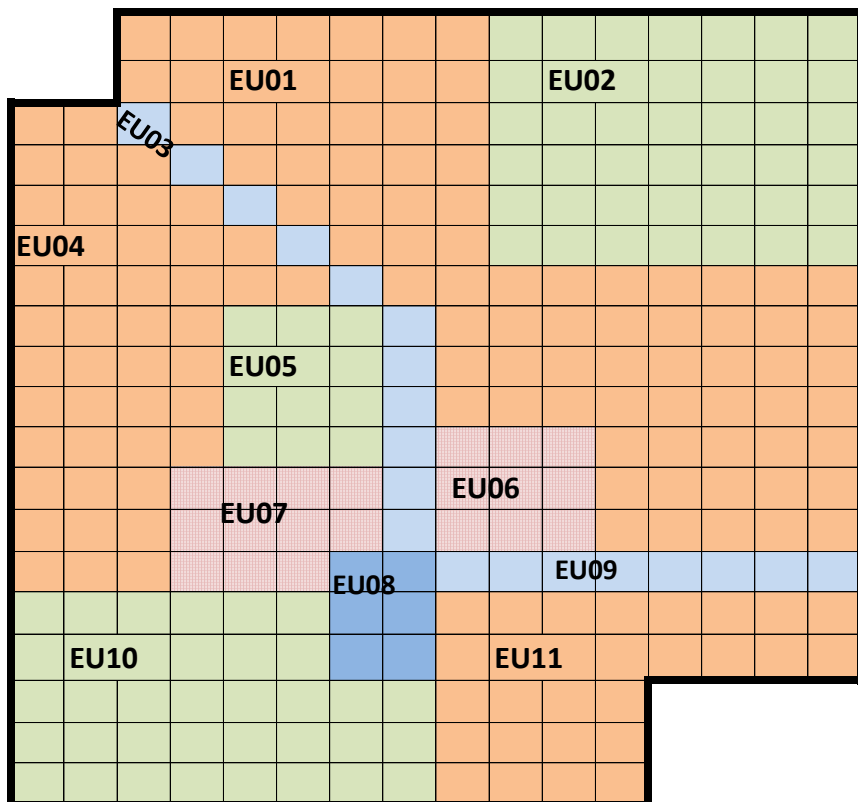


Spatial Units: Group Exercise 1: Calculate area of each EU and EU type



Note: One BSU = 250m*250m = 6.25 ha

EAU area = 288 BSUs = 18 km²

1 ha = (100m x 100m) = 10,000m²

1 km² = 100 ha = 1,000,000m²

EU Table

EU	BSU count	Area (km ²)
EU01 = Herbaceous crops		
EU02 = Tree covered areas		
EU03 = Inland water bodies		
EU04 = Herbaceous crops		
EU05 = Tree covered areas		
EU06 = Artificial surfaces (urban)		
EU07 = Artificial surfaces (urban)		
EU08 = Shrubs..regularly flooded (wetland)		
EU09 = Inland water bodies		
EU10 = Tree covered areas		
EU11 = Herbaceous crops		
Total		

Summary Table

EU Type	BSU count	Area (km ²)
Artificial surfaces (urban)		
Herbaceous crops		
Tree covered areas		
Inland water bodies		
Shrubs..regularly flooded (wetland)		
Total		

