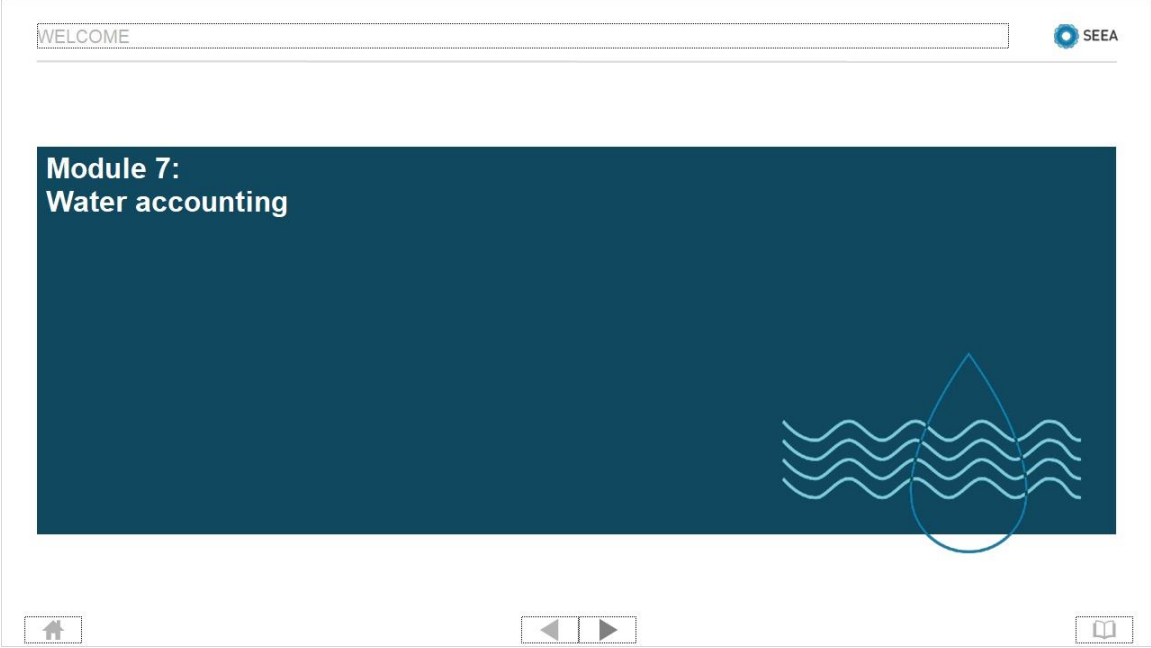
SEEA_EnvAcc_M7_EN

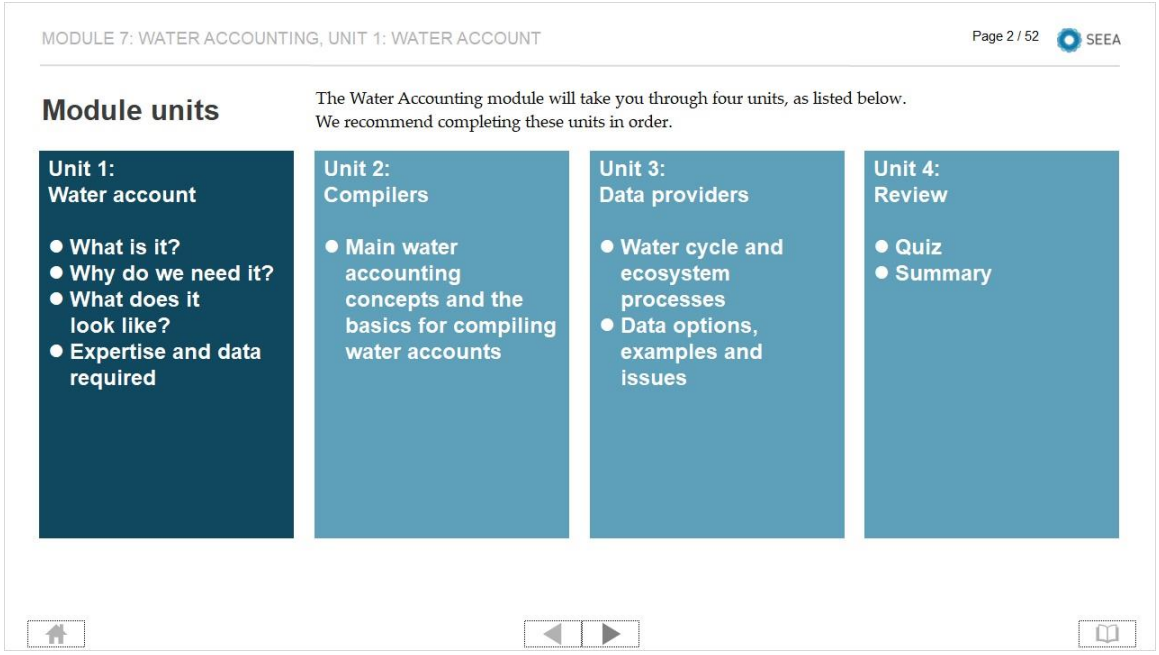
1. Module 1 - Introduction

1.1 Welcome

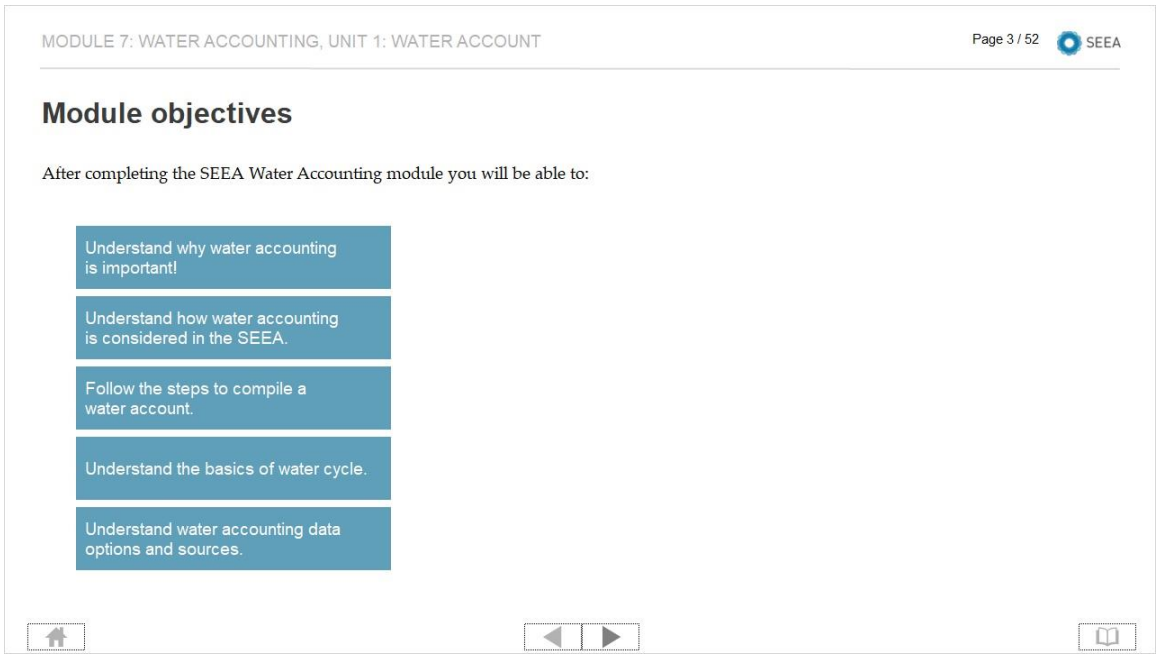


Notes:

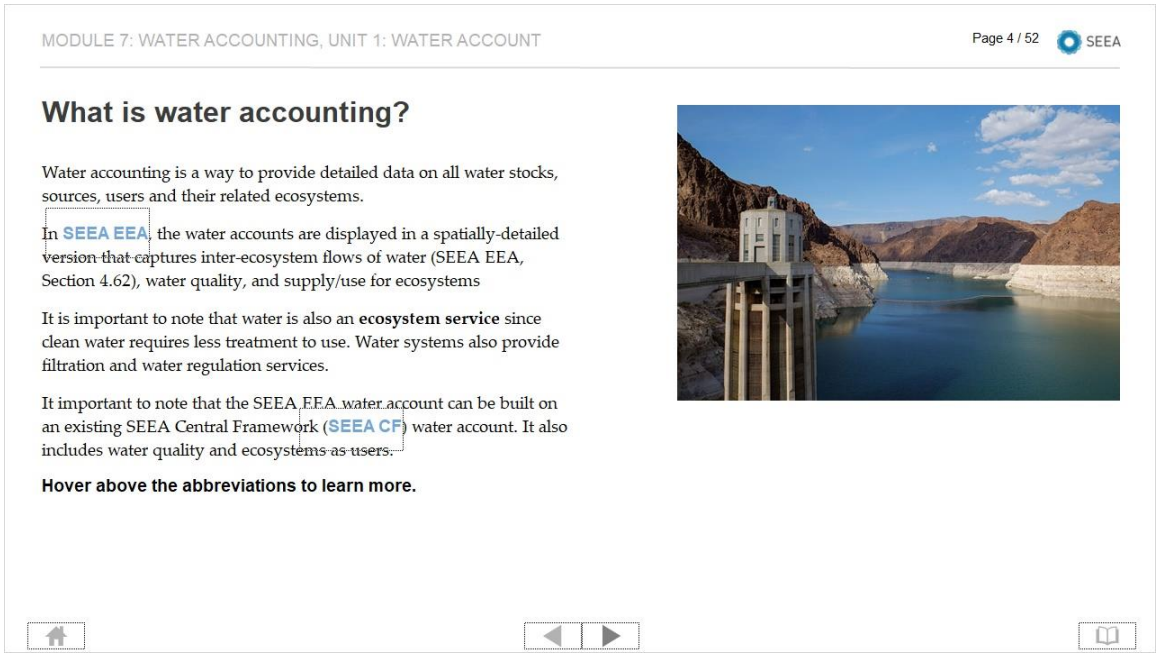
1.2 Module units



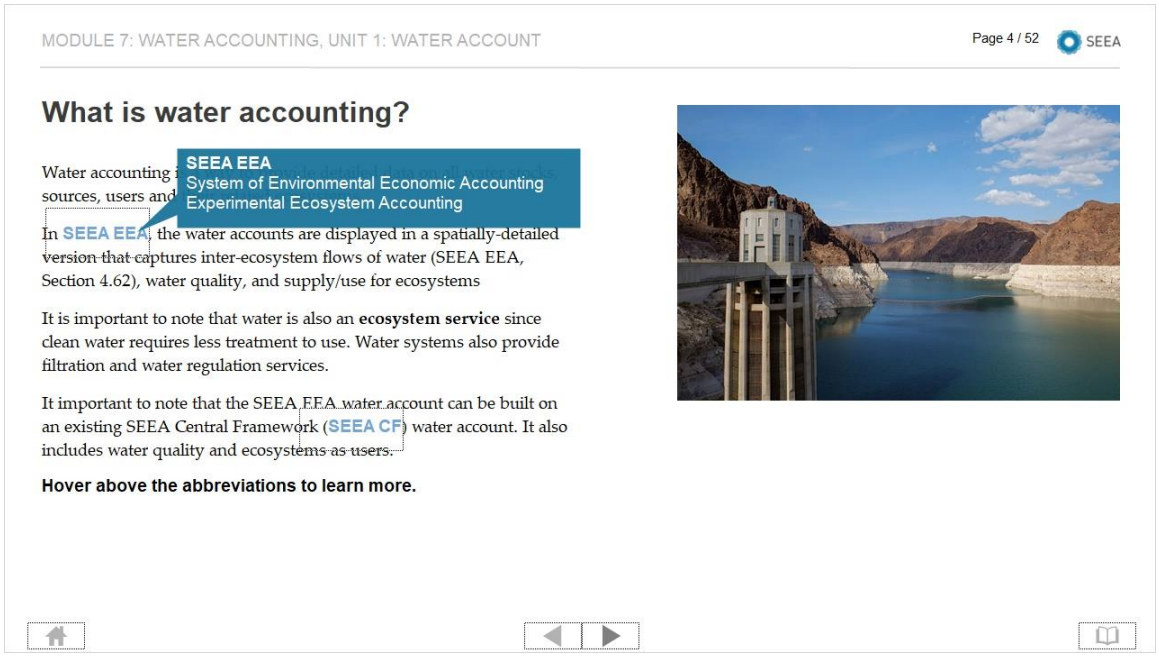
1.3 Module objectives



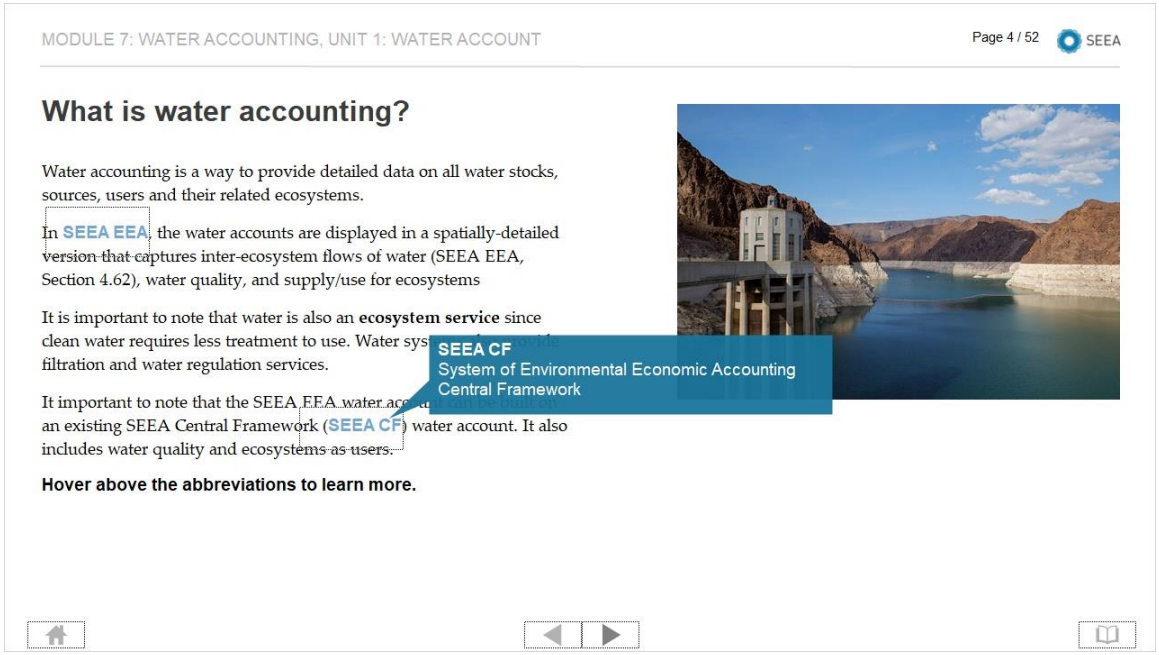
1.4 What is Water Accounting?



