olap?

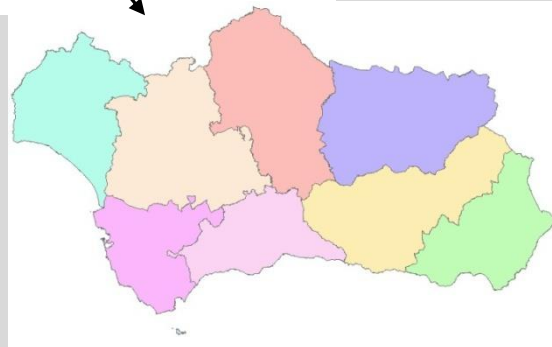
Dimensions are organised, hierarchically into levels.



**NUTS 1**



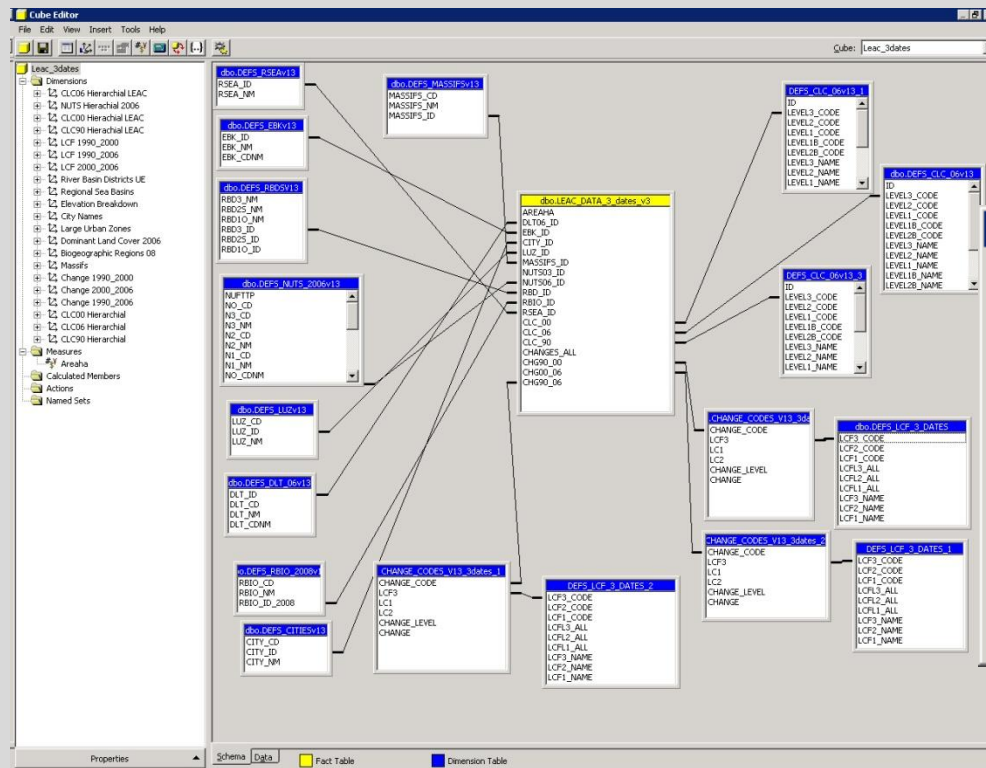
**NUTS 2**



**NUTS 3**

# What is Olap?

- In order to process database information using OLAP, an OLAP server is required to organize and compare the information.
- In this case, the Microsoft Analysis Services 2000 is used.



View of OLAP cube from the OLAP Server

**About Microsoft SQL Server Analysis Services**

Microsoft SQL Server Analysis Services  
Microsoft Corporation  
Version: 8.00.194

Microsoft SQL Server Analysis Services  
© 1988-2000 Microsoft Corp. All rights reserved.

OK



## How to use the cube?

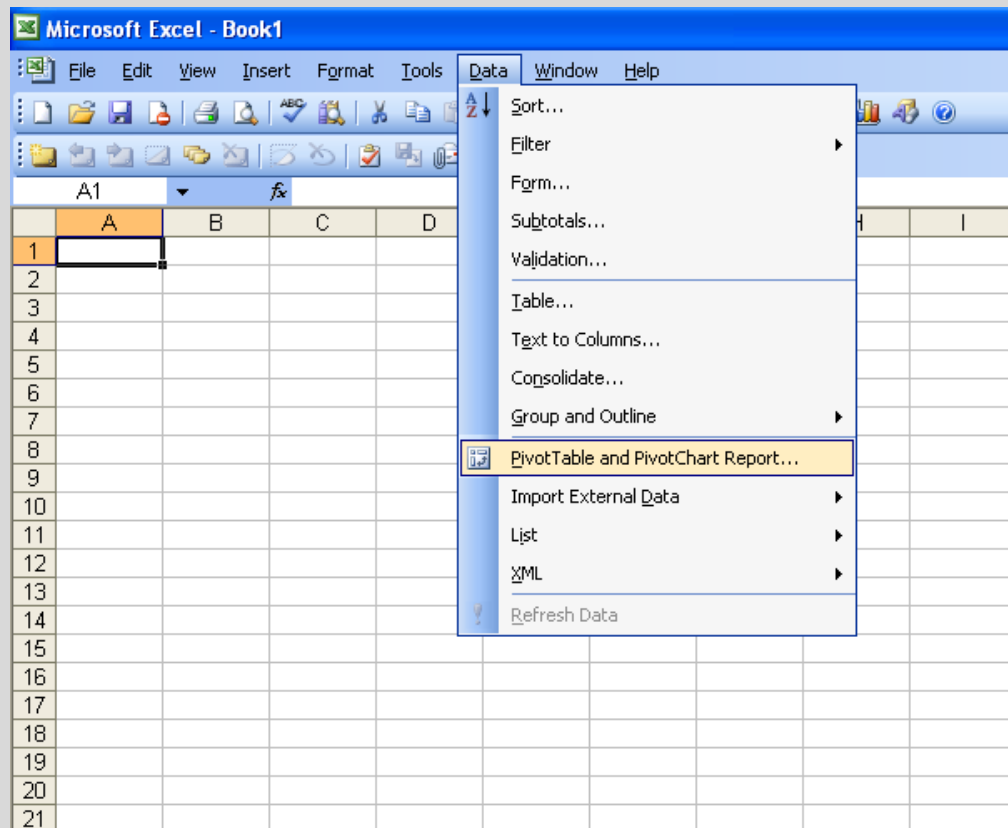
- An OLAP Cube can be queried **online** and **offline**.
- So far, the online connection has not been implemented for outside ETCSIA/UAB consortium members.
- In order to test the cube, we provide a single file **.CUB** which works offline. An offline cube file is a file that stores a portion of the source data from an OLAP server database. This allows you to continue to make changes to PivotTable and PivotChart reports when the server is unavailable or you're disconnected from the network.
- The **.CUB** file can be connected to and queried from Microsoft Excel 2010 with a few steps detailed in the following slides.

