AARHUS UNIVERSITY

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Linking N flows in 3B*, 3D** and 5.B.2***: emissions of N gasses (NH_3, NO)

* Animal husbandry and manure management
** Crop production and agricultural soils
*** Anaerobic digestion for biogas production

Interaction between chapter methodologies

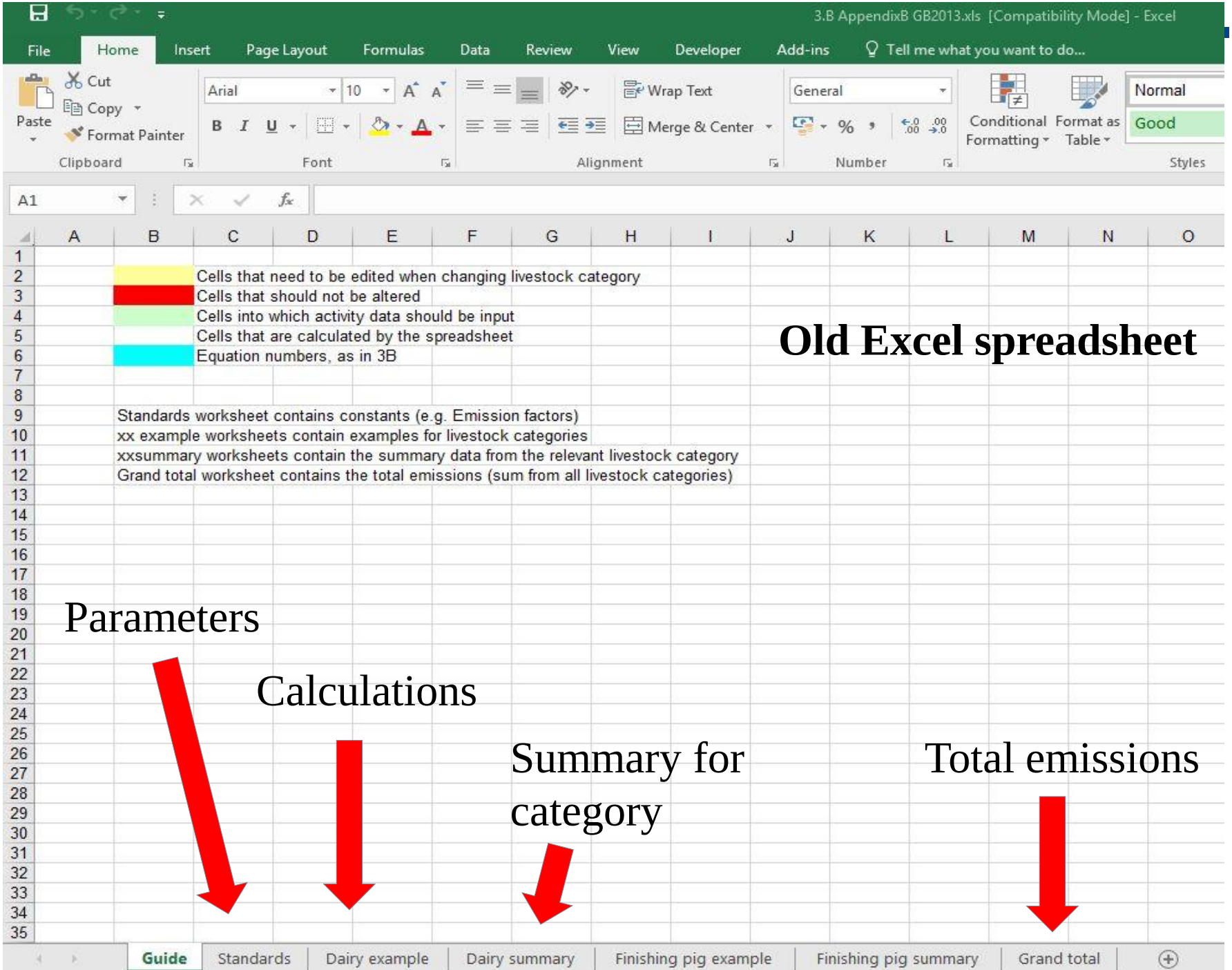
- Manure is increasingly used as a feedstock in biogas production
  - Mainly a measure to reduce greenhouse gas emissions from manure management
- Biogas production from energy crops is increasing