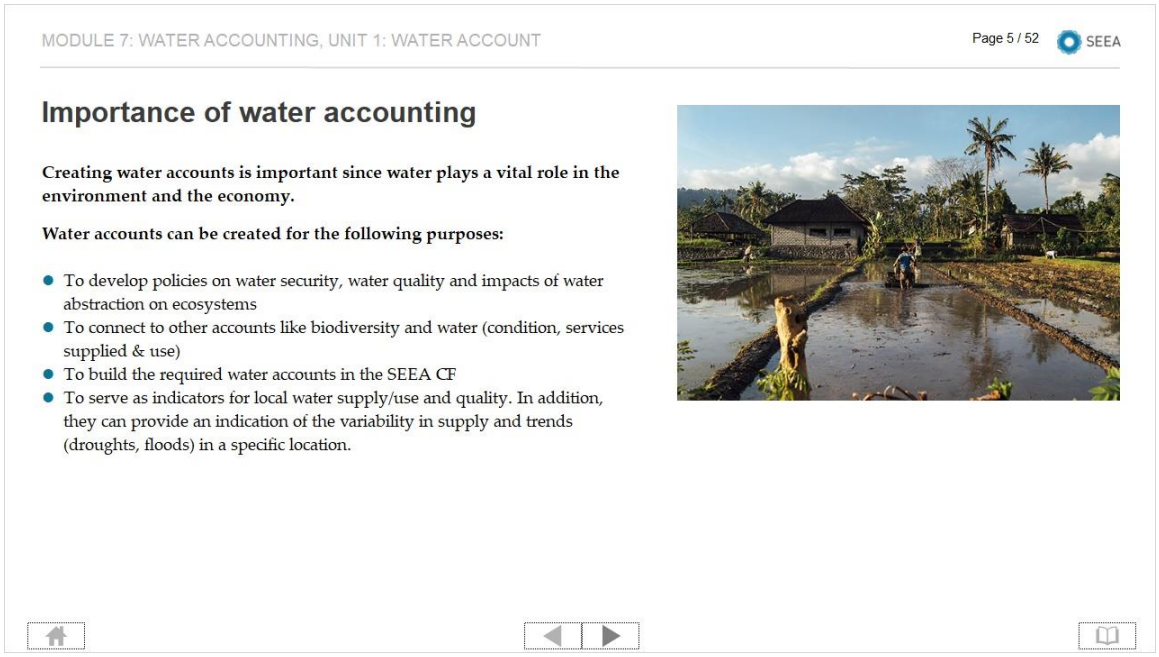
Explanation 1 (Slide Layer)



Explanation 2 (Slide Layer)



1.5 Importance of Water Accounting



1.6 Water Accounting Representation

Water accounting representation

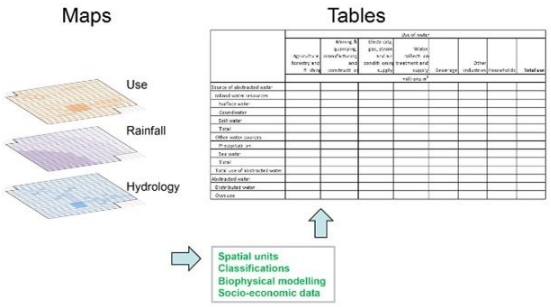
After the water cycle components are understood, **water accounts** can be represented using maps and tables that contain **spatial units, classifications, biophysical modelling and socio-economic data.**

A corresponding water assets table would link these accounts to the ecosystem types that provide and use the water.

The water account provides spatial details for data on:

- stock
- supply and
- use, including soil moisture and groundwater

In addition, the table illustrates water quality measures (and their contribution to **condition accounts**).



1.7 Water Account Data and Expertise Requirements

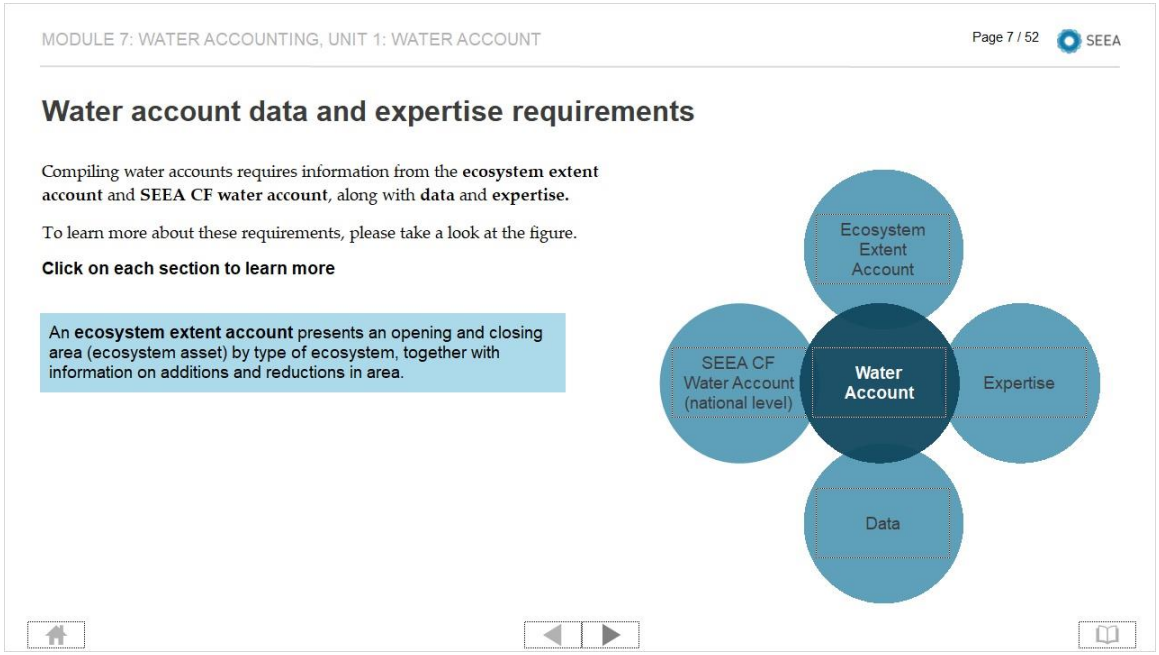
Water account data and expertise requirements

Compiling water accounts requires information from the **ecosystem extent account** and **SEEA CF water account**, along with **data** and **expertise.**

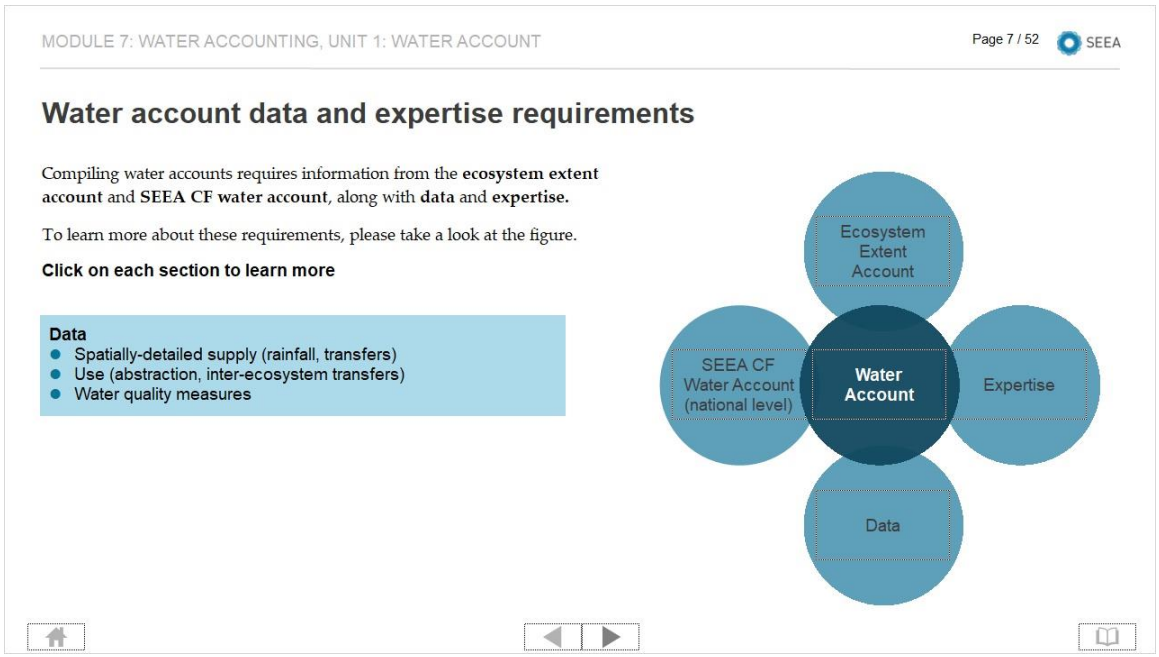
To learn more about these requirements, please take a look at the figure.

Click on each section to learn more

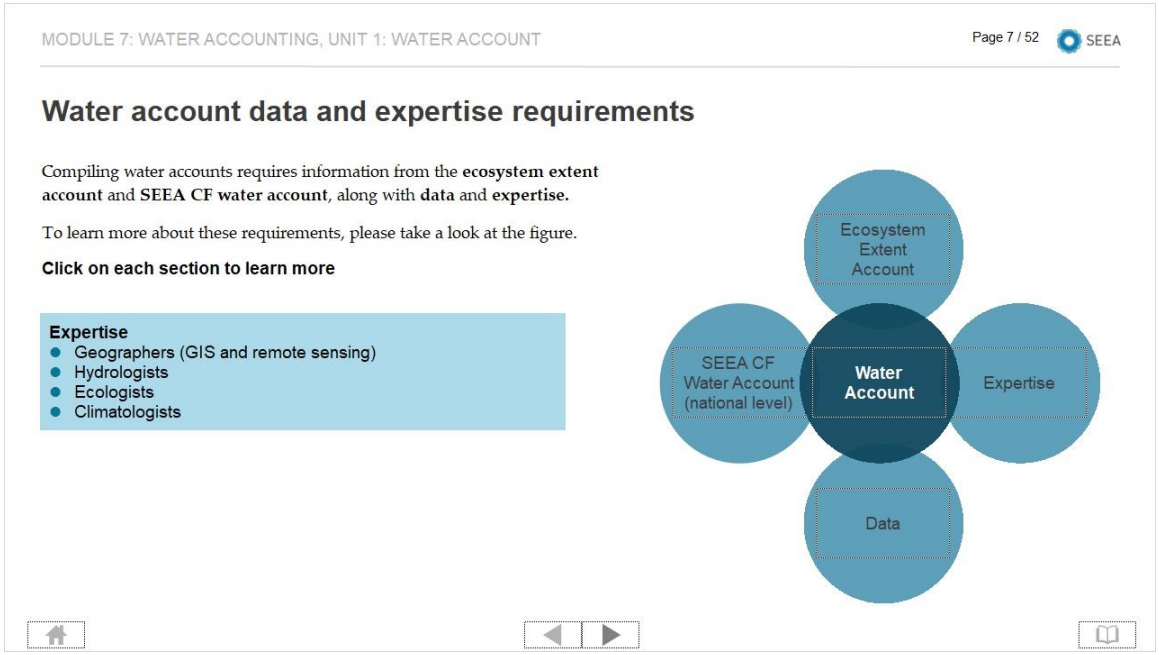
Explanation 1 (Slide Layer)



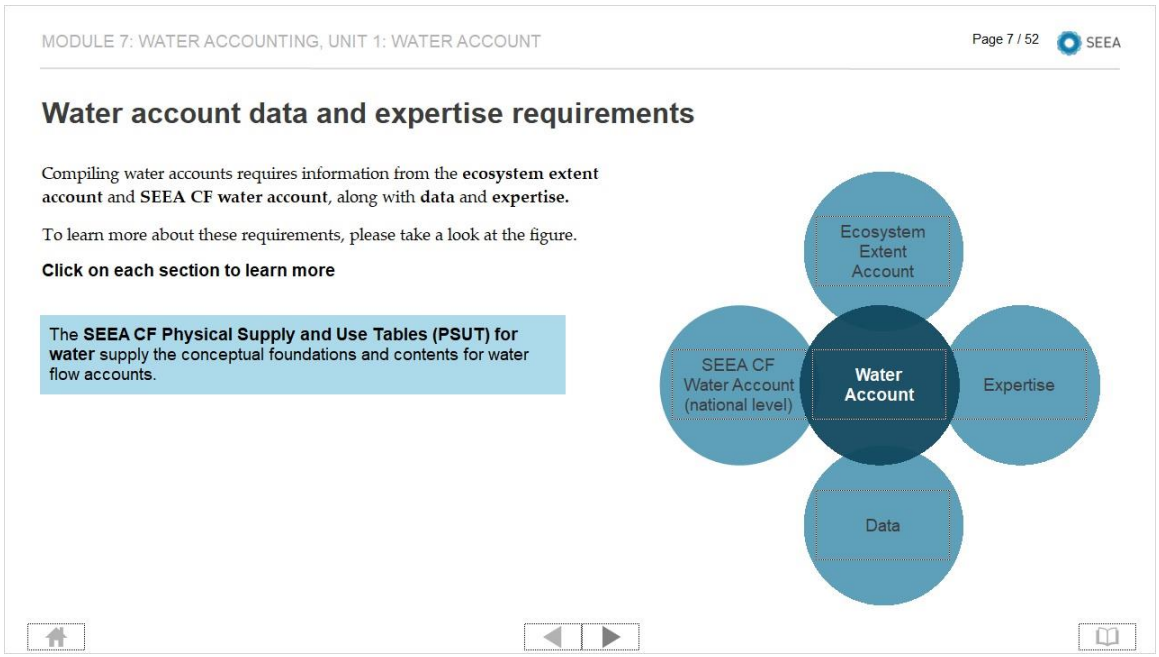
Explanation 2 (Slide Layer)