# Connecting to the Offline Cube...

(With Microsoft Excel 2003)

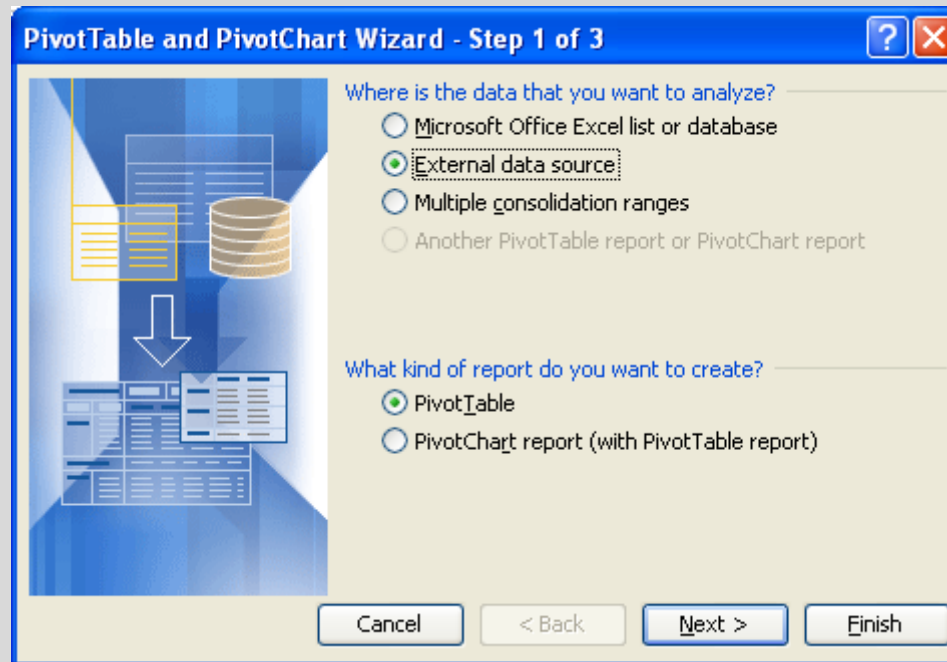
# Connecting to the OFFLINE Cube with MS Excel 2003

Select “Pivot Table...” in the Data Menu



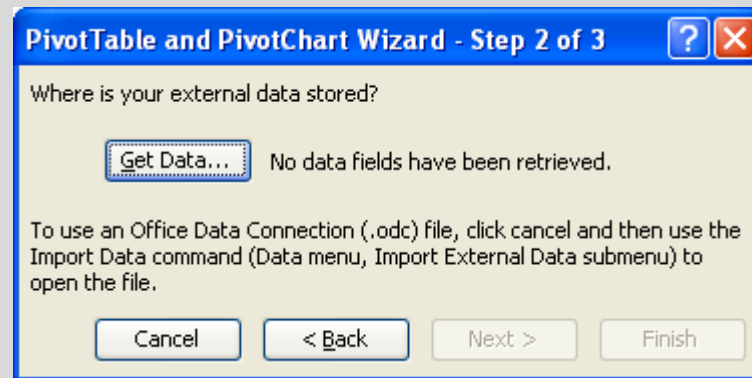
## Connecting to the OFFLINE Cube with MS Excel 2003

Select “External data source” and Pivot Table as report type



## Connecting to the OFFLINE Cube with MS Excel 2003

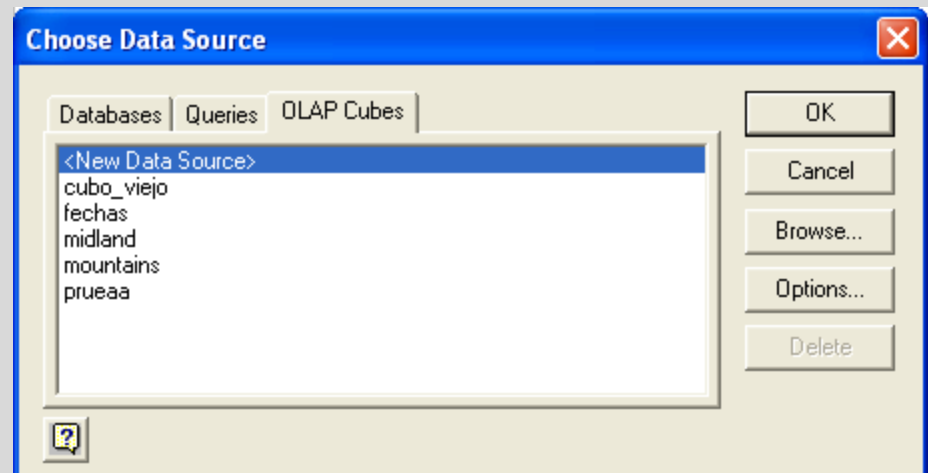
Click on “Get Data...”