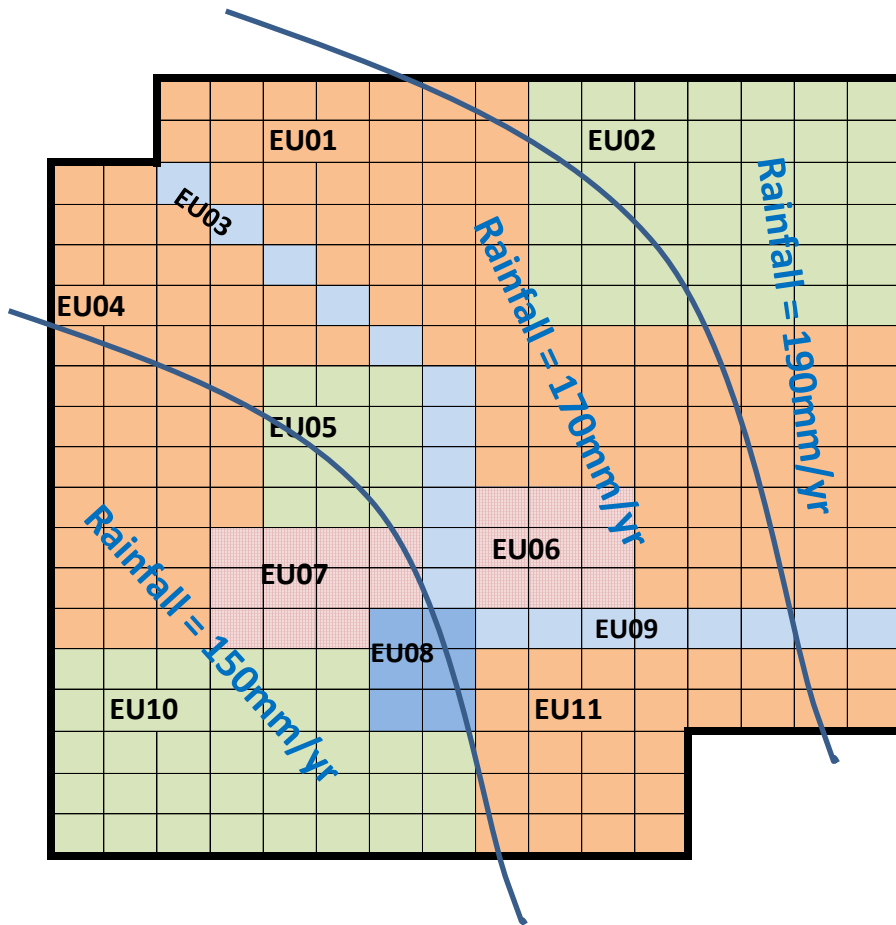
Note: 1 Km² = BSU count / 16

Instructions: (1) Count the BSUs in each EU and record in the BSU Count column of the EU Table.

(2) Calculate the area for each EU

(3) Add the BSU Count and Area for each EU type and record in the Summary Table

Spatial Units: Group Exercise2: Calculate average rainfall (mm/year) for each EU



Rainfall table

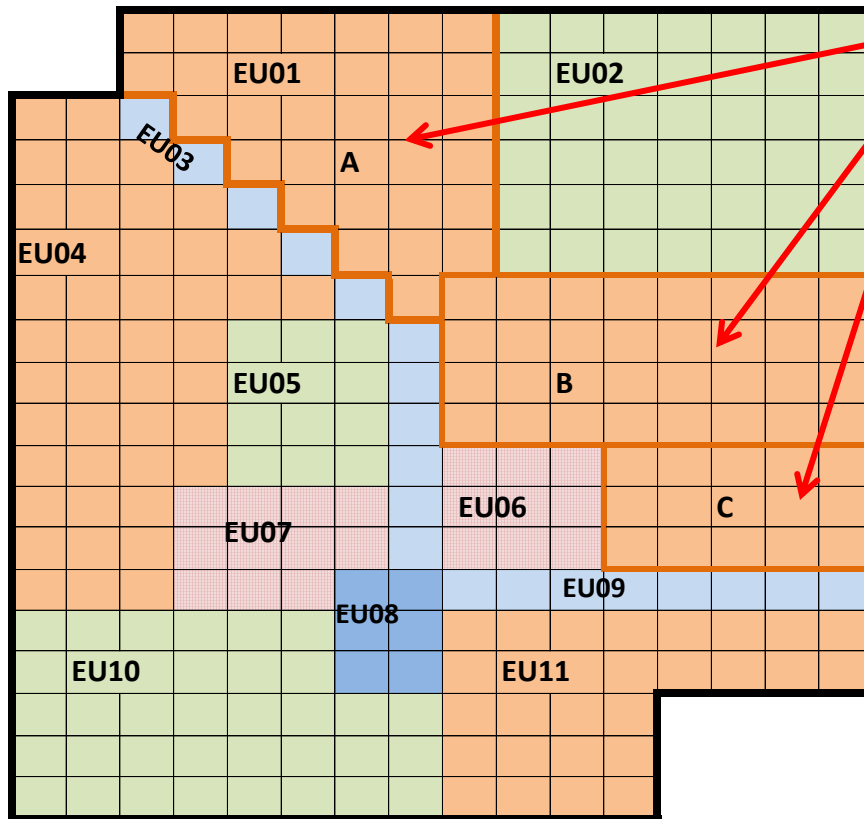
EU02	BSU Count	Total rainfall (mm)	
A: Rainfall = 190mm/yr			=BSU*190
B: Rainfall = 170mm/yr			=BSU*170
Total			= A + B