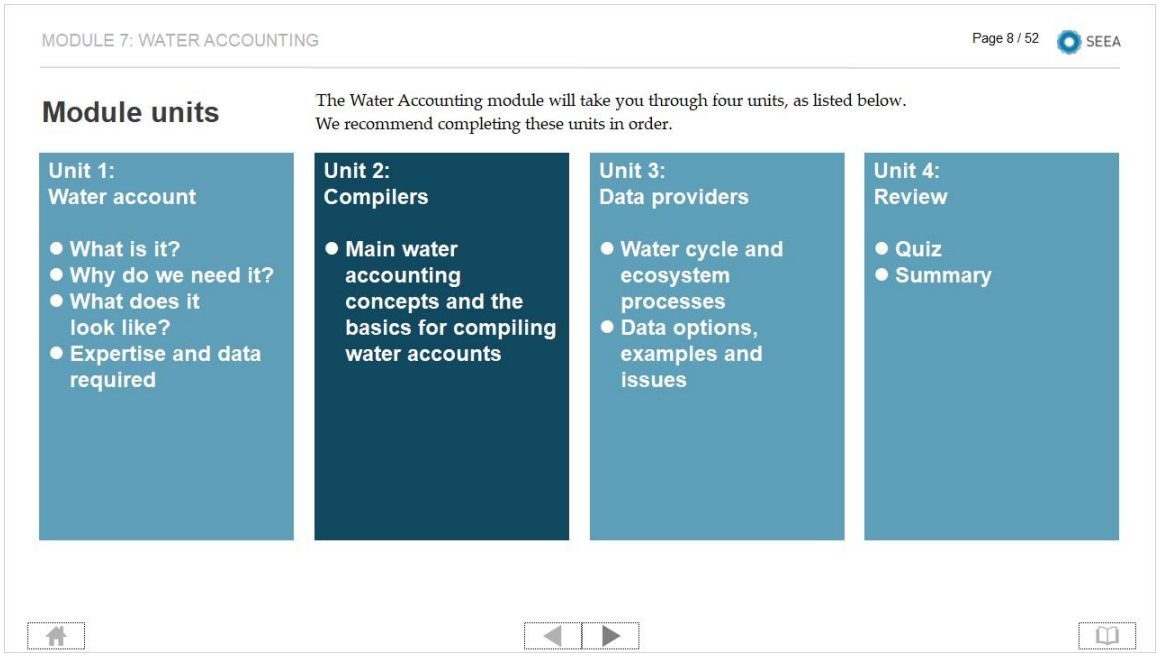
Explanation 3 (Slide Layer)



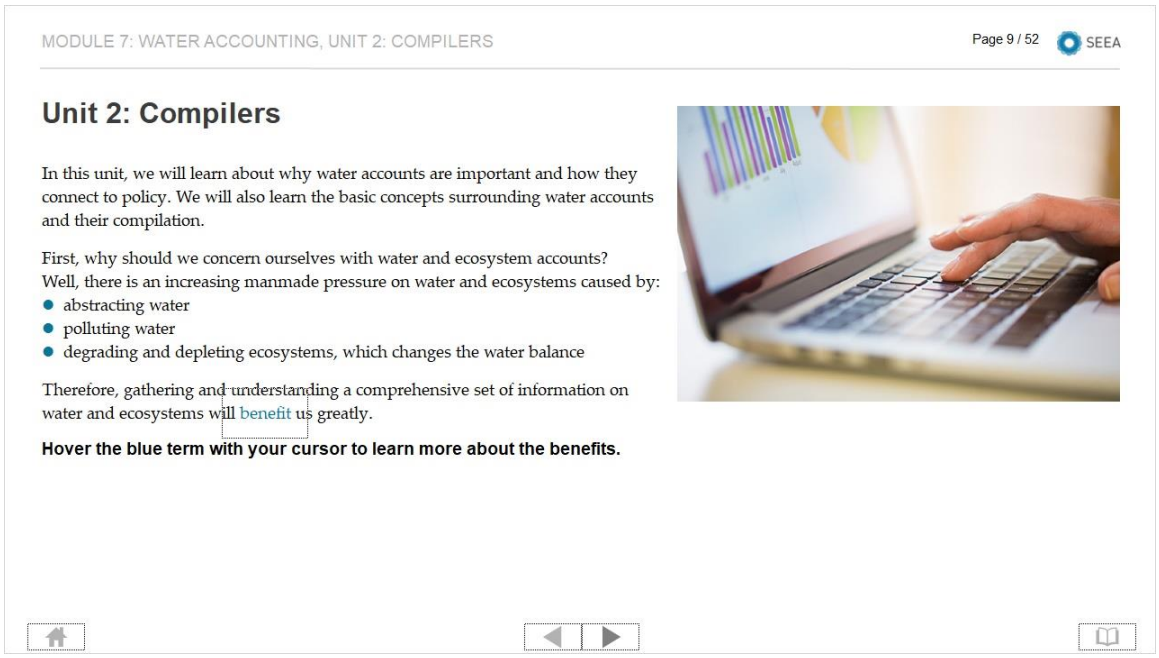
Explanation 4 (Slide Layer)



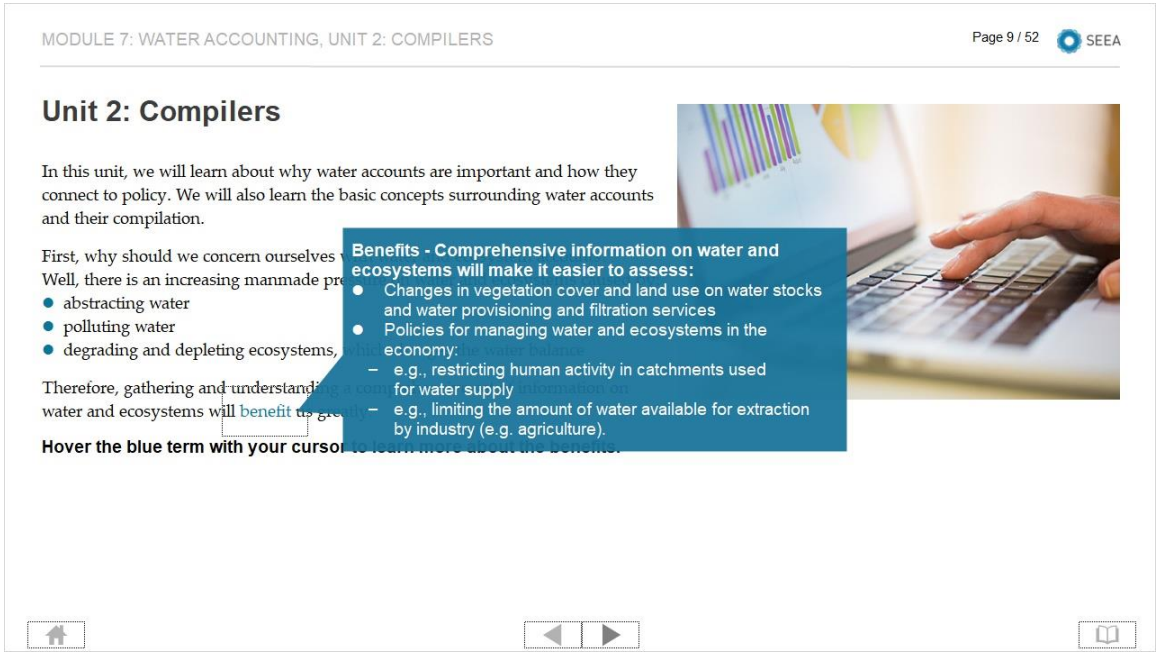
1.8 Module units



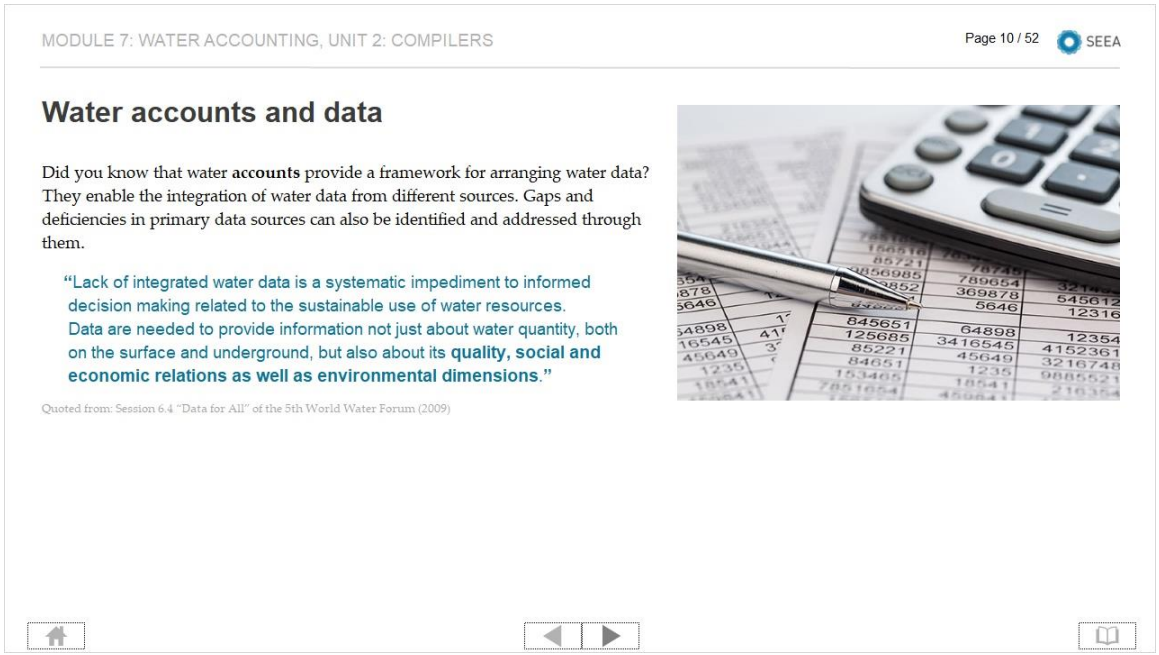
1.9 Beginning of Unit 2



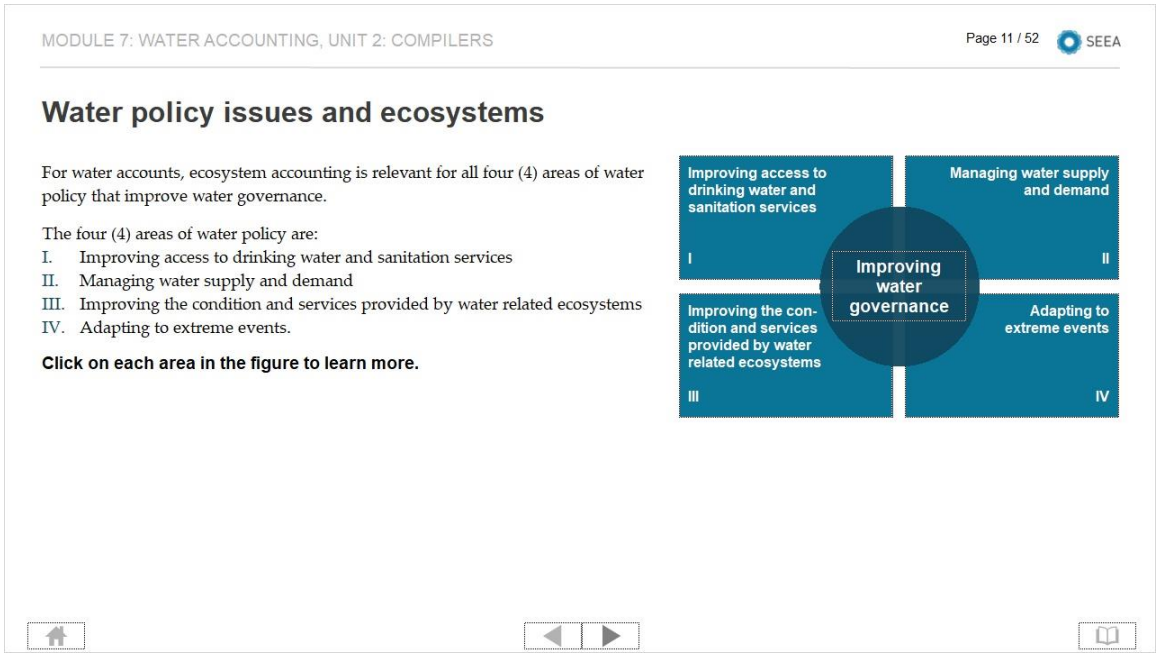
Explanation 1 (Slide Layer)



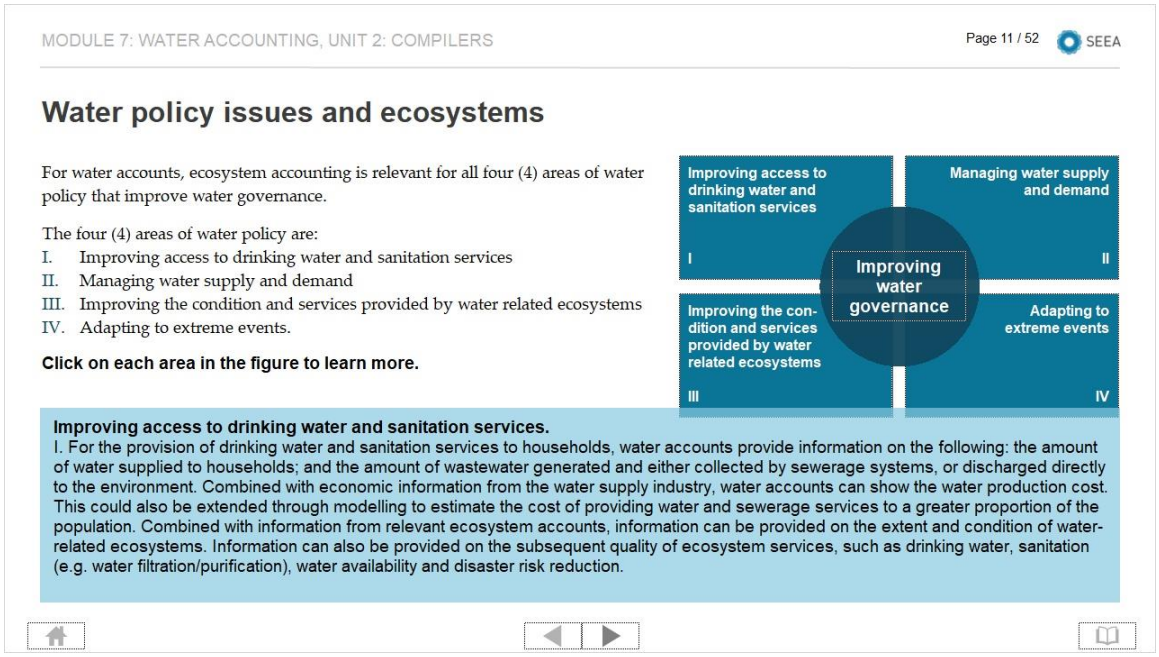
1.10 Accounts and Data



1.11 Water Policy Issues and Ecosystems



Explanation 1 (Slide Layer)