Go to “OLAP Cubes” Tab

Choose <New Data Source>

Click OK

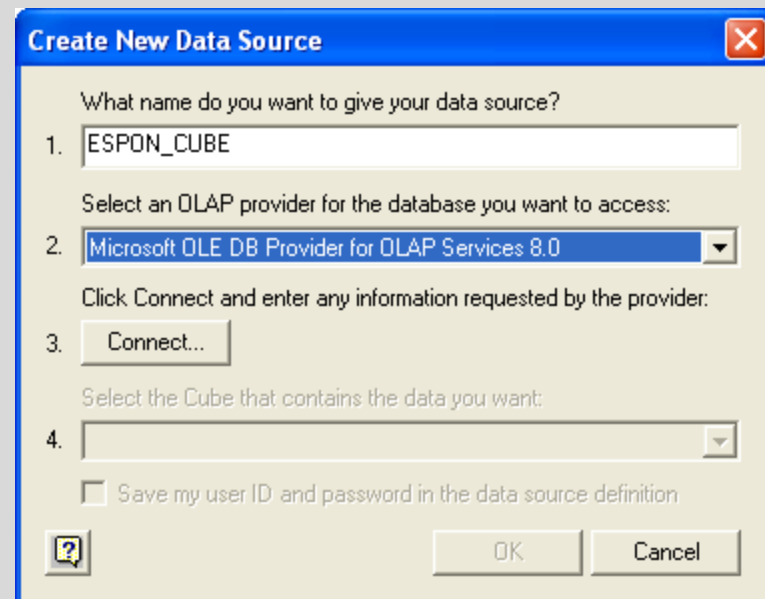


## Connecting to the OFFLINE Cube with MS Excel 2003

Write down a name for your connection

Choose “MS OLE DB Provider for OLAP Services 8.0 (note: this component should be installed in order to connect to an OLAP Cube)

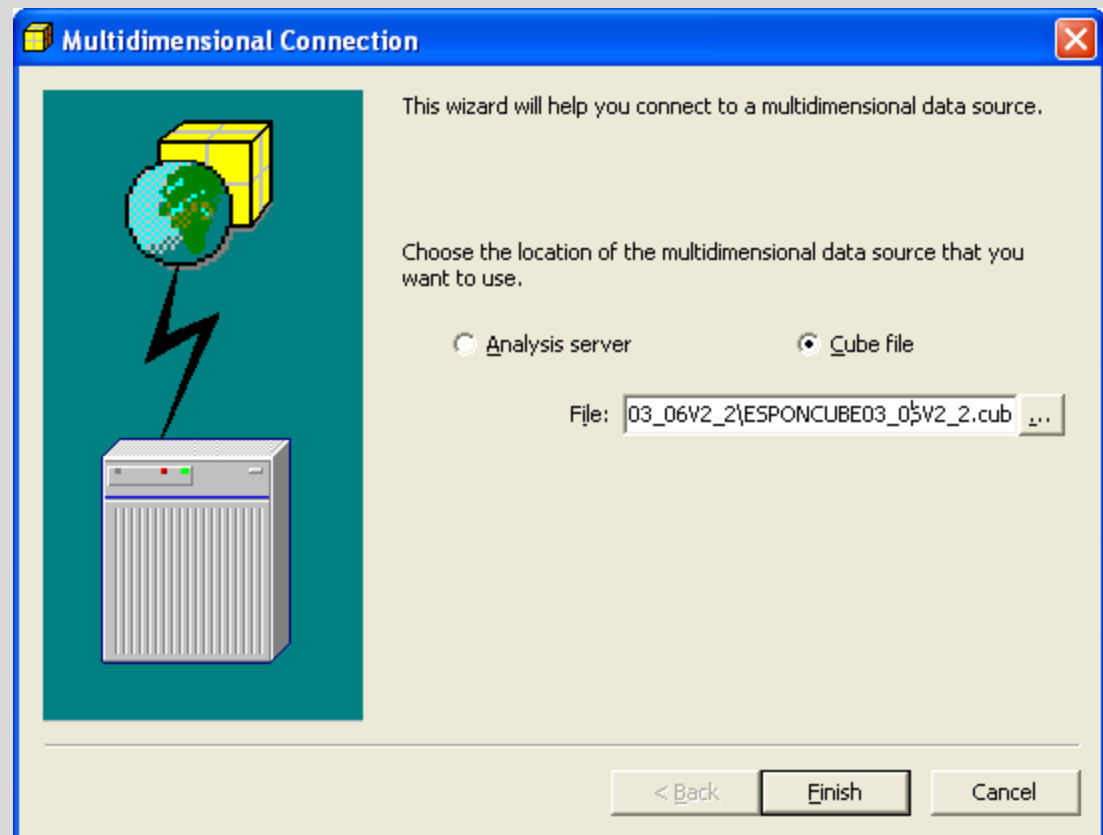
Click Connect... button



## Connecting to the OFFLINE Cube with MS Excel 2003

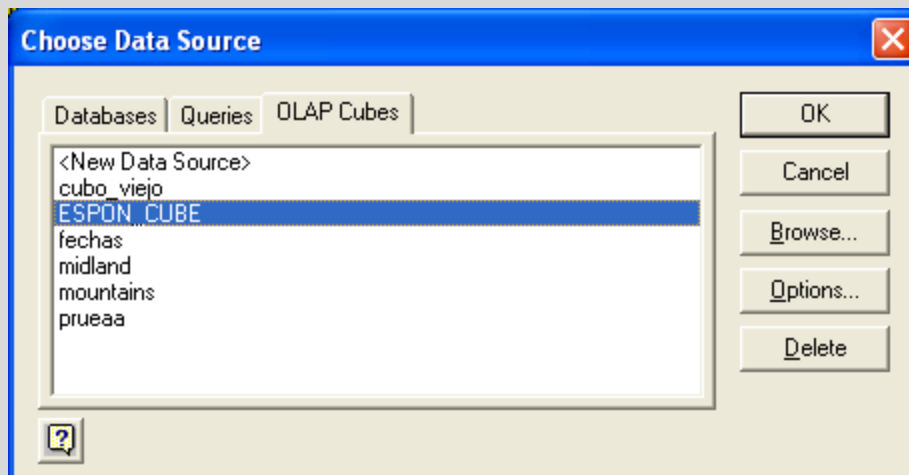
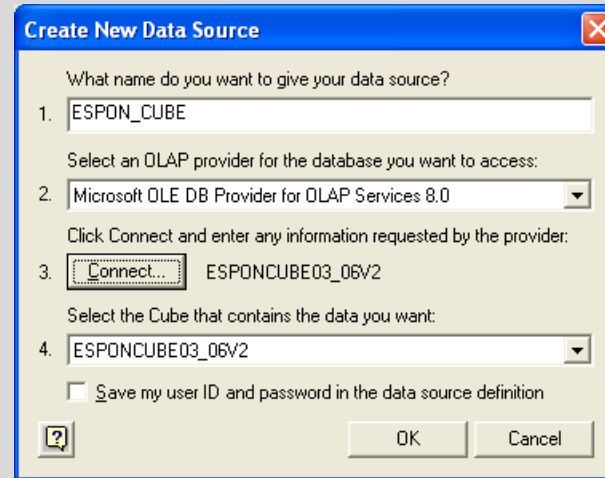
Choose Cube file, and browse and choose the .cub file in your computer