Rainfall summary table

	BSU Count	Average rainfall (mm)	
EU02 average Rainfall			=(A+B)/(BSU Count)

- Instructions: (1) For EU02 only, count the number of BSU in each rainfall band. Record in the BSU Count column of the Rainfall Table. Count partial BSUs as well.
 (2) Calculate the Total rainfall
 (3) Calculate the Total BSU Count for EU02.
 (4) Calculate the Average rainfall for EU02 (Total rainfall/total BSU count)

Spatial Units: Group Exercise3: Calculate average production (Tonnes/ha) for EU01



Farm productivity

Farm	Production (tonnes)	BSU Count	Productivity (tonnes/ha)
A	6,500		
B	9,000		
C	3,200		

=Production / BSU / 16

=Production / BSU / 16

=Production / BSU / 16

EU01 Productivity

	Total Production	BSU Count	Average Productivity
EU01			

=Production / BSU / 16

- (1) Count the number of BSUs in each farm (A, B, and C). Record the results in the BSU Count column.
- (2) Calculate the Productivity of each farm (A, B, and C). Record in the result in the Productivity column.
- (3) Calculate the Total Production for EU01. Calculate the Total BSU Count for EU01.
- (4) Calculate the Average Productivity for EU01.

Extent Account: Step 1 - Calculate Opening and Closing Land Cover (hectares)

Opening Land Cover

M	M	M	M	M	S	G	G	S	S
G	M	M	S	S	S	G	S	S	S
T	G	S	G	G	G	G	S	S	S
T	G	A	A	G	G	S	T	T	T
T	G	A	A	A	A	T	T	T	T
T	T	T	A	A	A	C	C	C	T
E	T	A	P	P	A	A	C	C	T
S	S	A	P	P	P	C	C	T	T
S	A	A	P	R	R	R	G	T	T
S	S	A	R	R	R	R	T	T	T

Note: Each cell represents one hectare.

Closing Land Cover

P	M	M	M	M	S	G	G	S	S
G	M	M	S	S	S	G	S	S	S
C	G	S	G	G	G	G	C	C	S
C	C	A	A	G	G	S	C	C	T
C	G	A	A	A	A	C	C	C	T
T	T	T	A	A	A	C	C	C	T
E	T	A	A	A	A	A	C	C	T
S	S	A	A	P	P	C	C	T	T
S	A	A	P	R	R	R	G	T	T
S	S	A	R	R	R	R	T	T	T

Note: Each cell represents one hectare.

Opening Land Cover		Code	Count (ha)
Artificial surfaces		A	
Crops		C	
Grassland		G	
Tree covered area		T	
Mangroves		M	
Shrub covered area		S	
Regularly flooded areas		R	
Sparse natural vegetated areas		P	
Terrestrial barren land		E	
Permanent snow, glaciers and inland water bodies		X	
Total			100

Closing Land Cover		Code	Count (ha)
Artificial surfaces		A	
Crops		C	
Grassland		G	
Tree covered area		T	
Mangroves		M	
Shrub covered area		S	
Regularly flooded areas		R	
Sparse natural vegetated areas		P	
Terrestrial barren land		E	
Permanent snow, glaciers and inland water bodies		X	
Total			100

Instructions: Count the number of cells (hectares) for each land cover type and record in the Land Cover table.

Extent Account: Step 2 - Calculate Land Cover Change Matrix and Physical Account for Land Cover

Table 1: Net Land Cover Change Matrix (hectares)

		Closing Land Cover										Opening
		Artificial surfaces	Crops	Grassland	Tree covered area	Mangroves	Shrub covered area	Regularly flooded areas	Sparse natural vegetated areas	Terrestrial barren land	Permanent snow, glaciers and inland water bodies	
Opening Land Cover	Code	A	C	G	T	M	S	R	P	E	X	
Artificial surfaces	A											
Crops	C											
Grassland	G											
Tree covered area	T											
Mangroves	M											
Shrub covered area	S											
Regularly flooded areas	R											
Sparse natural vegetated areas	P											
Terrestrial barren land	E											
Permanent snow, glaciers and inland water bodies	X											
Closing												

Note: Rows represent reductions in stock; columns represent deletions in stock

Instructions: (1) Transfer the Opening and Closing areas from the Land Cover Tables.