Changes to chapter methodologies

- Emissions from field-applied manure are calculated in 3B but reported in 3D
- Need to include interaction with 5.B.2
  - Emissions from manure used for biogas production
- Changes made to 3B:
  - Account for manure used for biogas production (removed from 3B)
  - Account for emissions from biogas digestate applied to soil
- Changes made to 5B2:
  - Account for manure used for biogas production (imported from 3B)
  - Account for biogas digestate applied to soil (exported to 3B)
- Changes are for clarification only
  - No changes to the underlying methodology

New Excel spreadsheet

- Excel spreadsheet was associated with chapter 3B
  - Did not have the resources to update this spreadsheet to account for interaction with 5.B.2.
- Excel spreadsheet substantially modified
  - Now uses Visual Basic routine
  - Produces tab-separated (i.e. Excel readable) output files


3.B AppendixB GB2013.xls [Compatibility Mode] - Excel
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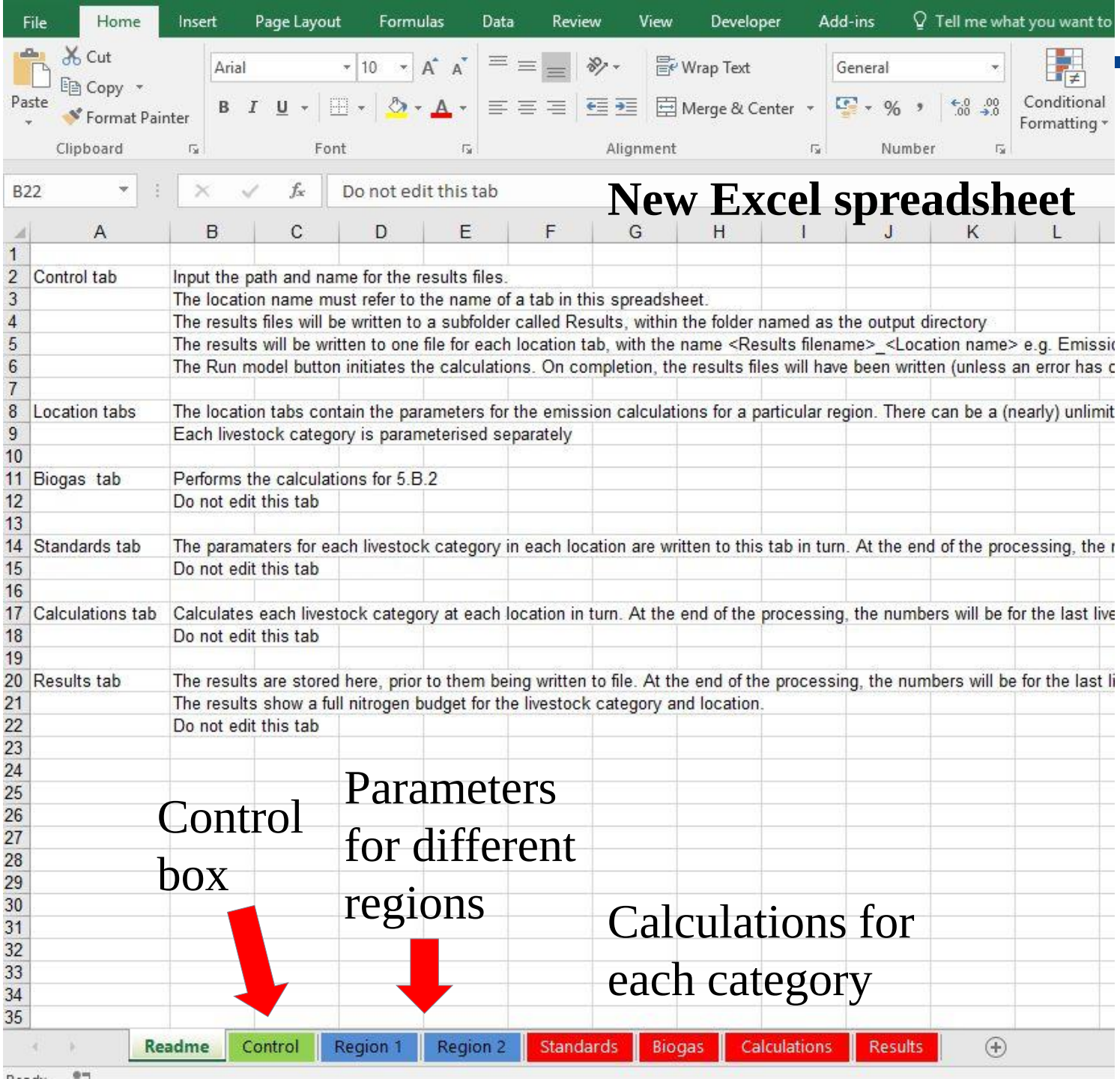
A1
Cells that need to be edited when changing livestock category
Cells that should not be altered
Cells into which activity data should be input
Cells that are calculated by the spreadsheet
Equation numbers, as in 3B
Standards worksheet contains constants (e.g. Emission factors)
xx example worksheets contain examples for livestock categories
xxsummary worksheets contain the summary data from the relevant livestock category
Grand total worksheet contains the total emissions (sum from all livestock categories)
Old Excel spreadsheet
Parameters
Calculations
Summary for category
Total emissions
Guide
Standards
Dairy example
Dairy summary
Finishing pig example
Finishing pig summary
Grand total