Click Finish



# Connecting to the OFFLINE Cube with MS Excel 2003

Click OK

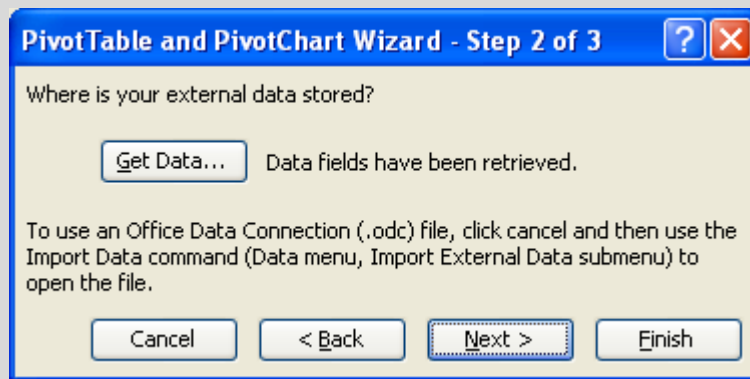


Choose the connection just created

Click OK



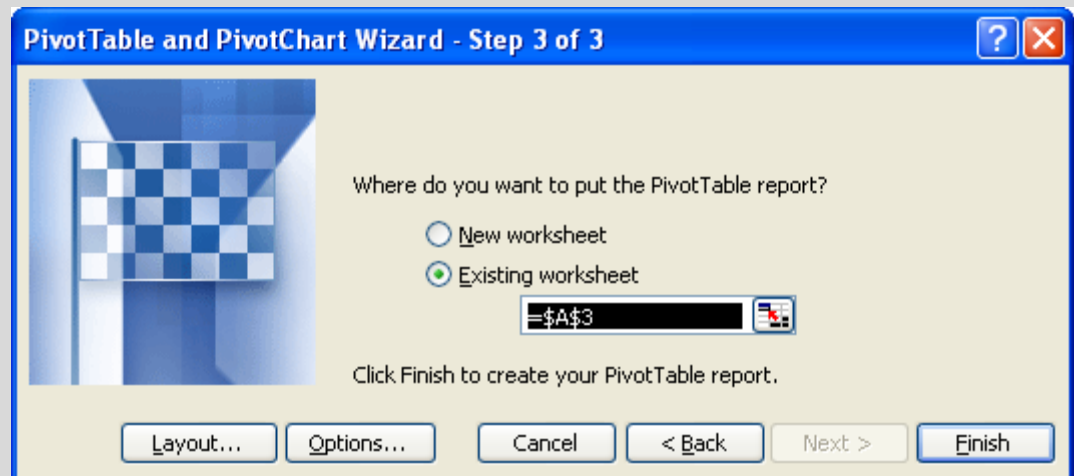
## Connecting to the OFFLINE Cube with MS Excel 2003



Click “Next >”

Choose either a new or existing worksheet

Click Finish

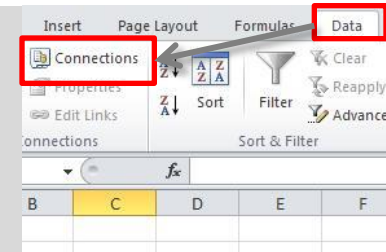


# Connecting to the Offline Cube...

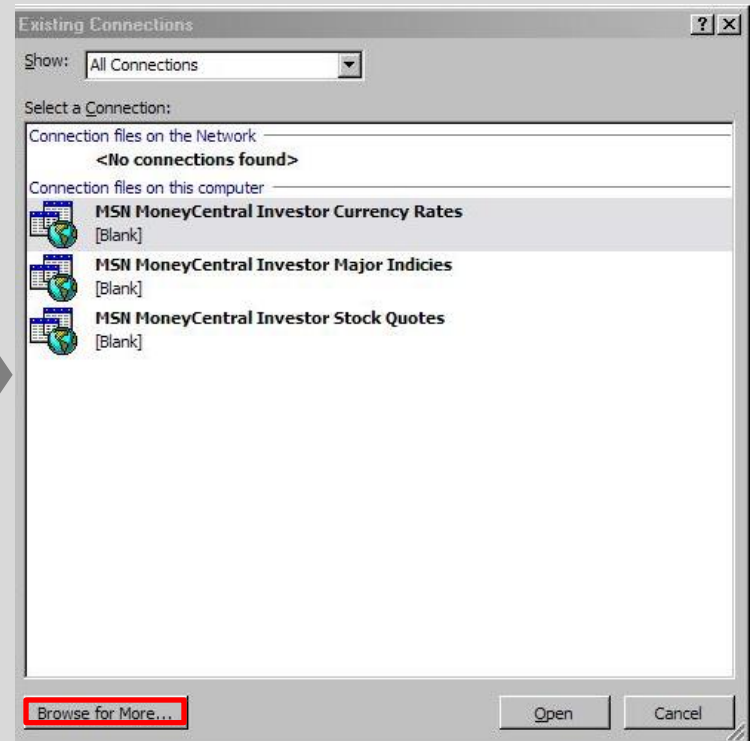
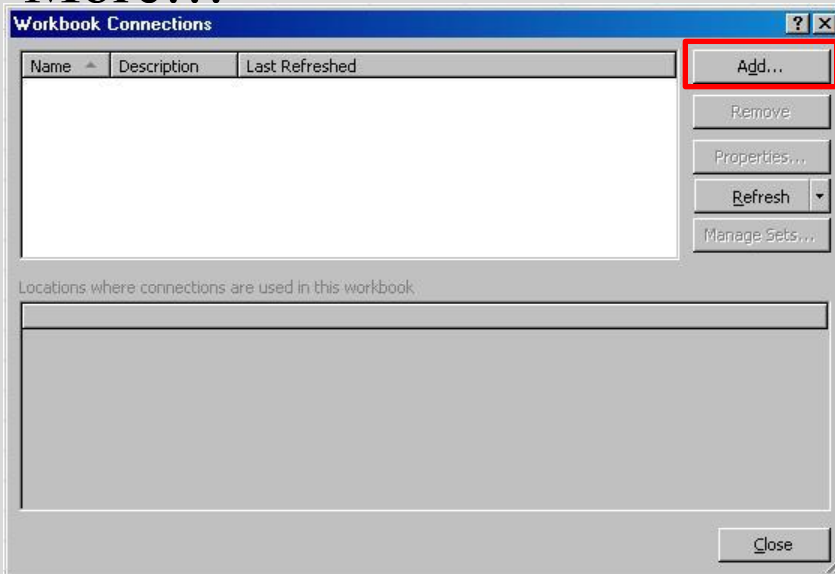
(With Microsoft Excel 2010)