(2) Count areas with no change and record on the diagonal.

(3) Record changes from Opening to Closing in rows (e.g., 1ha grassland changed to Crop)

(4) Check: Rows add to Opening; Columns add to Closing.

Extent Account: Step 2 - Calculate Land Cover Change Matrix and Physical Account for Land Cover

Table 2: Physical Account for Land Cover

	Artificial surfaces	Crops	Grassland	Tree covered area	Mangroves	Shrub covered area	Regularly flooded areas	Sparse natural vegetated areas	Terrestrial barren land	Permanent snow, glaciers and inland water bodies	Total
Opening Stock											
Additions to Stock											
Reductions in Stock											
Closing Stock											

Note: Reductions are sum of row, excluding areas that remained the same

Instructions: (1) Transfer Opening Land Cover to Opening Stock row

(2) Transfer Closing Land Cover to Closing Stock row

(3) Add columns (excluding areas that stayed the same) to obtain Additions to Stock

(4) Add rows (excluding areas that stayed the same) to obtain Reductions in Stock

(5) Check: Total Stock = 100; Additions = Reductions

Carbon Accounting: Step 3 - Calculate Carbon Stock Account and Carbon Sequestration Services

Services Supply Account: Group Exercise 1

Services Supply Database

EU	Extent (ha)	(C) Crop	(R) Recreation	(W) Water	(S) Carbon Sequestration	
		tonnes/year	trips/year	m ³ /year	tonnes /ha/year	tonnes /year
EU01 = Herbaceous crops	500.0	18,700.0	500.0	600.0	20	
EU02 = Tree covered areas	262.5	0.0	1,500.0	500.0	30	
EU03 = Inland water bodies	68.8	0.0	1,600.0	15,000.0	5	
EU04 = Herbaceous crops	281.3				20	
EU05 = Tree covered areas	75.0				30	
EU06 = Artificial surfaces (urban)	56.3	0.0	500.0	500.0	0	
EU07 = Artificial surfaces (urban)	68.8	0.0	700.0	400.0	0	
EU08 = Shrubs..regularly flooded (wetland)	37.5	700.0	5,000.0	10,000.0	40	
EU09 = Inland water bodies	50.0				5	
EU10 = Tree covered areas	225.0				30	
EU11 = Herbaceous crops	175.0				20	
Total	1,800.0					

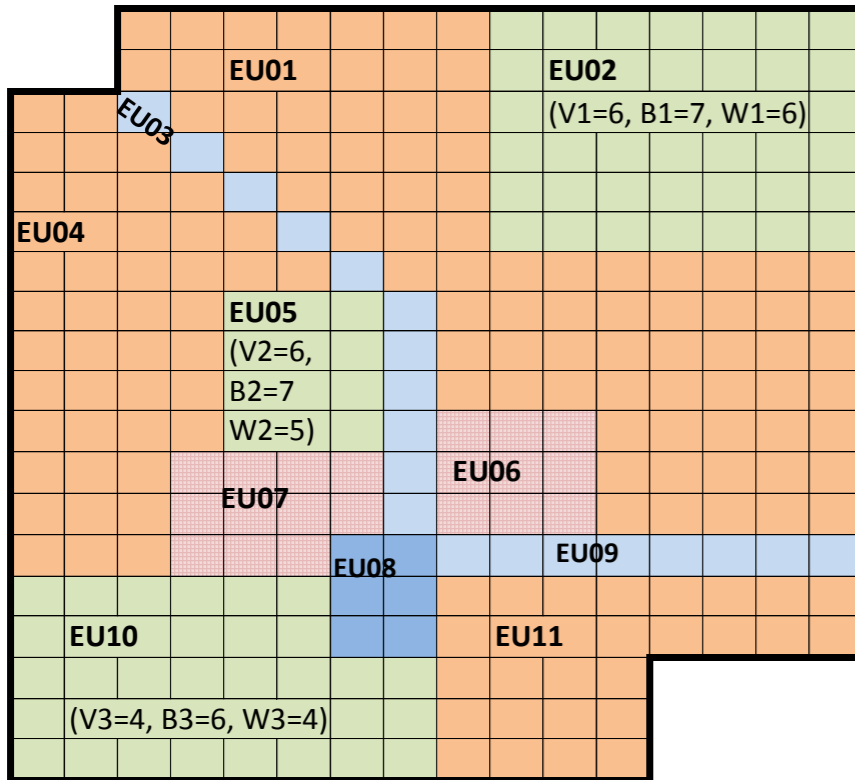
Instructions: (1) Calculate unknown services from nearest neighbour for (C), (R), W); e.g., Crop for EU04 = EU01/500*281