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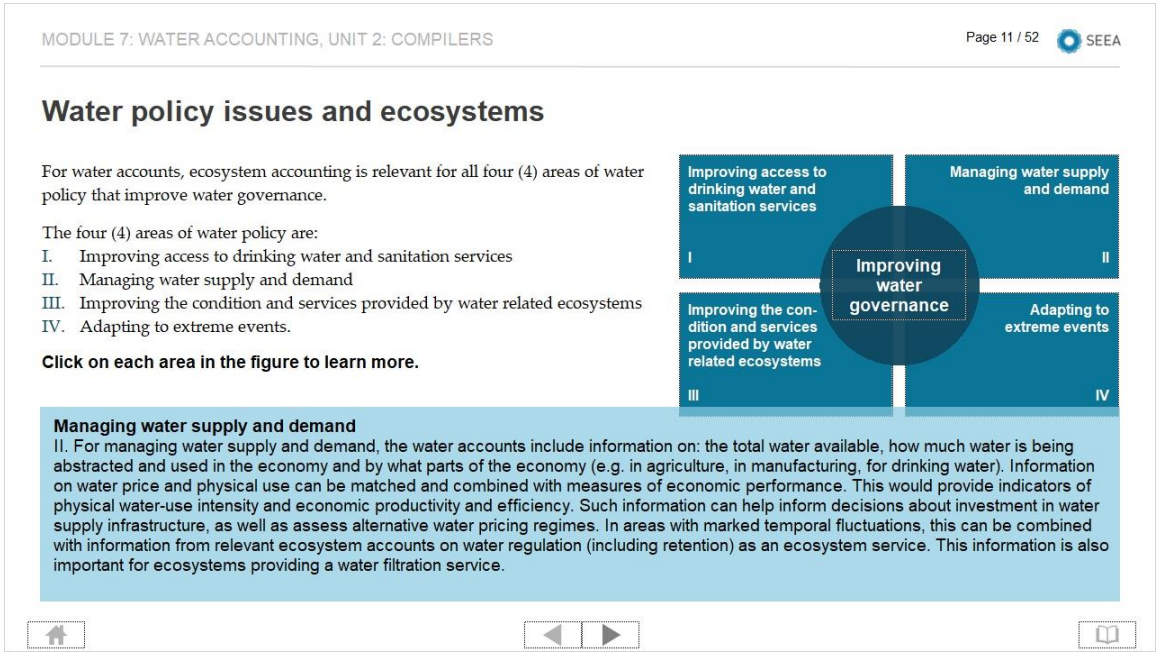
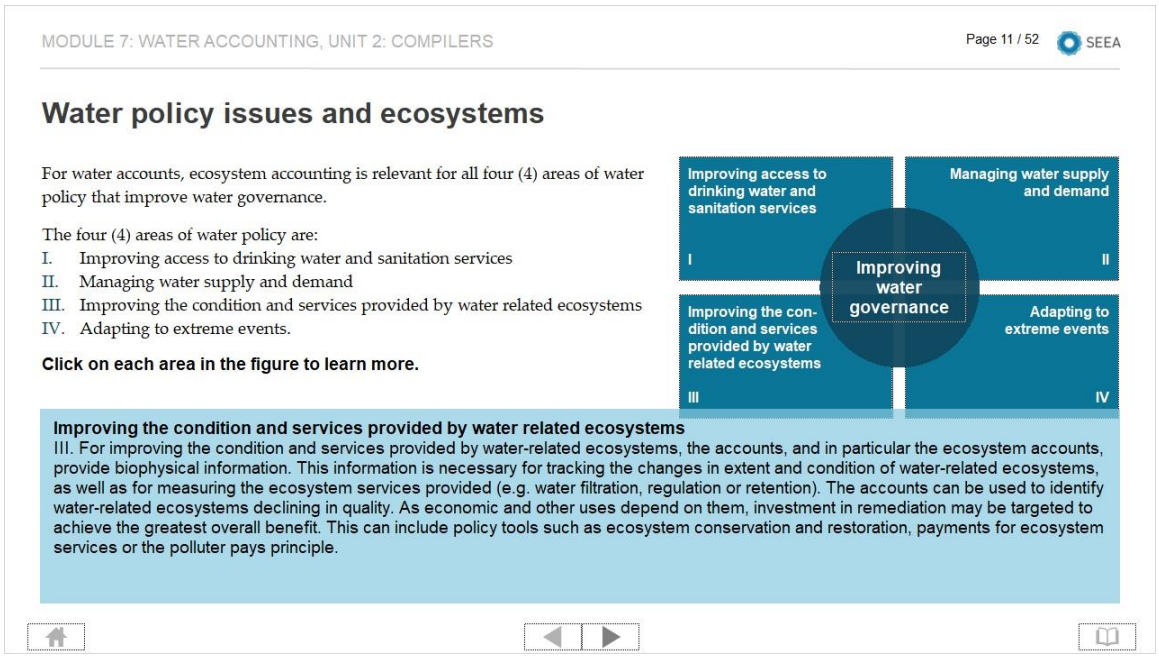


Explanation 3 (Slide Layer)



Explanation 4 (Slide Layer)

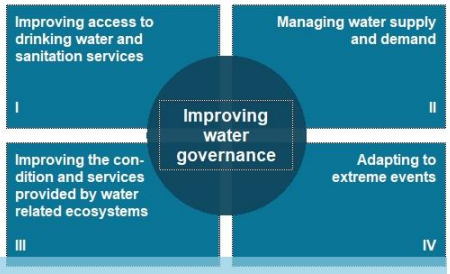
Water policy issues and ecosystems

For water accounts, ecosystem accounting is relevant for all four (4) areas of water policy that improve water governance.

The four (4) areas of water policy are:

I. Improving access to drinking water and sanitation services
II. Managing water supply and demand
III. Improving the condition and services provided by water related ecosystems
IV. Adapting to extreme events.

Click on each area in the figure to learn more.



Adapting to extreme events
IV. For adapting to extreme events, the water and ecosystem accounts can show the impacts on economic production, mortality and asset losses of droughts and floods. A broader set of ecosystem accounts can show benefits from the services of flood protection, drought mitigation and water flow regulation. Further changes in the condition and services provided by water-related ecosystems can be linked to extreme events and climate change over the long term.

1.12 Concepts - Water Cycle

Concepts – the water cycle

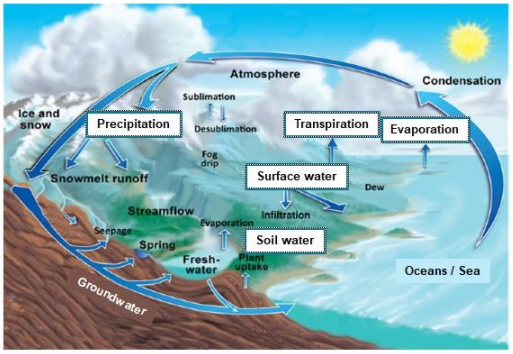
There are two general **concepts** to be considered in the water accounts:

- water cycle
- water stocks, supply, abstraction, and use.

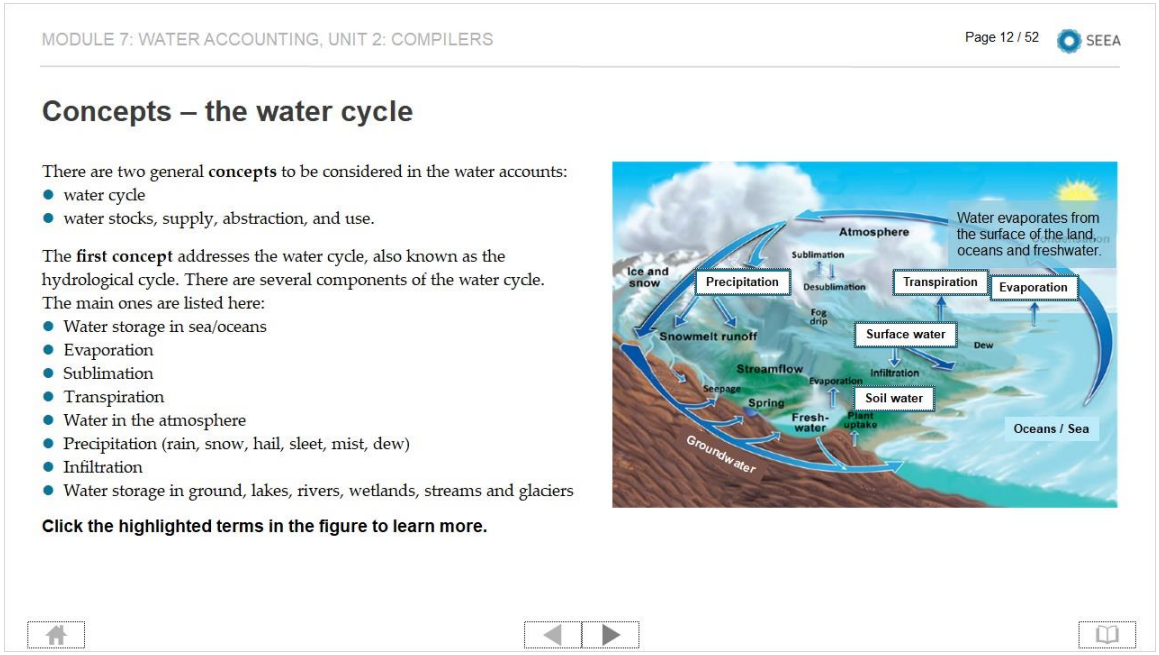
The **first concept** addresses the water cycle, also known as the hydrological cycle. There are several components of the water cycle. The main ones are listed here:

- Water storage in sea/oceans
- Evaporation
- Sublimation
- Transpiration
- Water in the atmosphere
- Precipitation (rain, snow, hail, sleet, mist, dew)
- Infiltration
- Water storage in ground, lakes, rivers, wetlands, streams and glaciers

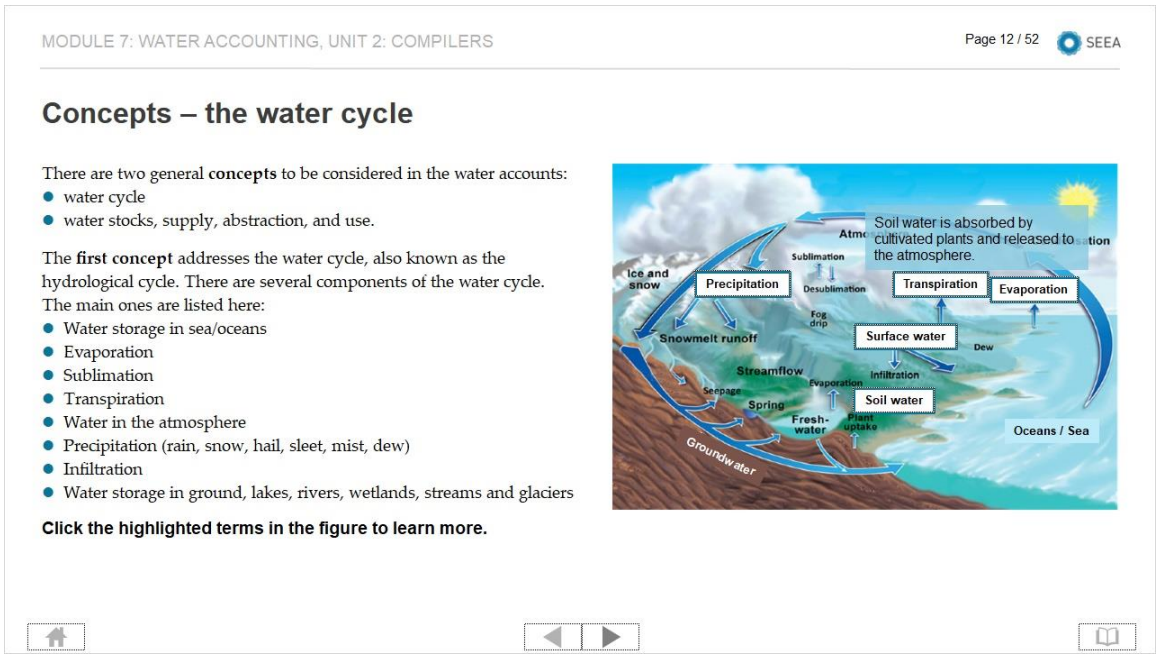
Click the highlighted terms in the figure to learn more.



Evaporation (Slide Layer)



Transpiration (Slide Layer)



Percipitation (Slide Layer)

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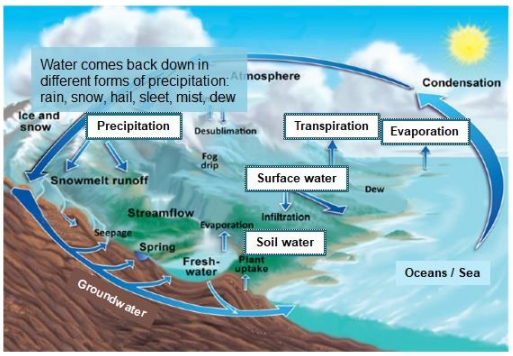

Flows downstream (Slide Layer)

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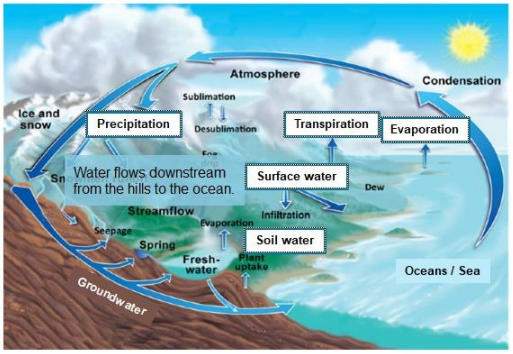
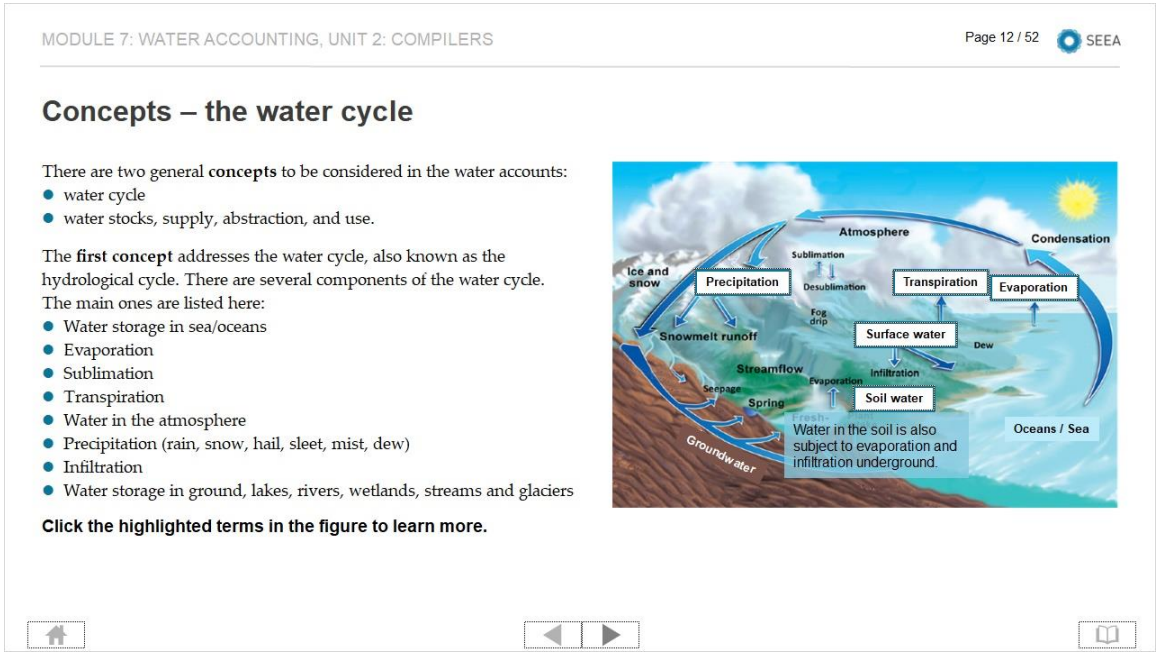
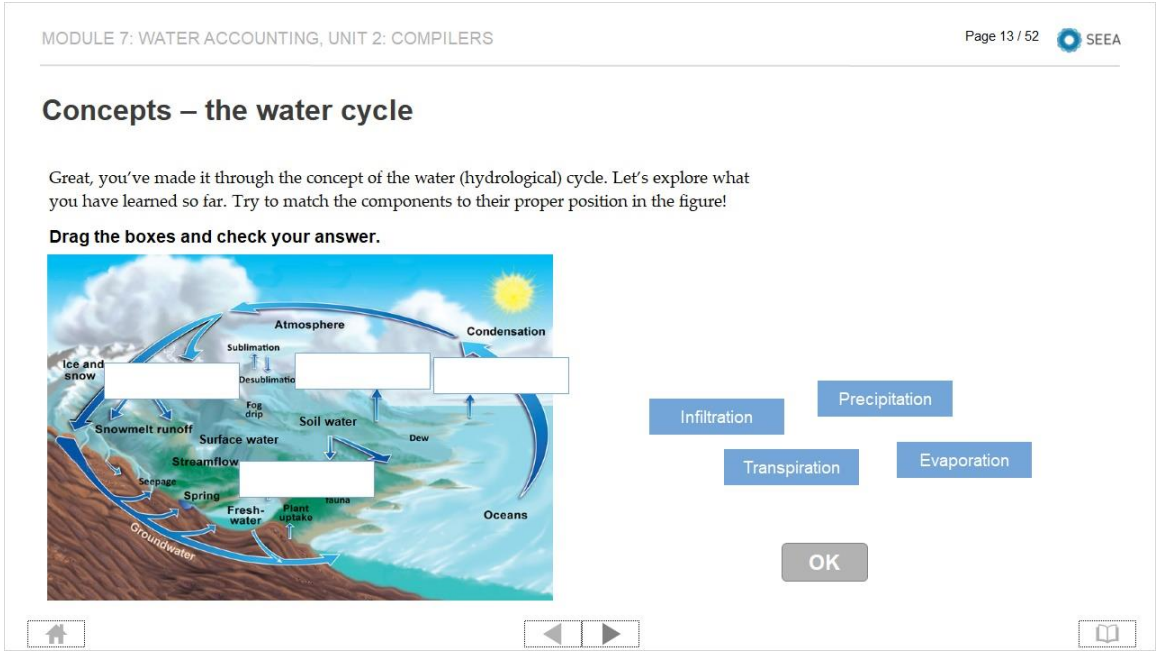