# Connecting to the OFFLINE Cube with MS Excel 2010

Select “Connections” in the *Data* Menu

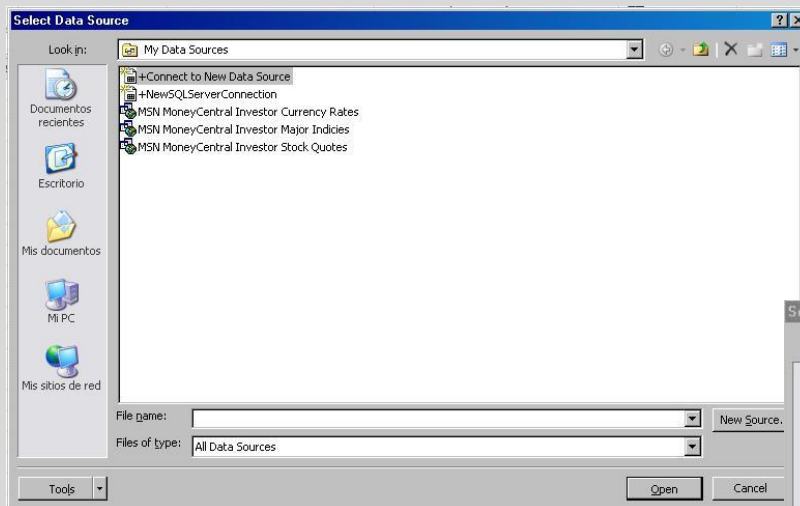


Then, select “Add” and in the next window “Browse for More...”

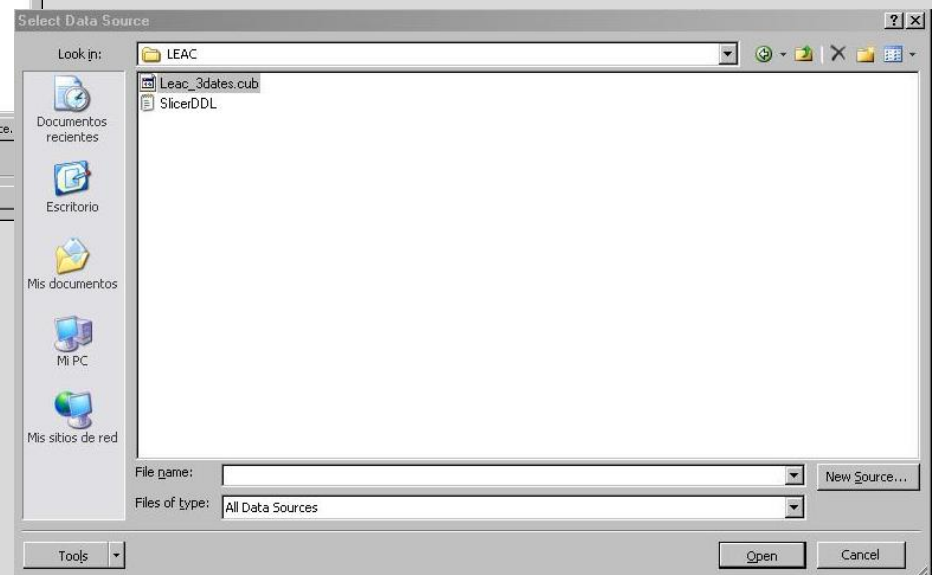


## Connecting to the OFFLINE Cube with MS Excel 2010

In the window search for the folder where you have your .cub file...



Select it and click  
“Open”



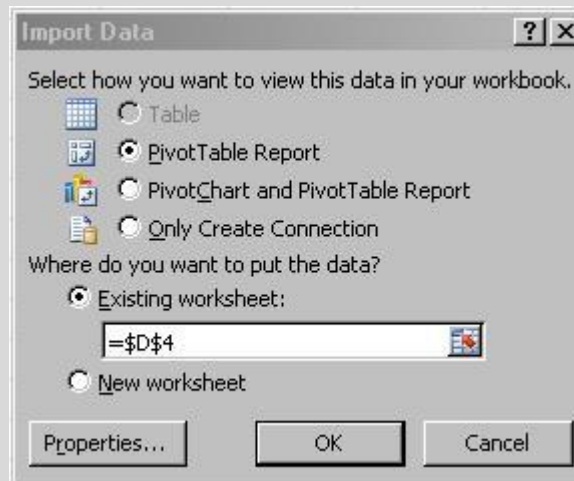
## Connecting to the OFFLINE Cube with MS Excel 2010

Select how do you want to view the data.

The default is as Pivot Table Report

Select the rows and columns where you want to see the results and

Click Ok





# Working with the CUBE

(With Microsoft Excel 2003)

# The Cube is ready to be used!

Microsoft Excel - Book1

File Edit View Insert Format Tools Data Window Help

Type a question for help

A3

Drop Page Fields Here

Drop Column Fields Here

Drop Row Fields Here

Drop Data Items Here

PivotTable Field List

Drag Items to the PivotTable report

- Biogeographic Regions 08
- CLC00 Hierarchial
- CLC00 Hierarchial LEAC
- CLC06 Hierarchial
- CLC06 Hierarchial LEAC
- Dominant Land Cover 00
- Dominant Land Cover 06
- Elevation Breakdown
- Large Urban Zones
- Massif Areas
- Massifs
- Nuts 03 Hierarchial
- Nuts 06 Hierarchial
- Nuts 3 Code 03
- Nuts 3 Code 06
- Regional Sea Basins
- River Basin Districts UE
  - Active people 2003
  - Active people 2006
  - GDP ME 2003
  - GDP ME 2006
  - Hectares
  - Unemployment 2003
  - Unemployment 2006