(2) Carbon, calculate from lookup table (S); e.g., Carbon for EU01 = 20*500)

(3) Calculate EAU Total for each service

Condition Account: Group Exercise 1: Calculate improvements and reductions in condition

(Opening Conditions)



Condition Table

EU	Extent (BSU)	(V) Vegetation	(B) Biodiversity	(W) Water	Index
EU01 = Herbaceous crops	80	4.00	3.00	5.00	4.00
EU02 = Tree covered areas	42				$=(V+B+W)/3$
EU03 = Inland water bodies	11	5.00	6.00	6.00	5.67
EU04 = Herbaceous crops	45	3.00	2.00	4.00	3.00
EU05 = Tree covered areas	12				$=(V+B+W)/3$
EU06 = Artificial surfaces (urban)	9	2.00	2.00	4.00	2.67
EU07 = Artificial surfaces (urban)	11	2.00	1.00	3.00	2.00
EU08 = Shrubs..regularly flooded (wetland)	6	5.00	7.00	5.00	5.67
EU09 = Inland water bodies	8	3.00	3.00	4.00	3.33
EU10 = Tree covered areas	36				$=(V+B+W)/3$
EU11 = Herbaceous crops	28	3.00	2.00	3.00	2.67
Total	288				

EU Type	Extent (BSU)	Vegetation	Biodiversity	Water	Index
Artificial surfaces (urban)	20	2.00	1.45	3.45	2.30
Herbaceous crops	153	3.52	2.52	4.34	3.46
Tree covered areas	90				$=(V+B+W)/3$
Inland water bodies	19	4.16	4.74	5.16	4.68
Shrubs..regularly flooded (wetland)	6	5.00	7.00	5.00	5.67
Total	288	4.01	3.96	4.57	4.18

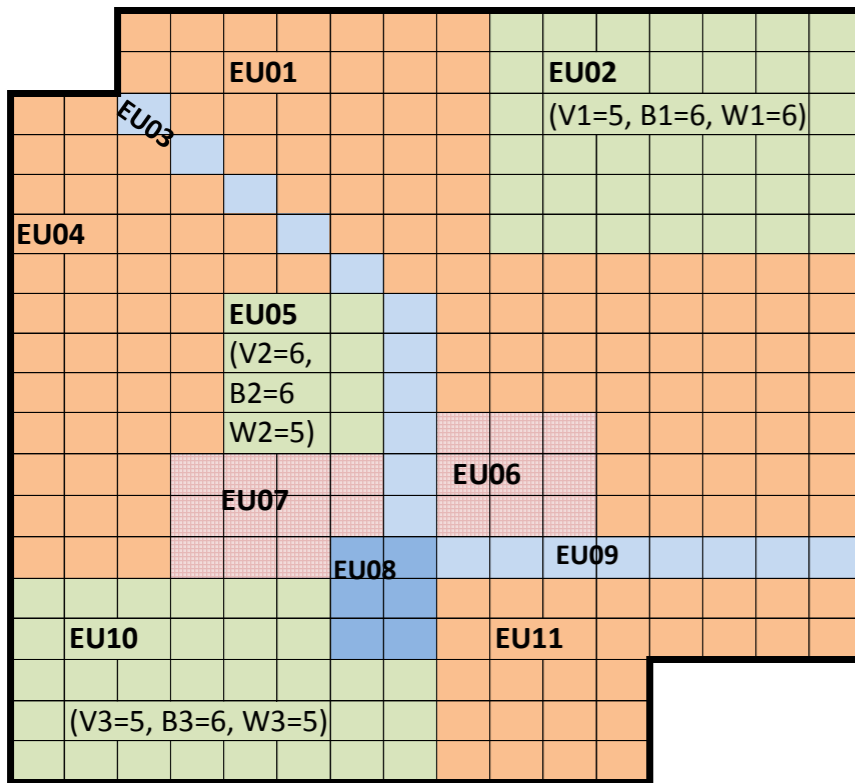
Instructions: (1) Transfer the condition measures from the map to the Condition Table for EU02, EU05 and EU10.