Soil (Slide Layer)



1.13 Concepts - Water Cycle

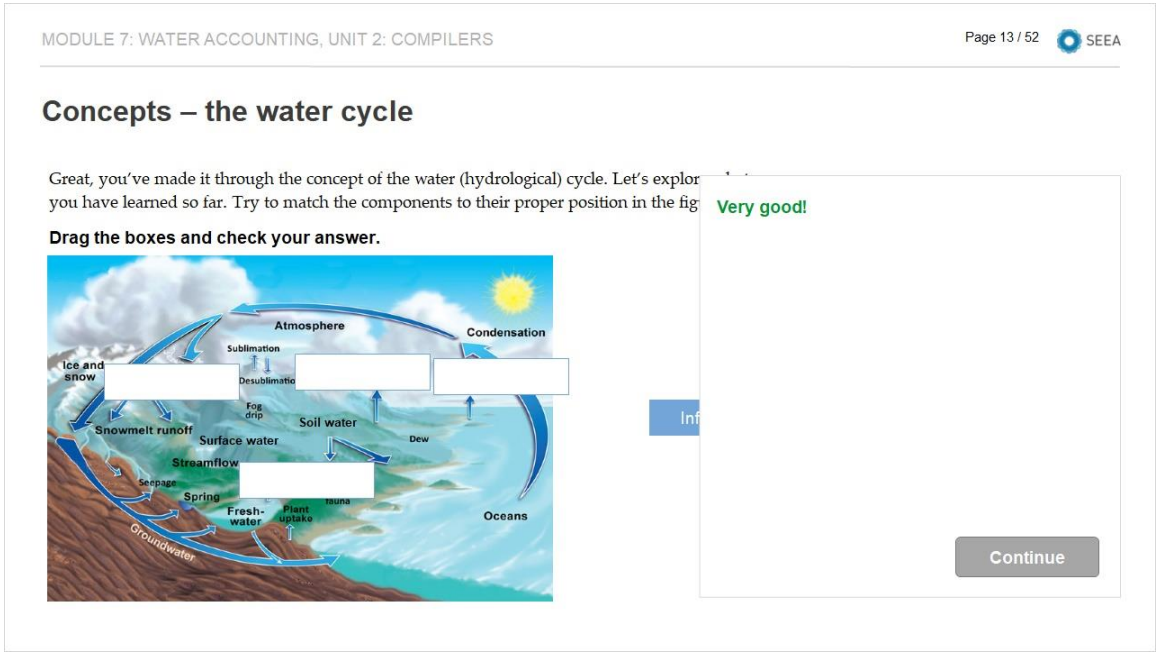
(Drag and Drop, 10 points, 1 attempt permitted)



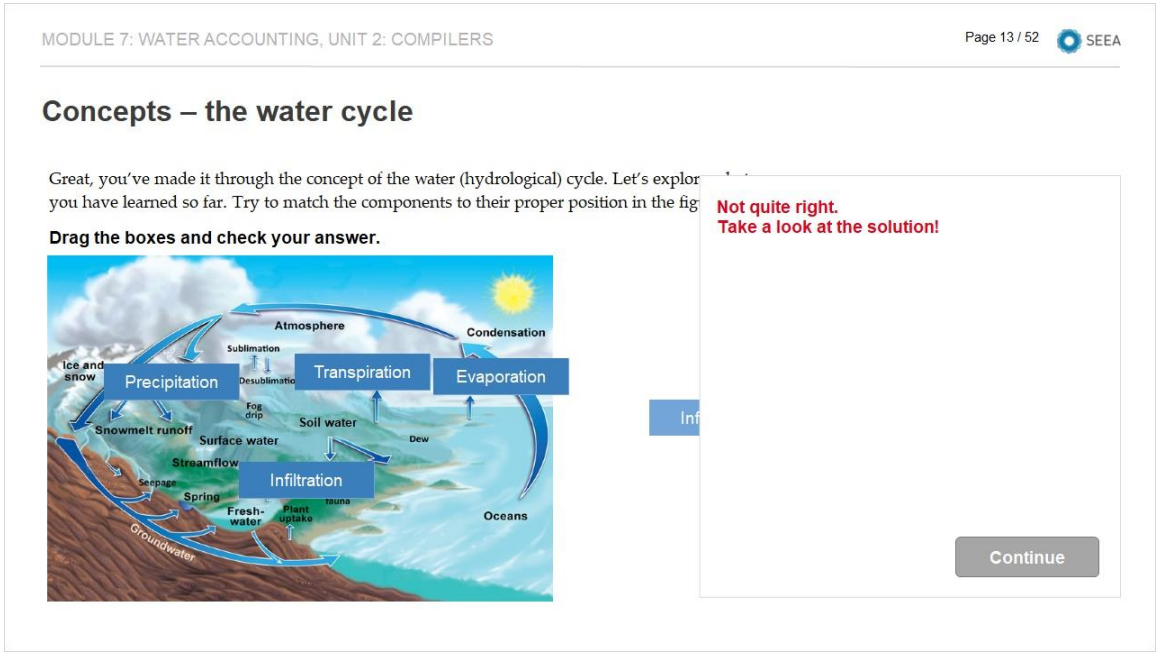
Drag Item	Drop Target
Infiltration	Rectangle 8
Precipitation	Rectangle 5
Evaporation	Rectangle 6
Transpiration	Rectangle 7

Drag and drop properties
Snap dropped items to drop target (Stack random)
Delay item drop states until interaction is submitted

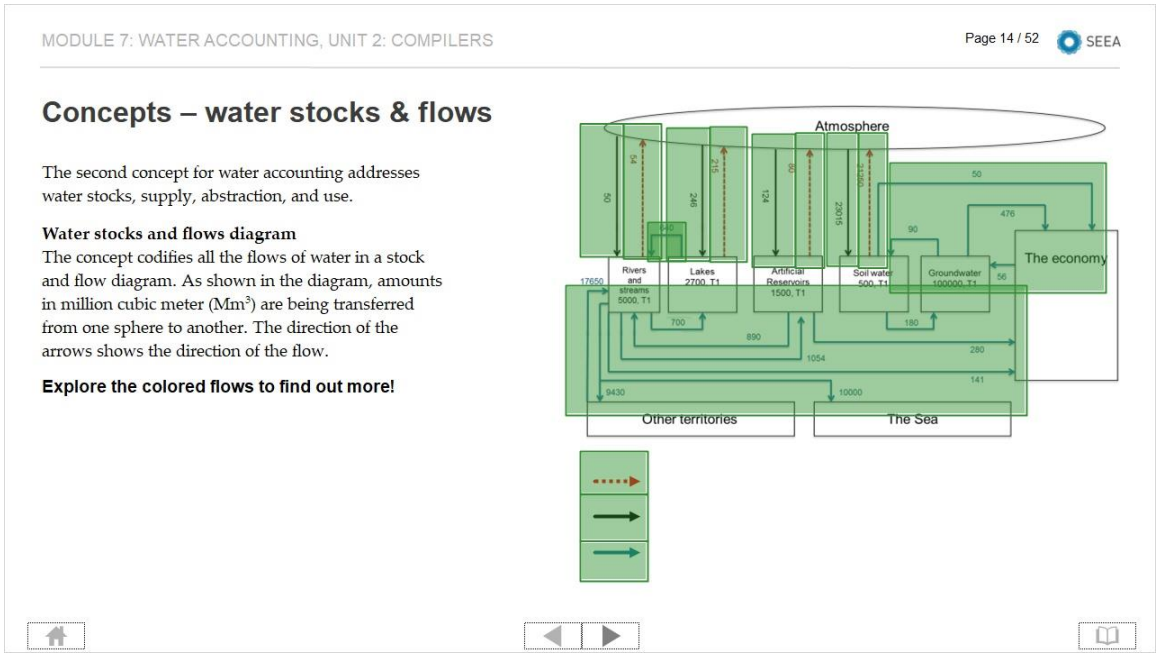
Correct (Slide Layer)



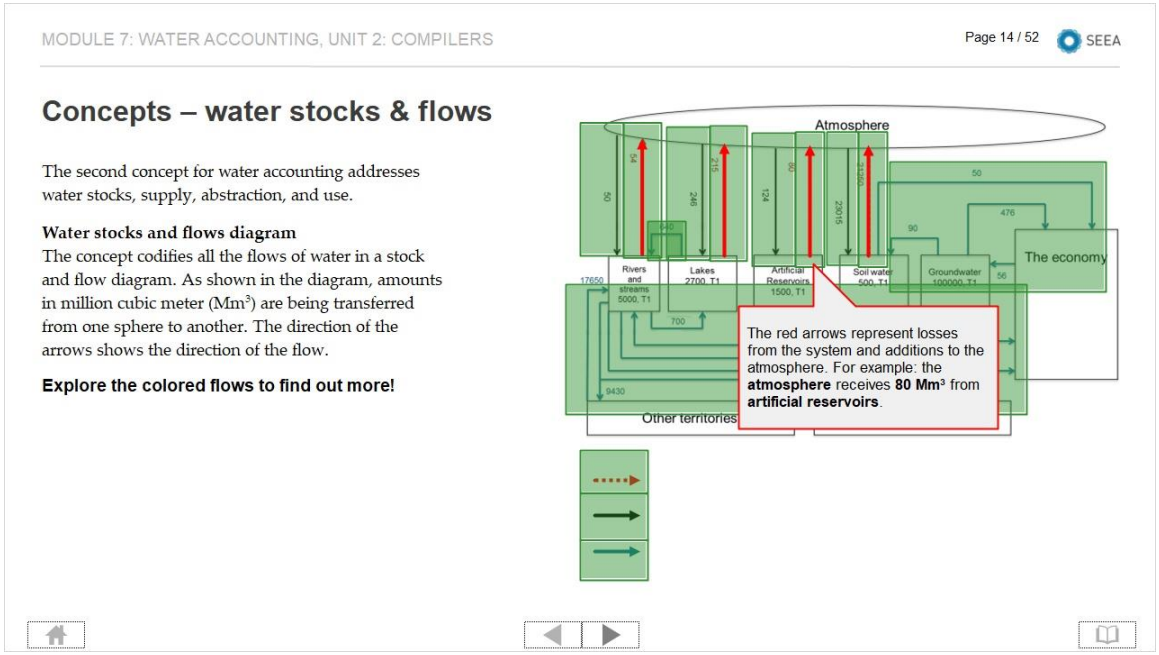
Incorrect (Slide Layer)