Add To Row Area

Ready NUM

# Querying the Cube

Drag & Drop dimensions (e.g. Nuts 3 Code 06) in the Row Area:

The screenshot shows a Microsoft Excel window with a PivotTable. The PivotTable is located in cells A3:G3. The PivotTable Field List on the right shows the following dimensions:

- Biogeographic Regions 08
- CLC00 Hierarchial
- CLC00 Hierarchial LEAC
- CLC06 Hierarchial
- CLC06 Hierarchial LEAC
- Dominant Land Cover 00
- Dominant Land Cover 06
- Elevation Breakdown
- Large Urban Zones
- Massif Areas
- Massifs
- Nuts 03 Hierarchial
- Nuts 06 Hierarchial
- Nuts 3 Code 03
- Nuts 3 Code 06**
- Regional Sea Basins
- River Basin Districts UE
- Active people 2003
- Active people 2006
- GDP MI 2003
- GDP MI 2006
- Hectares
- Unemployment 2003
- Unemployment 2006

The PivotTable area contains the text "Drop Data Items Here". The PivotTable Field List shows "Nuts 3 Code 06" selected and added to the Row Area.



# Querying the Cube

Drag & Drop measures (e.g. GDP M€ 06) in the Data Area:

The screenshot shows Microsoft Excel with a PivotTable and the PivotTable Field List task pane. The PivotTable is located in the range A3:B48 and displays GDP M€ 2006 values for various Nuts 3 Code 06 categories. The PivotTable Field List task pane is open on the right, showing a list of available measures. The 'GDP M€ 2006' measure is highlighted in the list, and the 'Add To' dropdown is set to 'Data Area'.

Nuts 3 Code 06	Total
AD???	0,247751848
AL???	0,465693633
AT111	728,1931807
AT112	3193,773684
AT113	1770,642809
AT121	5713,880057
AT122	5451,836716
AT123	4243,001456
AT124	4732,672501
AT125	1898,205201
AT126	6112,046373
AT127	11524,59537
AT130	63493,5594
AT211	8336,695231
AT212	2819,554547
AT213	3623,138297
AT221	13133,97141
AT222	2040,074413
AT223	4726,079903
AT224	5342,382776
AT225	3869,352016
AT226	2434,436218
AT311	6298,746306
AT312	21018,23391
AT313	3483,482771
AT314	4646,092557
AT315	6150,905421
AT321	493,4053386
AT322	4655,104042
AT323	12759,38914
AT331	1117,082467
AT332	9166,609866
AT333	1153,767175
AT334	2950,55961
AT335	7492,388255
AT341	2947,880575
AT342	8252,260815
BA???	0
BE100	56130,90852
BE211	36432,08288
BE212	9929,114352
BE213	12295,41348
BE221	11591,85324
BE222	4739,696783

# Querying the Cube

Drag & Drop other measures (e.g. CLC06 hierarchial Level 1) in the Column Area:

	Artificial surfaces	Agricultural areas	Forest and semi natural areas	Wetlands	Water bodies
AD???	0	0,067579154	0,180172694	0,26949714	0
AL???	0,001209781	0,154561764	0,26949714	0,26949714	0
AT111	197,0577376	390,863028	150,252415	150,252415	0
AT112	1093,4802253	1743,400225	278,7536963	278,7536963	61,29181205
AT113	466,7078947	886,6163315	414,2395753	1,204954306	0,179907983
AT121	1443,833608	2682,674183	1453,895441	1453,895441	0,179907983
AT122	2022,892244	2030,112194	1398,791619	1398,791619	0
AT123	1653,11915	1807,431627	767,4337577	767,4337577	0
AT124	1274,770293	2178,709867	1205,322014	2,892318638	0
AT125	564,5829665	1229,536177	112,5733632	112,5733632	0
AT126	2472,993142	2698,316259	841,4419009	0,043189434	0
AT127	5814,556977	4350,371427	1289,392092	1289,392092	0
AT130	53534,35716	6007,550661	2544,116125	2544,116125	0
AT211	3372,28517	2424,762894	2106,98821	65,02180656	0
AT212	757,4505355	937,7760787	1057,212263	7,873403953	0
AT213	890,8433111	1584,004511	1090,363041	12,70503376	0
AT221	7371,855395	3267,906664	2479,971809	2479,971809	0
AT222	695,6500801	678,2732405	729,1404419	22,01796117	0
AT223	1793,718956	1418,787501	1511,254009	0,099508152	0
AT224	1156,609864	2715,199397	1454,275538	0,039632758	0
AT225	1064,139635	1749,272349	1005,268443	1005,268443	0
AT226	855,3774599	960,8277128	614,4895726	3,741472982	0
AT311	1441,176922	3782,656606	960,9372547	4,052804907	0
AT312	10953,73965	6815,117005	2727,602093	2727,602093	0
AT313	802,3627883	1690,708449	962,321704	0,398366798	0
AT314	1679,770591	1858,349371	898,0008046	5,128866641	0
AT315	1899,819163	2649,789047	1345,477748	1,321853435	0
AT321	133,5040451	170,6746037	185,3107194	2,916597038	0
AT322	1467,434483	1547,690556	1607,424558	8,466101429	0
AT323	5583,557845	4372,590977	2276,113871	16,64593996	0
AT331	291,1493218	307,832963	512,9734639	3,239103959	0
AT332	3848,717426	2605,488675	1896,273342	0,284830828	0
AT333	344,0473114	422,0271396	387,6927239	0	0
AT334	814,4927201	931,3467156	1185,76873	0,558141561	0
AT335	2153,317701	2445,814896	2443,059269	16,39981204	0
AT341	829,8928113	812,9687155	1280,428401	9,119393077	0
AT342	3437,133929	2325,481265	2125,966575	63,93234278	0
BA???	0	0	0	0	0
BE100	54072,64629	910,7753826	998,3918099	23,26175519	0
BE211	24526,19534	8516,797923	2518,1949	0	0
BE212	4036,588117	5029,268725	640,7872316	0	0
BE213	4538,629495	5968,667216	1540,943521	1,931434515	0
BE221	4717,981482	4967,486933	1601,83202	31,02599041	0
BE222	1729,070667	2291,756936	661,1209967	1,687437637	0