(2) Calculate the Index $(V+B+W)/3$

(3) Calculate the pro-rated condition measure for Forest Tree Cover (multiply measure * BSU Count for each area; add and divide by total BSU Count). Calculate the index.

Condition Account: Group Exercise 1: Calculate improvements and reductions in condition

(Closing Conditions)



Condition Table

EU	Extent (BSU)	Vegetation	Biodiversity	Water	Index
EU01 = Rainfed herbaceous cropland	80	4.00	3.00	6.00	4.33
EU02 = Forest tree cover	42	5.00	6.00	6.00	5.67
EU03 = Inland water bodies	11	5.00	6.00	7.00	6.00
EU04 = Rainfed herbaceous cropland	45	3.00	3.00	5.00	3.67
EU05 = Forest tree cover	12	6.00	6.00	5.00	5.67
EU06 = Urban and associated developed	9	2.00	2.00	4.00	2.67
EU07 = Urban and associated developed	11	2.00	1.00	3.00	2.00
EU08 = Open wetlands	6	5.00	7.00	6.00	6.00
EU09 = Inland water bodies	8	3.00	3.00	5.00	3.67
EU10 = Forest tree cover	36	5.00	6.00	5.00	5.33
EU11 = Rainfed herbaceous cropland	28	3.00	3.00	4.00	3.33
	288				

EU Type	Extent (BSU)	Vegetation	Biodiversity	Water	Index
Urban and associated	20	2.00	1.45	3.45	2.30
Rainfed herbaceous cropland	153	3.52	3.00	5.34	3.95
Forest tree cover	90	5.13	6.00	5.47	5.53
Inland water bodies	19	4.16	4.74	6.16	5.02
Open wetlands	6	5.00	7.00	6.00	6.00
Total	288	3.99	4.03	5.32	4.45

Condition Account

	Extent (BSU)	Vegetation	Biodiversity	Water	Index
Opening Conditions	288				
Improvements in condition					
Reductions in condition					
Closing Conditions	288	3.99	4.03	5.32	4.45

Instructions: (1) Transfer the values for Opening and Closing Conditions to the appropriate row of the Condition Account.