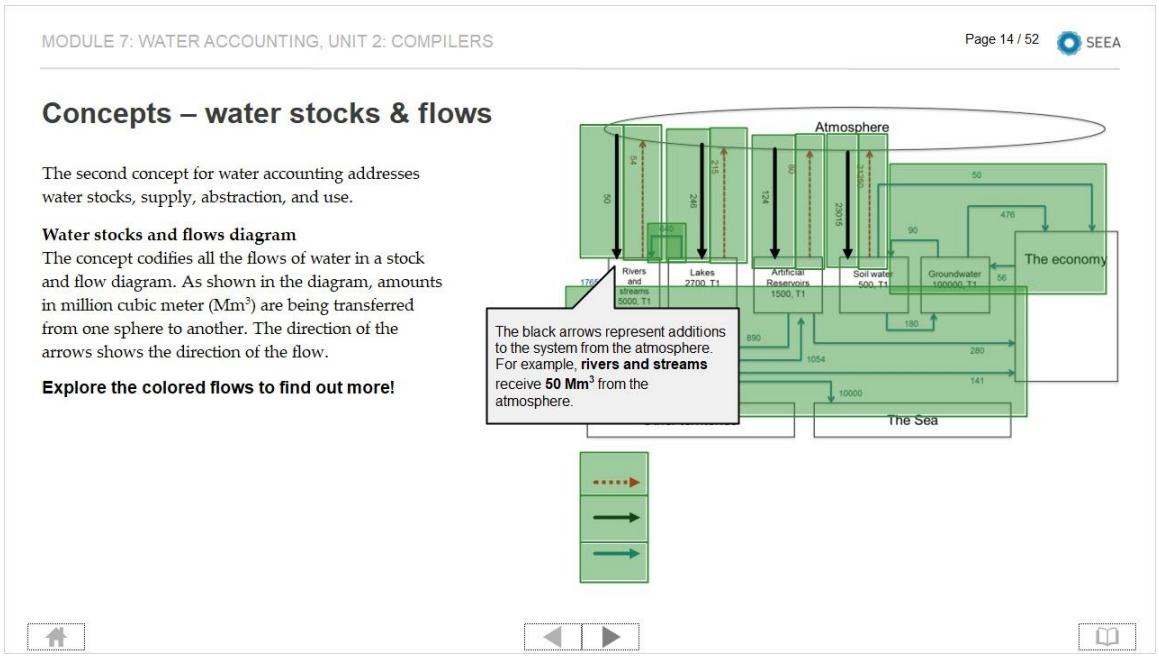
1.14 Concepts - Water stocks & flows



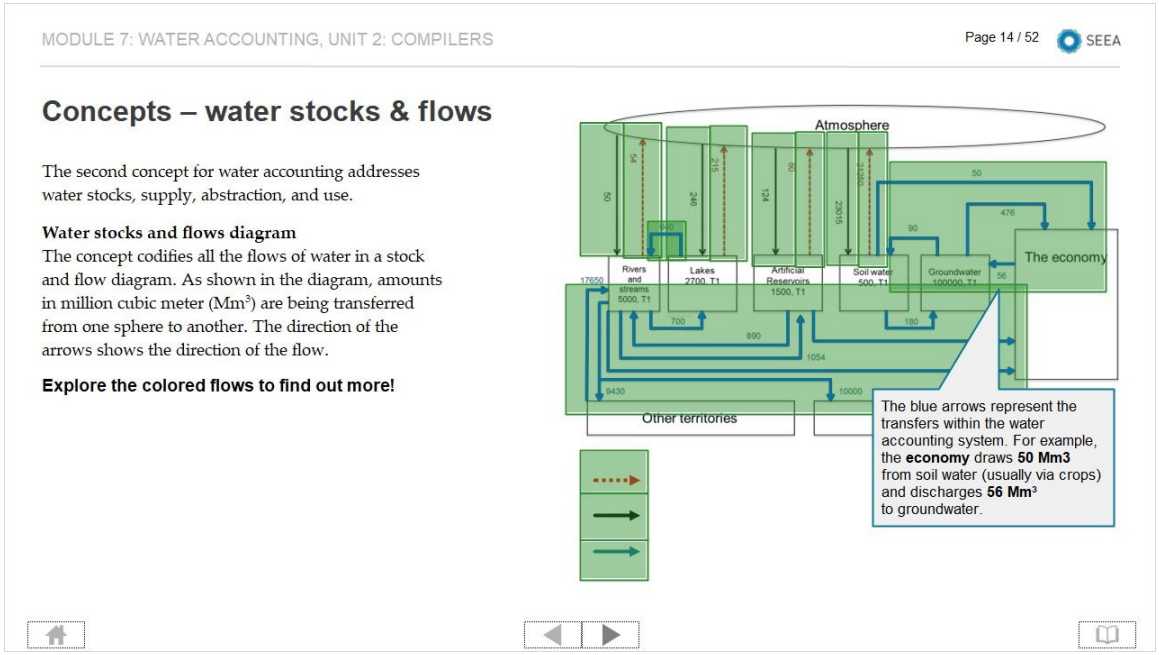
rot (Slide Layer)



schwarz (Slide Layer)



blau (Slide Layer)



1.15 Concepts - Water stocks & flows

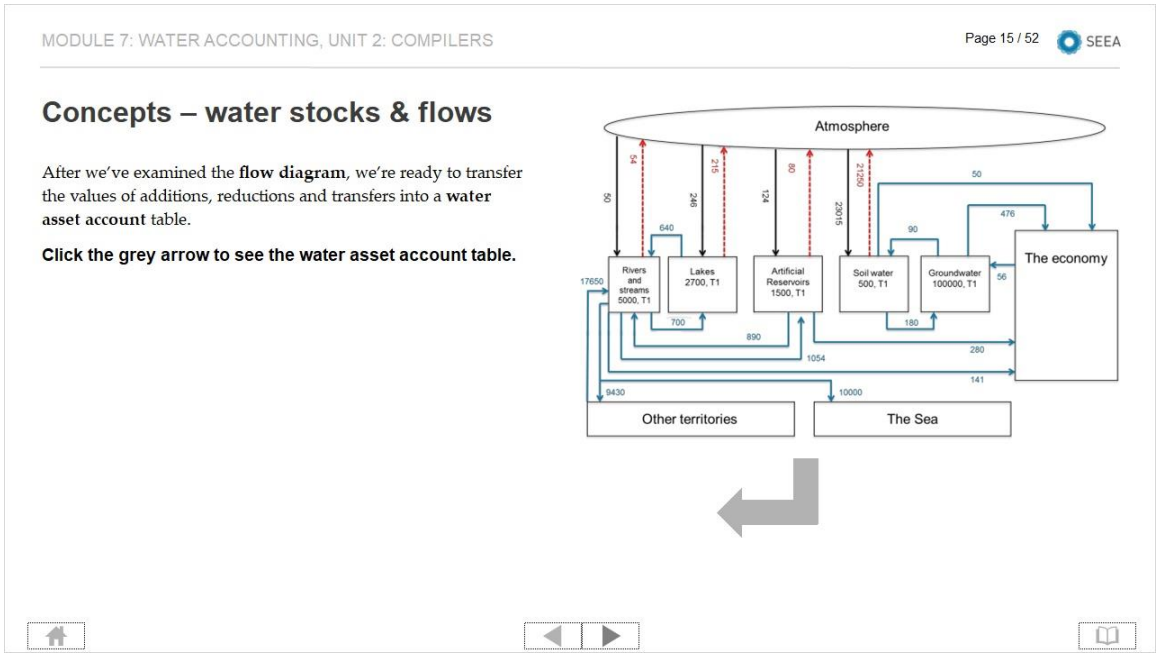
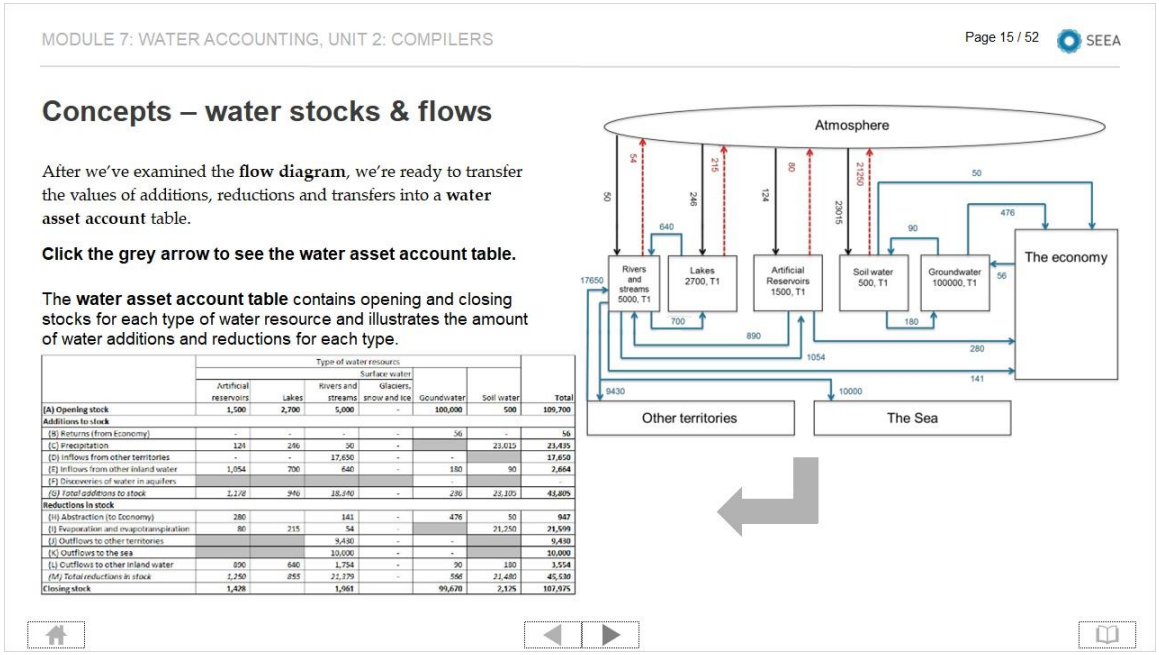
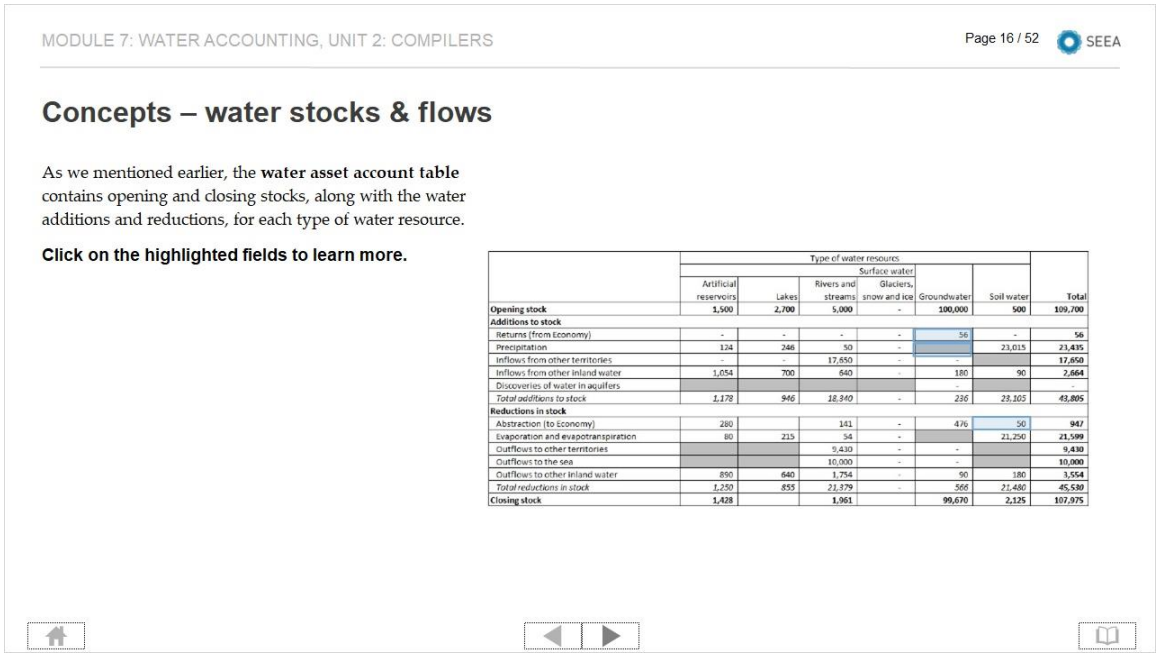


Table (Slide Layer)

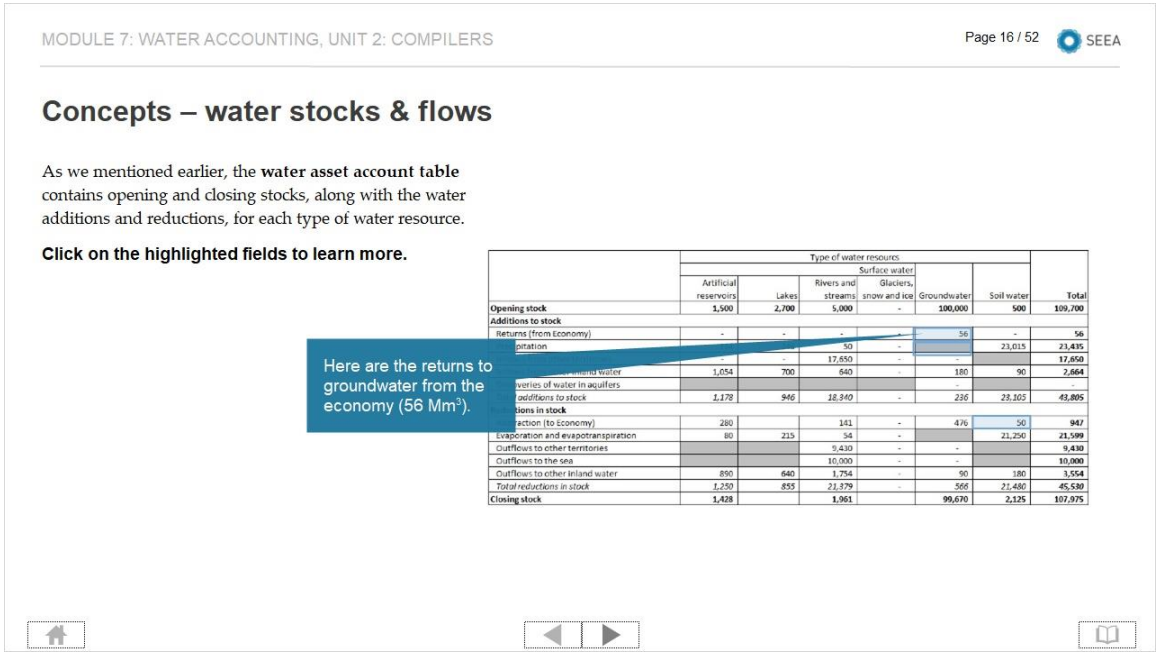


1.16 Concepts - Water stocks & flows



	Type of water resources						
			Surface water				
	Artificial reservoirs	Lakes	Rivers and streams	Glaciers, snow and ice	Groundwater	Soil water	Total
Opening stock	1,500	2,700	5,000	-	100,000	500	109,700
Additions to stock							
Returns (from Economy)	-	-	-	-	56	-	56
Precipitation	124	246	50	-		23,015	23,435
Inflows from other territories	-	-	17,650	-	-		17,650
Inflows from other inland water	1,054	700	640	-	180	90	2,664
Discoveries of water in aquifers					-		-
Total additions to stock	*1,178*	*946*	*18,340*	-	*236*	*23,105*	*43,805*
Reductions in stock							
Abstraction (to Economy)	280		141	-	476	50	947
Evaporation and evapotranspiration	80	215	54	-		21,250	21,599
Outflows to other territories			9,430	-	-		9,430
Outflows to the sea			10,000	-	-		10,000
Outflows to other inland water	890	640	1,754	-	90	180	3,554
Total reductions in stock	*1,250*	*855*	*21,379*	-	*566*	*21,480*	*45,530*
Closing stock	1,428		1,961		99,670	2,125	107,975

Explanation 1 (Slide Layer)



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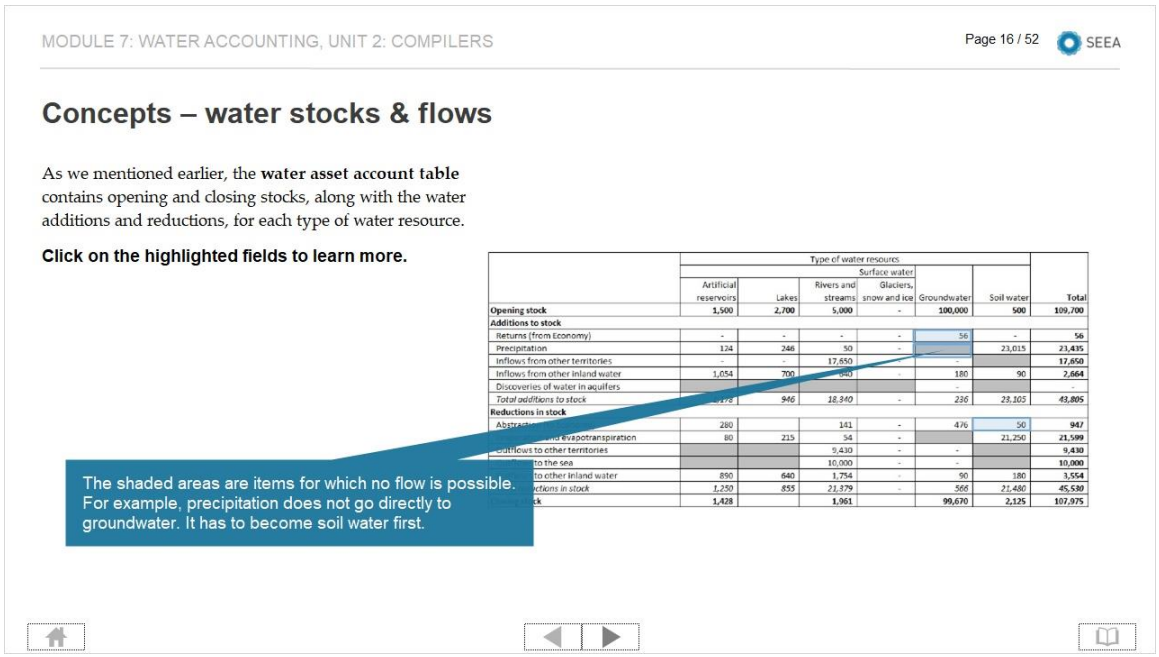
Explanation 2 (Slide Layer)



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Explanation 3 (Slide Layer)

Concepts – water stocks & flows

As we mentioned earlier, the **water asset account table** contains opening and closing stocks, along with the water additions and reductions, for each type of water resource.