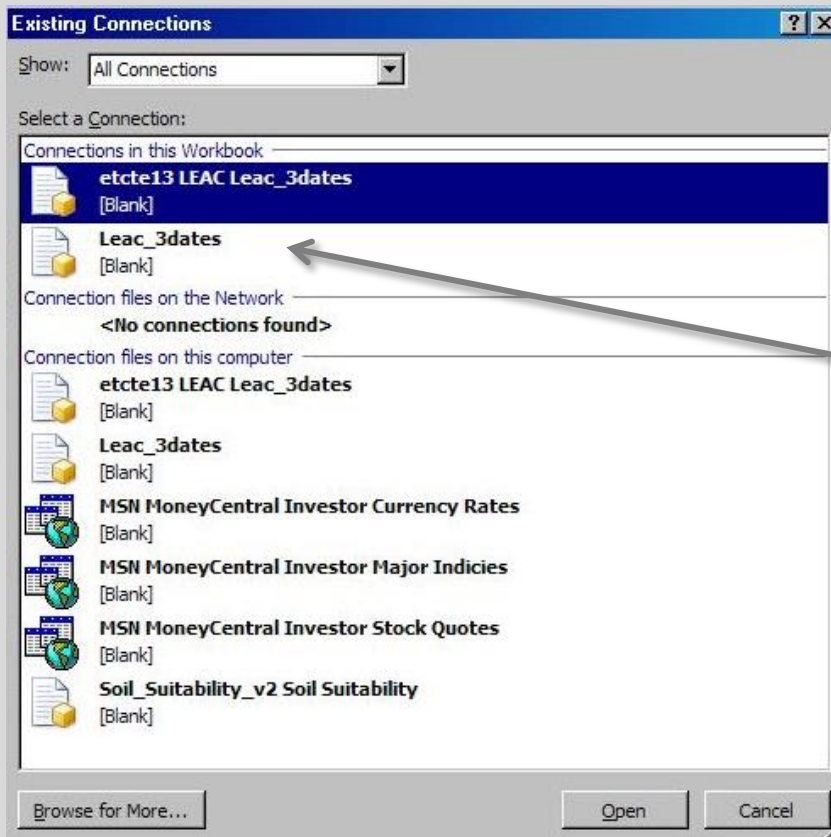
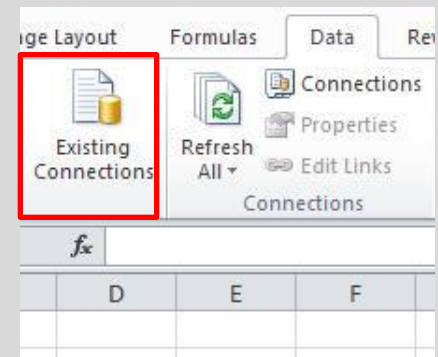
# Working with the CUBE

(With Microsoft Excel 2010)

# Working with the Cube with MS Excel 2010

(opening already loaded offline cubes)

Select “Existing Connections” in the *Data* Menu



Choose the Offline cube connection by selecting the respective previously saved connection and click Open...

# Working with the Cube with MS Excel 2010

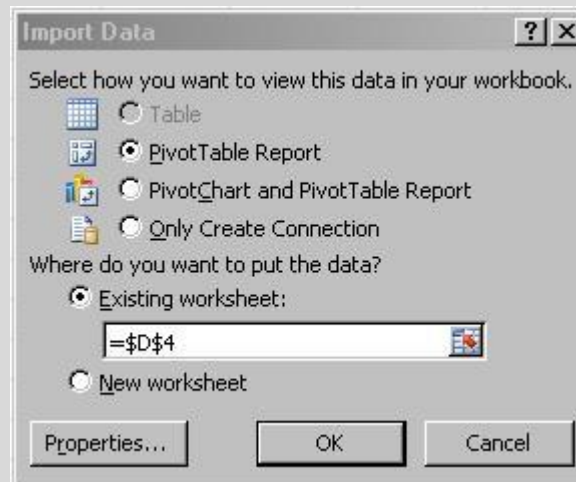
(opening already loaded offline cubes)

Select how do you want to view the data.