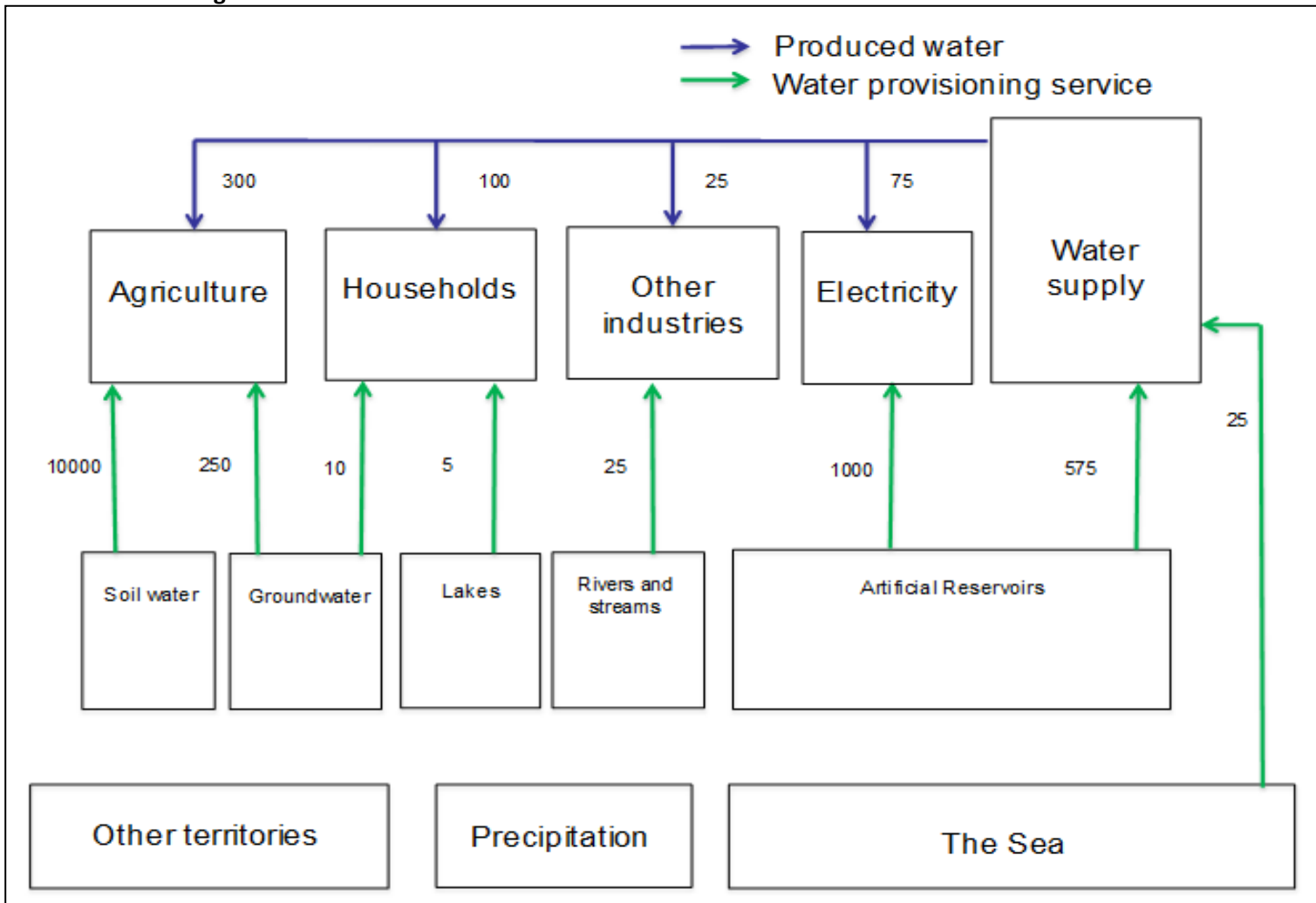
(2) Calculate difference between Opening and Closing Conditions (Closing - Opening)

(3) Record Improvements (positive values) in the Improvements row

(4) Record reductions (negative values) in the Reductions row

Water Accounts: Group Exercise 1: Water asset account (m³)

Stock and Flow Diagram



Water Accouts: Group Exercise 1: Water asset account (m³)

Water Asset Account (m³)