Click on the highlighted fields to learn more.

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Reductions in stock							
Abstraction (to Economy)	280		141	-	476	50	947
Evaporation and evapotranspiration	80	215	54	-		21,250	21,599
Outflows to other territories			9,430	-	-		9,430
Outflows to the sea			10,000		-		10,000
Outflows to other inland water	890	640	1,754	-	90	180	3,554
Total reductions in stock	*1,250*	*855*		-	*566*	*21,480*	*45,530*
Closing stock	1,428		1,961		99,670	2,125	107,975

The abstraction of soil water by the economy (50 Mm^3).

1.17 Concepts - Water stocks & flows

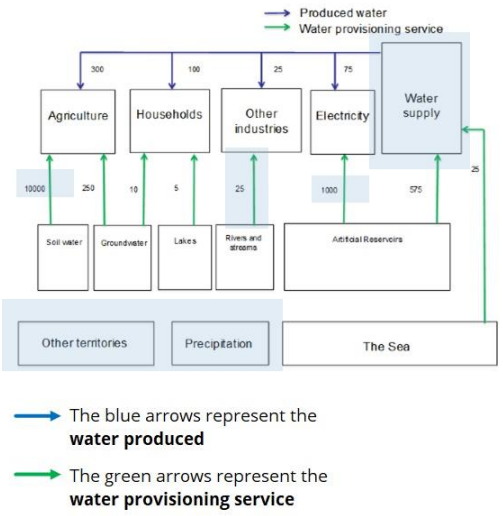
Concepts – water stocks & flows

In a similar process to how we turned the flow diagram into the water asset account table, we can take a **water use diagram** and create a **physical water use table.**

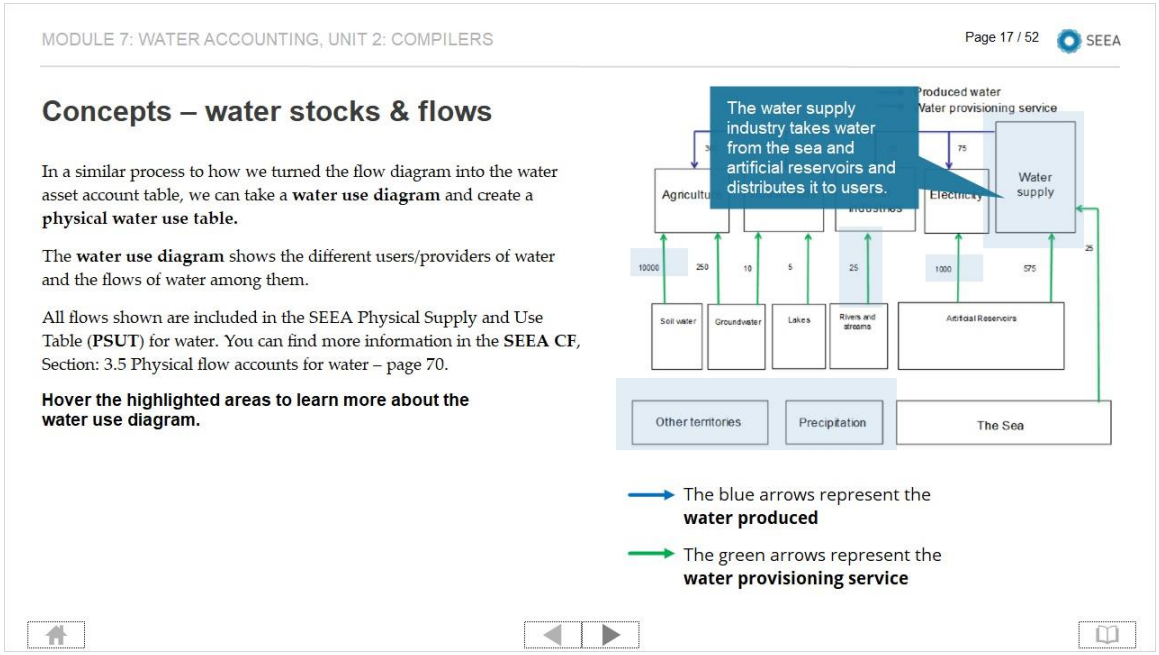
The **water use diagram** shows the different users/providers of water and the flows of water among them.

All flows shown are included in the SEEA Physical Supply and Use Table (**PSUT**) for water. You can find more information in the **SEEA CF**, Section: 3.5 Physical flow accounts for water – page 70.

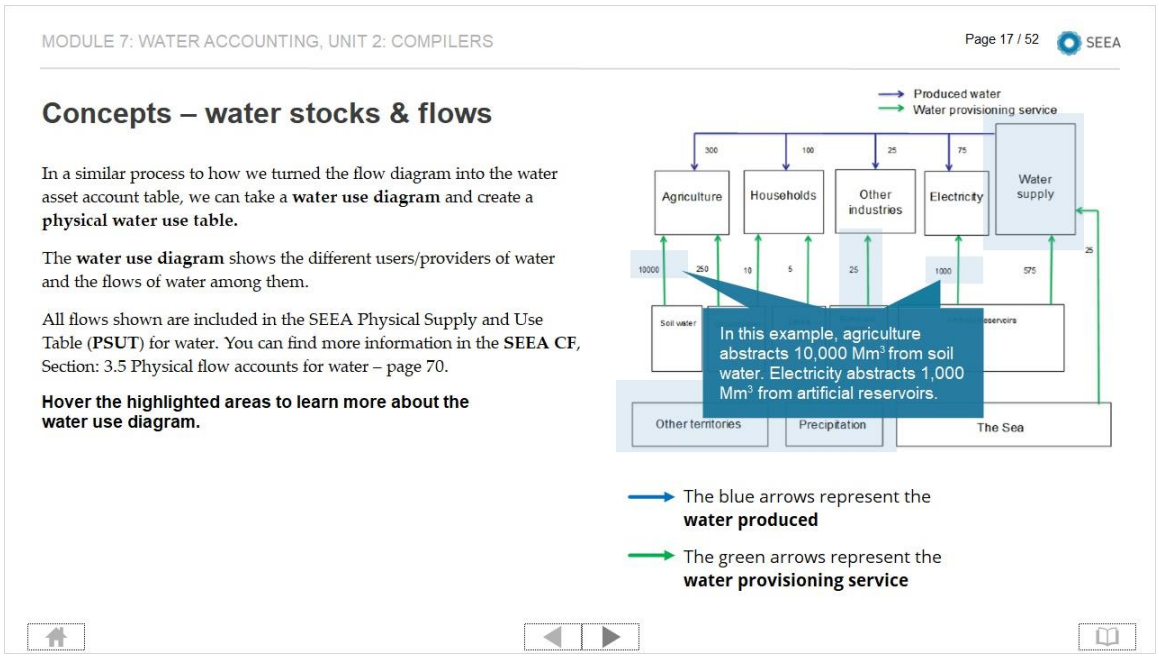
Hover the highlighted areas to learn more about the water use diagram.



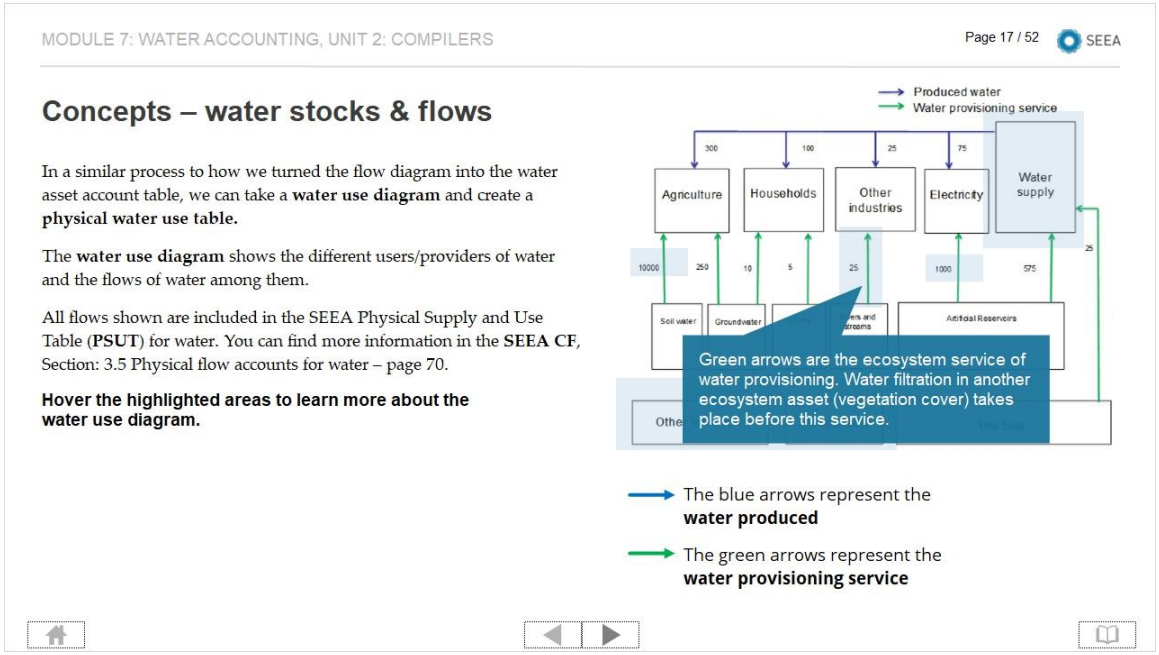
Explanation 1 (Slide Layer)



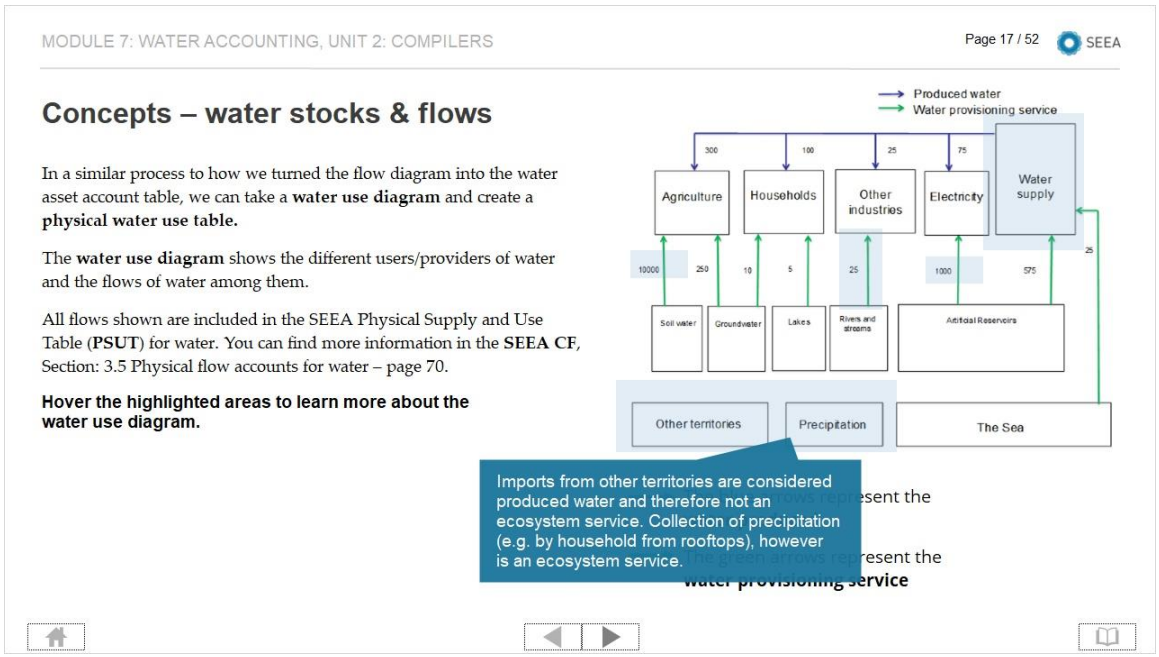
Explanation 2 (Slide Layer)



Explanation 3 (Slide Layer)



Explanation 4 (Slide Layer)