	A	B
1		
2	Control tab	Input the path and name for the results files.
3		The location name must refer to the name of a tab in this spreadsheet.
4		The results files will be written to a subfolder called Results, within the folder named as the output directory
5		The results will be written to one file for each location tab, with the name <Results filename>_<Location name> e.g. Emissio
6		The Run model button initiates the calculations. On completion, the results files will have been written (unless an error has c
7		
8	Location tabs	The location tabs contain the parameters for the emission calculations for a particular region. There can be a (nearly) unlimit
9		Each livestock category is parameterised separately
10		
11	Biogas tab	Performs the calculations for 5.B.2
12		Do not edit this tab
13		
14	Standards tab	The paramaters for each livestock category in each location are written to this tab in turn. At the end of the processing, the r
15		Do not edit this tab
16		
17	Calculations tab	Calculates each livestock category at each location in turn. At the end of the processing, the numbers will be for the last live
18		Do not edit this tab
19		
20	Results tab	The results are stored here, prior to them being written to file. At the end of the processing, the numbers will be for the last li
21		The results show a full nitrogen budget for the livestock category and location.
22		Do not edit this tab
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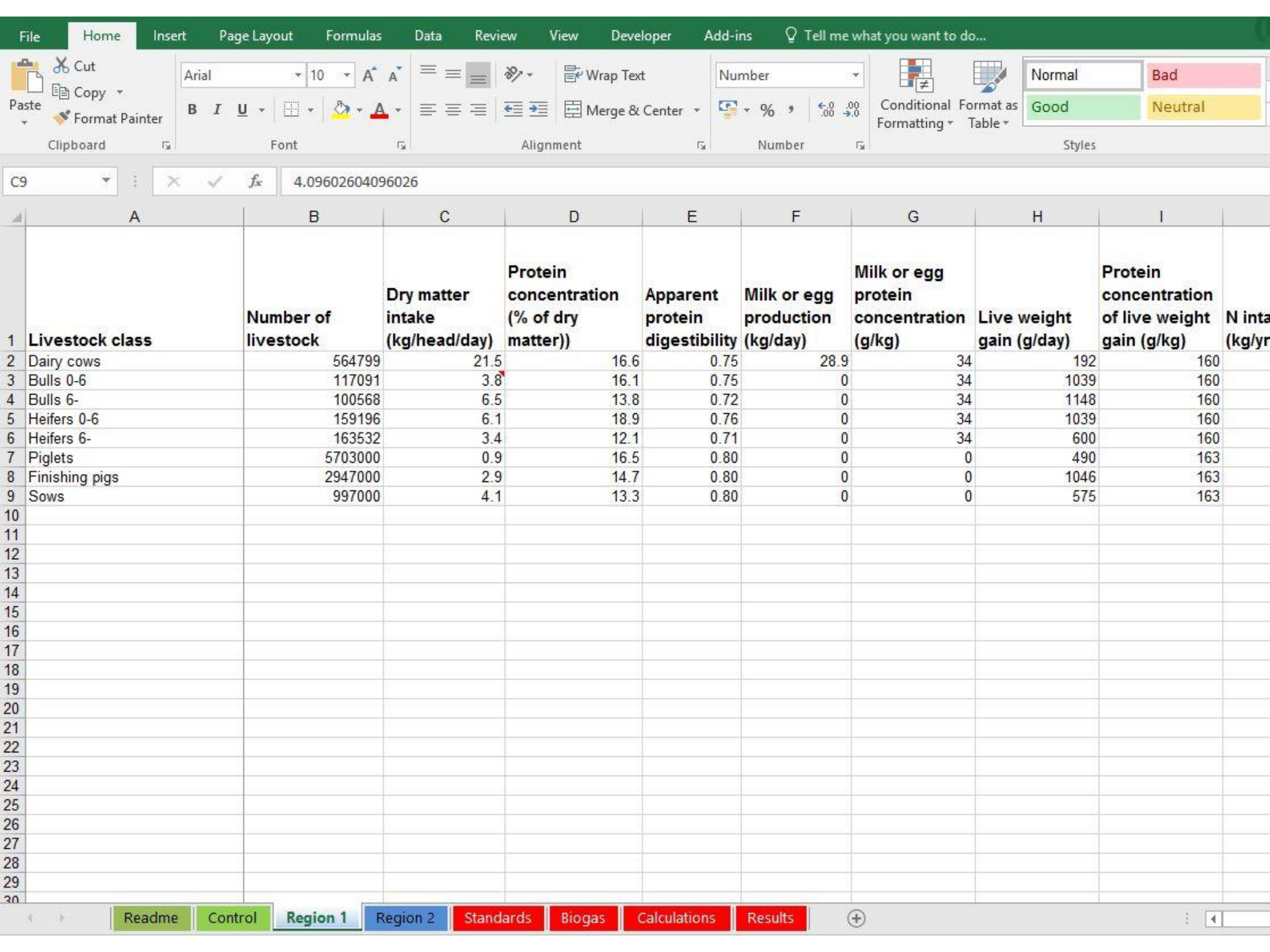