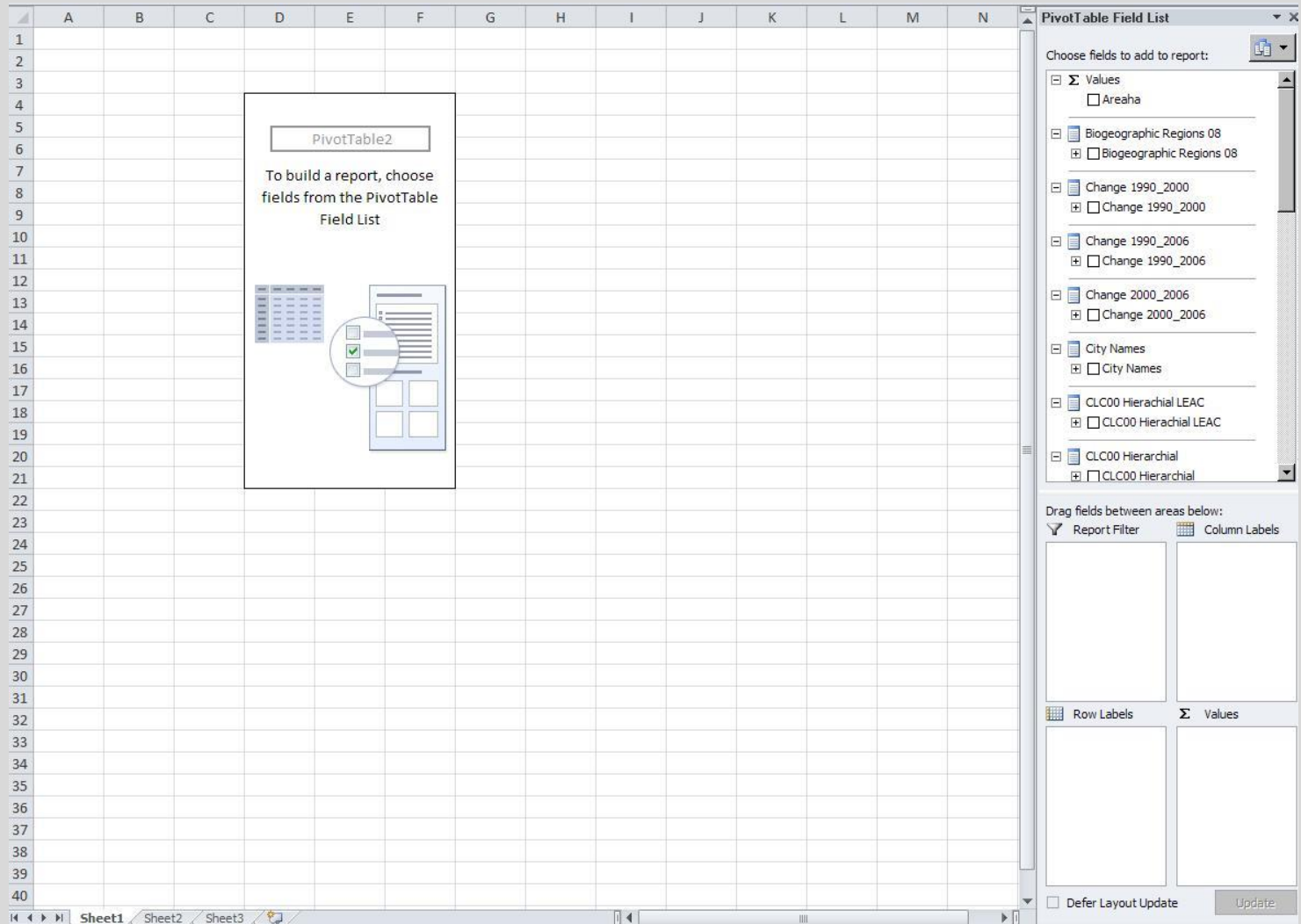
The default is as Pivot Table Report

Select the rows and columns where you want to see the results and

Click Ok



# The Cube is ready to be used!



The screenshot displays an Excel spreadsheet with a PivotTable named 'PivotTable2' in the center. The PivotTable is currently empty. To the right of the spreadsheet is the 'PivotTable Field List' task pane. The task pane shows a list of fields to be added to the report, including 'Values', 'Biogeographic Regions 08', 'Change 1990\_2000', 'Change 1990\_2006', 'Change 2000\_2006', 'City Names', 'CLC00 Hierachial LEAC', and 'CLC00 Hierachial'. Below the list, there are four areas for dragging fields: 'Report Filter', 'Column Labels', 'Row Labels', and 'Values'. The 'Report Filter' and 'Column Labels' areas are currently empty. The 'Row Labels' and 'Values' areas are also empty. The 'Defer Layout Update' checkbox is checked, and the 'Update' button is visible at the bottom right of the task pane.

**PivotTable2**

To build a report, choose fields from the PivotTable Field List

**PivotTable Field List**

Choose fields to add to report:

- Values
  - Areaha
- Biogeographic Regions 08
  - Biogeographic Regions 08
- Change 1990\_2000
  - Change 1990\_2000
- Change 1990\_2006
  - Change 1990\_2006
- Change 2000\_2006
  - Change 2000\_2006
- City Names
  - City Names
- CLC00 Hierachial LEAC
  - CLC00 Hierachial LEAC
- CLC00 Hierachial
  - CLC00 Hierachial

Drag fields between areas below:

Report Filter     Column Labels

Row Labels     Values

Defer Layout Update    Update

# Querying the Cube

Select the checkboxes with the data you want to see and combine in the Pivot Table. (Example: Changes 2000-2006 by Biogeographical Regions 2008)

	A	B	C	D	E	F	G	H	I	J	K	L	M
1													
2													
3													
4				Row Labels	Areaha								
5				Changes	5863390								
6				Alpine	192962								
7				Atlantic	652134								
8				Black sea	97025								
9				Boreal	1875451								
10				Continental	778758								
11				Macaronesia	7210								
12				Mediterranean	1949132								
13				Pannonian	306623								
14				Steppic	4095								
15				No changes	542132297								
16				Alpine	60136147								
17				Atlantic	67556389								
18				Black sea	11970516								
19				Boreal	93763519								
20				Continental	137679160								
21				Macaronesia	736473								
22				Mediterranean	147234035								
23				Pannonian	19306990								
24				Steppic	3749068								
25				Unknown	39038551								
26				Alpine	17203								
27				Atlantic	25556743								
28				Black sea	11187								
29				Boreal	174619								
30				Continental	52318								
31				Macaronesia	31								
32				Mediterranean	13213820								
33				Pannonian	657								
34				Steppic	11973								
35				Grand Total	587034238								

By selecting “Row Labels” you can filter the values you want to show..

## Practical Info

- Play around with the ESPON OLAP Cube to build new queries.
- You can also build Pivot charts selecting this option in the menu import data.
- If you are using MS Excel 2010, please check:  
<http://office.microsoft.com/en-us/excel-help/CH010369145.aspx?CTT=97>
- Documentation about OLAP and OLAP Cubes:  
[http://en.wikipedia.org/wiki/Online\\_analytical\\_processing](http://en.wikipedia.org/wiki/Online_analytical_processing)  
[http://en.wikipedia.org/wiki/OLAP\\_cube](http://en.wikipedia.org/wiki/OLAP_cube)



# Compatibility

- OLAP Cubes are compatible to work with Microsoft Excel 2003 and 2007
- To connect using Microsoft Excel 2010 32 bits version you should install first PTS (Pivot Table Services) Service Pack 3 for AS 2000
- Olap cubes are not compatible to be open with 64 bits version of Microsoft Office 2010



# Connecting through ESRI ArcGIS

# Connecting through ESRI ArcGIS

Check the website <http://www.esri.com/software/arcgis/extensions/olap/download.html> to see the requirements needed to install the OLAP for ArcGIS Add-on and how to use the extension.

This is a way to connect to cubes from **ArcGIS 9.3 and previous versions**. Unfortunately, **there is not still information** on developments regarding the possibility to connect to OLAP cubes through **ArcGIS 10**.

Enjoy!

**UAB**

Universitat Autònoma de Barcelona

---

For further info:

[roger.milego@uab.cat](mailto:roger.milego@uab.cat)  
[mariajose.ramos@uab.cat](mailto:mariajose.ramos@uab.cat)