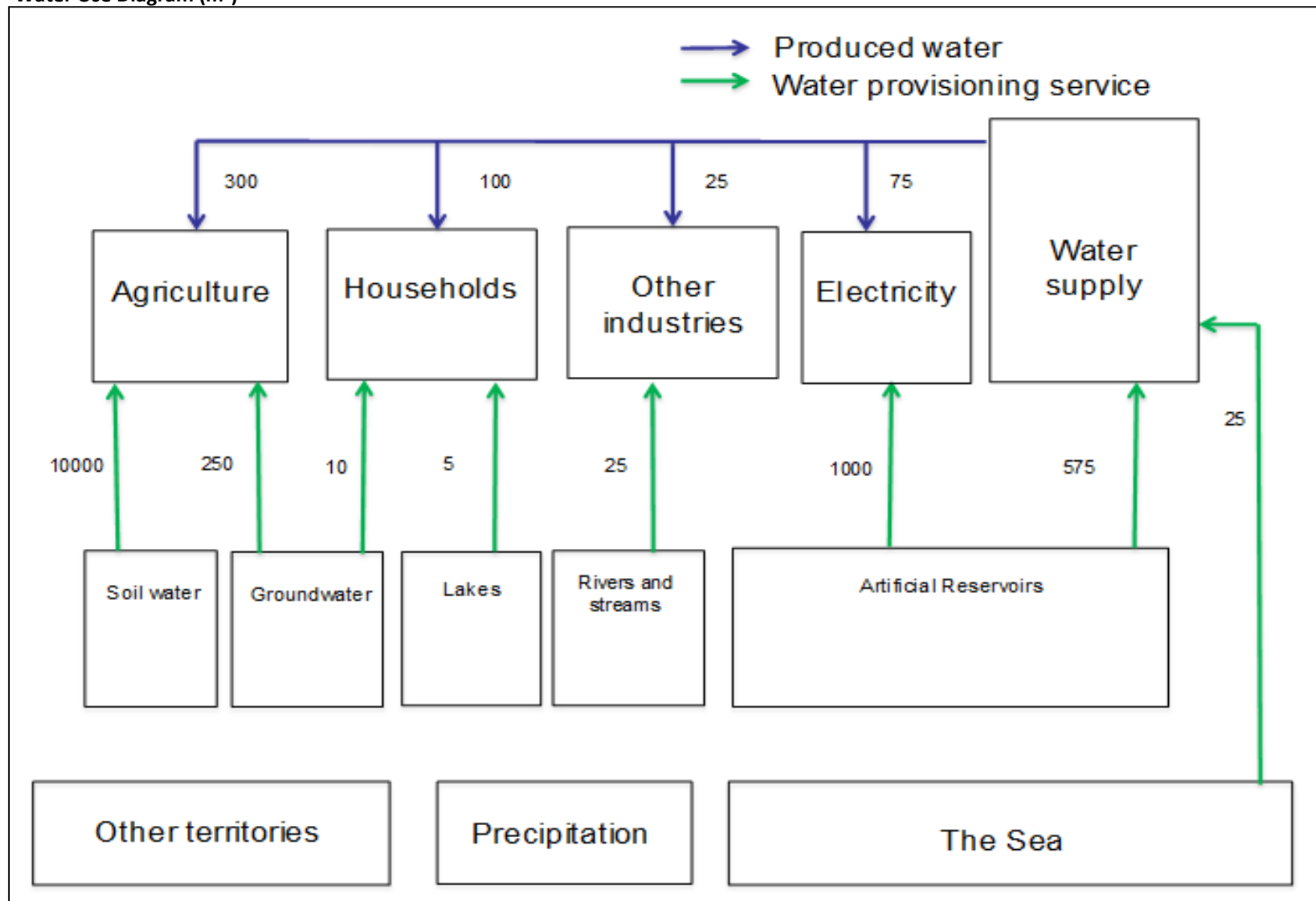
	Type of water resources				Total
	Surface water		Goundwater	Soil water	
	Artificial reservoirs	Rivers and streams			
(A) Opening stock					
Additions to stock					
(B) Returns (from Economy)					
(C) Precipitation					
(D) Inflows from other territories					
(E) Inflows from other inland water					
(F) Discoveries of water in aquifers					
<i>(G) Total additions to stock</i>					=B+C+D+E+F
Reductions in stock					
(H) Abstraction (to Economy)					
(I) Evaporation and evapotranspiration					
(J) Outflows to other territories					
(K) Outflows to the sea					
(L) Outflows to other inland water					
<i>(M) Total reductions in stock</i>					=H+I+J+K+L
Closing stock					=A + G - M

Instructions: (1) Transcribe Opening Stock and flows from Stock and Flow Diagram

(2) Calculate Totals and Closing Stock

Water Accouts: Group Exercise 2: Water Use Table (m³)

Water Use Diagram (m³)



Water Accouts: Group Exercise 2: Water Use Table (m³)

Water Use Table (m³)

	Use of water					Total use
	Agriculture, forestry and fishing	Electricity, gas, steam and air conditioning supply	Water collection, treatment and supply	Other industries	Households	
Sources of abstracted water						
Inland water resources						
(A) Surface water						
(B) Groundwater						
(C) Soil water						
(E) Sea water						
(F) Total abstracted water						=A+B+C+D+E
Abstracted water						
(G) Distributed water (to other economic units)						
(H) Use of water (from other economic units)						
(I) Own use						
Total use of water (abstracted and distributed water)						=H+I

Note: Surface water = (Lakes + Rivers and Streams + Artificial Reservoirs)

Note: Own use for Water collection, treatment and supply = Abstracted - (total distributed)

Instructions: (1) Transcribe values for Distribution and Abstraction from Water Use diagram

(2) Calculate Total Use (column and row)