File Home Insert Page Layout Formulas Data Review View Developer Add-ins Tell me what you want to do...

Cut Copy Format Painter Paste — Clipboard

Arial 10 — Font

Wrap Text Merge & Center — Alignment

Number — Number

Conditional Formatting Format as Table — Styles

Normal Bad Good Neutral

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	A	B	C	D	E	F	G	H	I
1	**Livestock class**	**Number of livestock**	**Dry matter intake (kg/head/day)**	**Protein concentration (% of dry matter))**	**Apparent protein digestibility**	**Milk or egg production (kg/day)**	**Milk or egg protein concentration (g/kg)**	**Live weight gain (g/day)**	**Protein concentration of live weight gain (g/kg)**	**N inta (kg/yr**
2	Dairy cows	564799	21.5	16.6	0.75	28.9	34	192	160	
3	Bulls 0-6	117091	3.8	16.1	0.75	0	34	1039	160	
4	Bulls 6-	100568	6.5	13.8	0.72	0	34	1148	160	
5	Heifers 0-6	159196	6.1	18.9	0.76	0	34	1039	160	
6	Heifers 6-	163532	3.4	12.1	0.71	0	34	600	160	
7	Piglets	5703000	0.9	16.5	0.80	0	0	490	163	
8	Finishing pigs	2947000	2.9	14.7	0.80	0	0	1046	163	
9	Sows	997000	4.1	13.3	0.80	0	0	575	163	
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Readme Control Region 1 Region 2 Standards Biogas Calculations Results

EEA Guidebook maintenance project

- Continue to use Excel?
  - Other technical solutions may be available
- Need volunteers to test any new/revised tool
  - Spend time testing
  - Get free advice