1.18 Concepts - Water stocks & flows

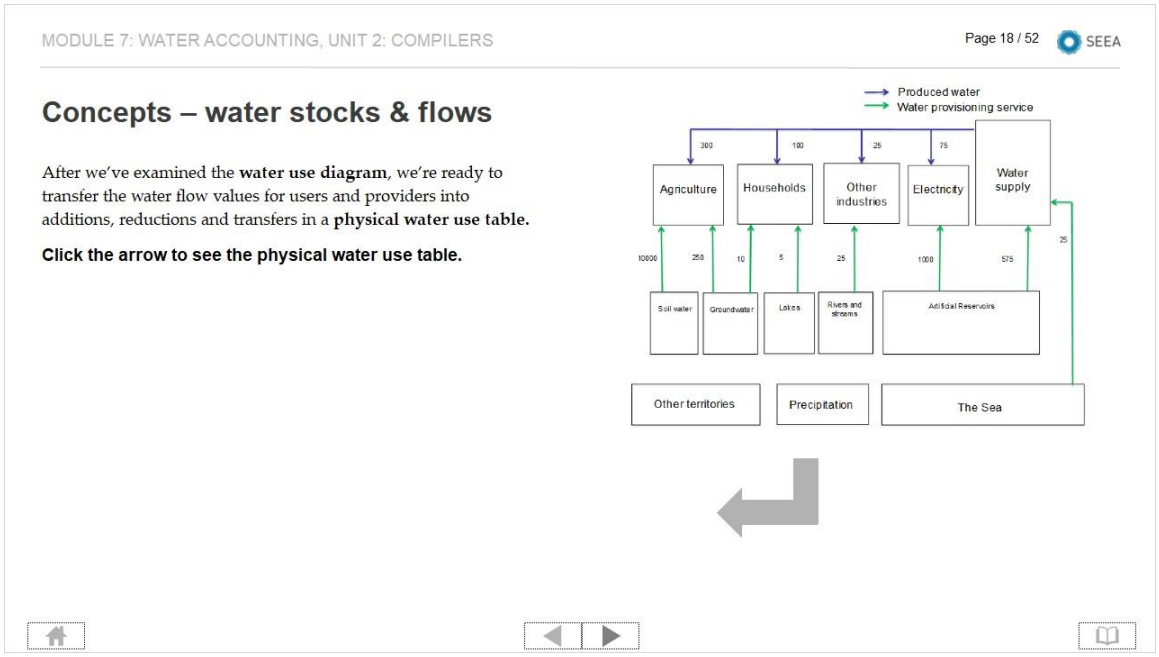
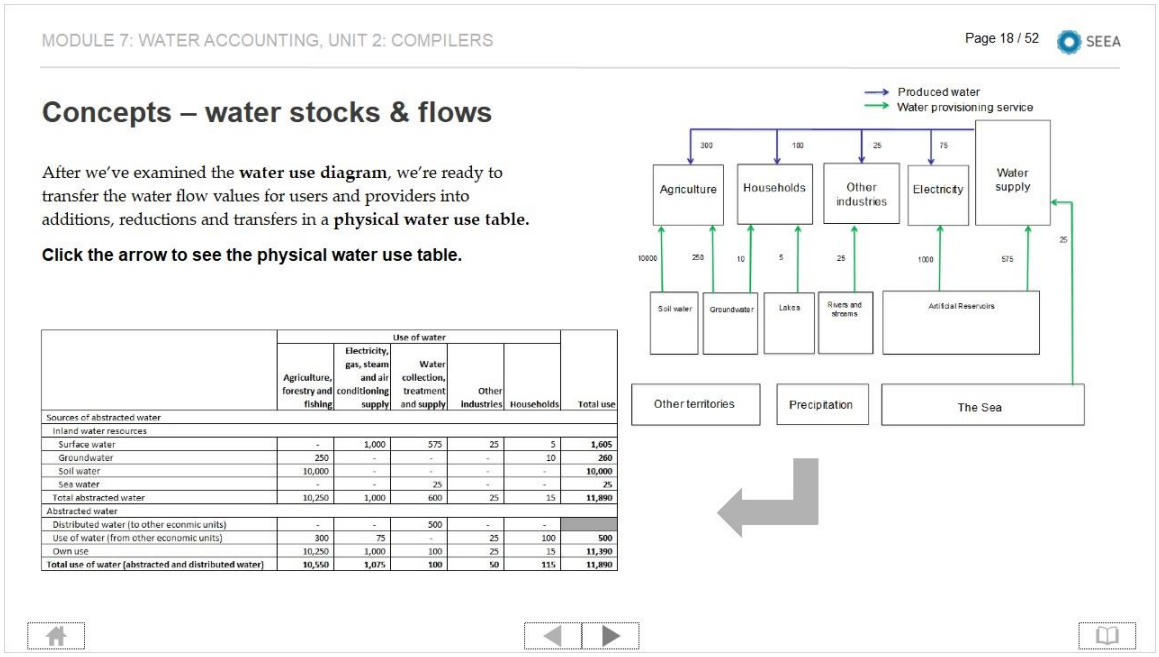
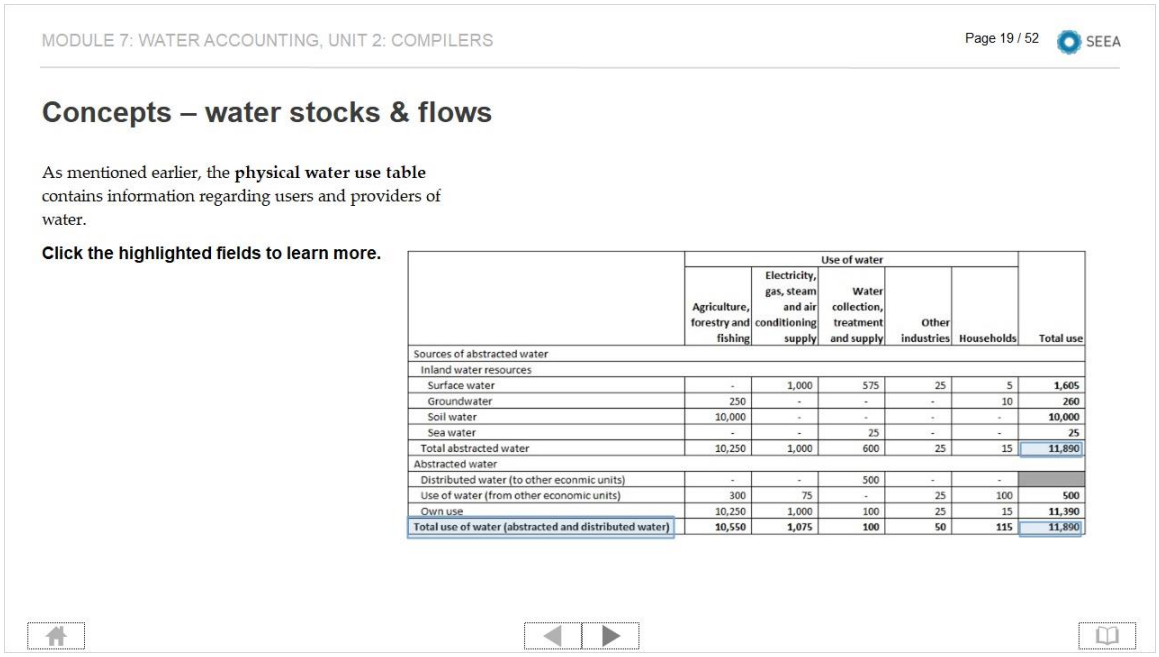


Table (Slide Layer)



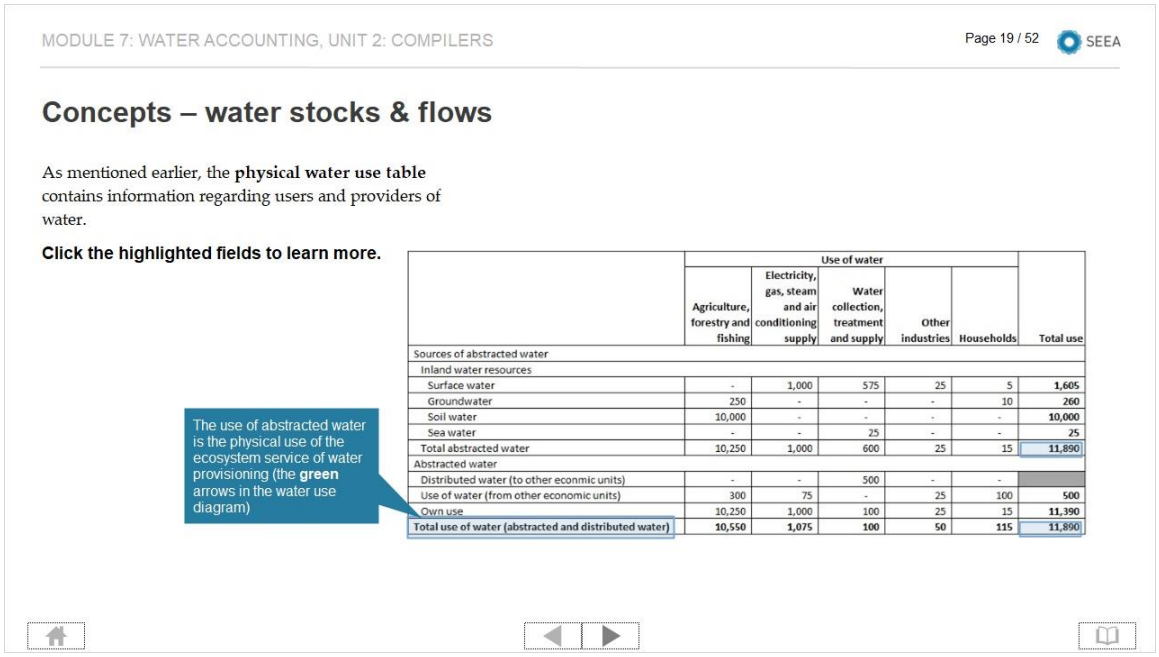
	Use of water					
	Agriculture, forestry and fishing	Electricity, gas, steam and air conditioning supply	Water collection, treatment and supply	Other industries	Households	Total use
Sources of abstracted water						
Inland water resources						
Surface water	-	1,000	575	25	5	**1,605**
Groundwater	250	-	-	-	10	**260**
Soil water	10,000	-	-	-	-	**10,000**
Sea water	-	-	25	-	-	**25**
Total abstracted water	10,250	1,000	600	25	15	**11,890**
Abstracted water						
Distributed water (to other econmic units)	-	-	500	-	-	
Use of water (from other economic units)	300	75	-	25	100	**500**
Own use	10,250	1,000	100	25	15	**11,390**
Total use of water (abstracted and distributed water)	**10,550**	**1,075**	**100**	**50**	**115**	**11,890**

1.19 Concepts - Water stocks & flows



	Use of water					
	Agriculture, forestry and fishing	Electricity, gas, steam and air conditioning supply	Water collection, treatment and supply	Other industries	Households	Total use
Sources of abstracted water						
Inland water resources						
Surface water	-	1,000	575	25	5	1,605
Groundwater	250	-	-	-	10	260
Soil water	10,000	-	-	-	-	10,000
Sea water	-	-	25	-	-	25
Total abstracted water	10,250	1,000	600	25	15	11,890
Abstracted water						
Distributed water (to other econmic units)	-	-	500	-	-	
Use of water (from other economic units)	300	75	-	25	100	500
Own use	10,250	1,000	100	25	15	11,390
Total use of water (abstracted and distributed water)	10,550	1,075	100	50	115	11,890

Explanation 1 (Slide Layer)



	Use of water					
	Agriculture, forestry and fishing	Electricity, gas, steam and air conditioning supply	Water collection, treatment and supply	Other industries	Households	Total use
Sources of abstracted water						
Inland water resources						
Surface water	-	1,000	575	25	5	1,605
Groundwater	250	-	-	-	10	260
Soil water	10,000	-	-	-	-	10,000
Sea water	-	-	25	-	-	25
Total abstracted water	10,250	1,000	600	25	15	11,890
Abstracted water						
Distributed water (to other econmic units)	-	-	500	-	-	
Use of water (from other economic units)	300	75	-	25	100	500
Own use	10,250	1,000	100	25	15	11,390
Total use of water (abstracted and distributed water)	10,550	1,075	100	50	115	11,890

Explanation 2 (Slide Layer)

Concepts – water stocks & flows

As mentioned earlier, the **physical water use table** contains information regarding users and providers of water.

Click the highlighted fields to learn more.

	Use of water					
	Agriculture, forestry and fishing	Electricity, gas, steam and air conditioning supply	Water collection, treatment and supply	Other industries	Households	Total use
Sources of abstracted water						
Inland water resources						
Surface water	-	1,000	575	25	5	1,605
Groundwater					10	260
Soil water	10				-	10,000
Sea water					-	25
Total abstracted water	10				15	11,890
Abstracted water						
Distributed water (to other econmic units)					-	
Use of water (from other economic units)	300	75	-	25	100	500
Own use	10,250	1,000	100	25	15	11,390
Total use of water (abstracted and distributed water)	10,550	1,075	100	50	115	11,890

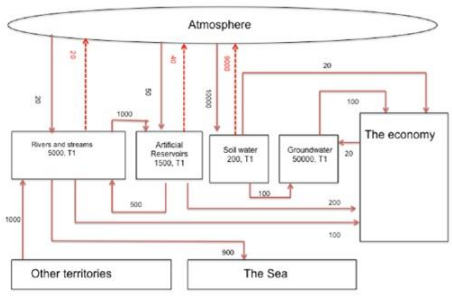
It should be noted that when creating a physical water use account, the total abstracted water = total use of water

1.20 Water Asset Account and Water Use Table Exercise

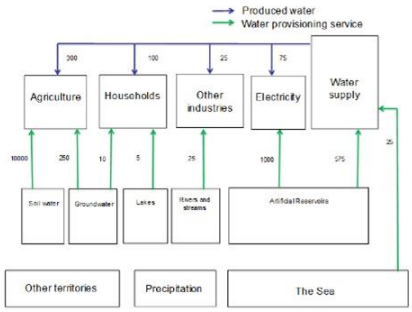
Water asset account and water use table exercise

Let's go further into compiling a **water asset account** and **water use table** by using a stock and flow diagram and a water use diagram. The main goal of this exercise is to identify the main **water use** from the diagrams given.

Stock and flow diagram (all units in m³)



Water use diagram (all units in m³)



1.21 Water Asset Account and Water Use Table Exercise

Water asset account and water use table exercise

To compile the water asset account, we will need a water use table (**Table 1**). In addition, to compile the water use table, we will an asset account for water resources (**Table 2**).

All right, let's get started!

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

	Type of water resources				
	Surface water				
	Artificial reservoirs	Rivers and streams	Groundwater	Soil water	**Total**
(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					
(G) Total additions to stock					
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					
(M) Total reductions in stock					
Closing stock					

1.22 Untitled Slide

Water asset account exercise

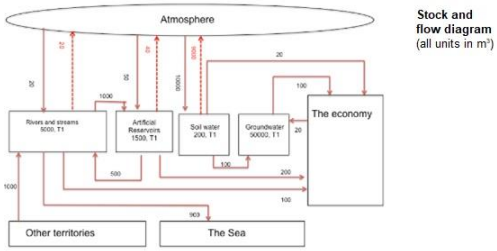
To compile the stock account in the water asset account, follow these two steps:

1) **Transfer opening stock and flows from stock and flow diagram**
2) **Calculate totals and closing stock (columns and rows)**

Note:

- The water stocks are artificial reservoirs, rivers and streams, groundwater, and soil water.
- (E) and (L) are transfers among rivers and streams, artificial reservoirs, groundwater and soil water.
- The shaded areas mean there are no flows from or within these stocks.

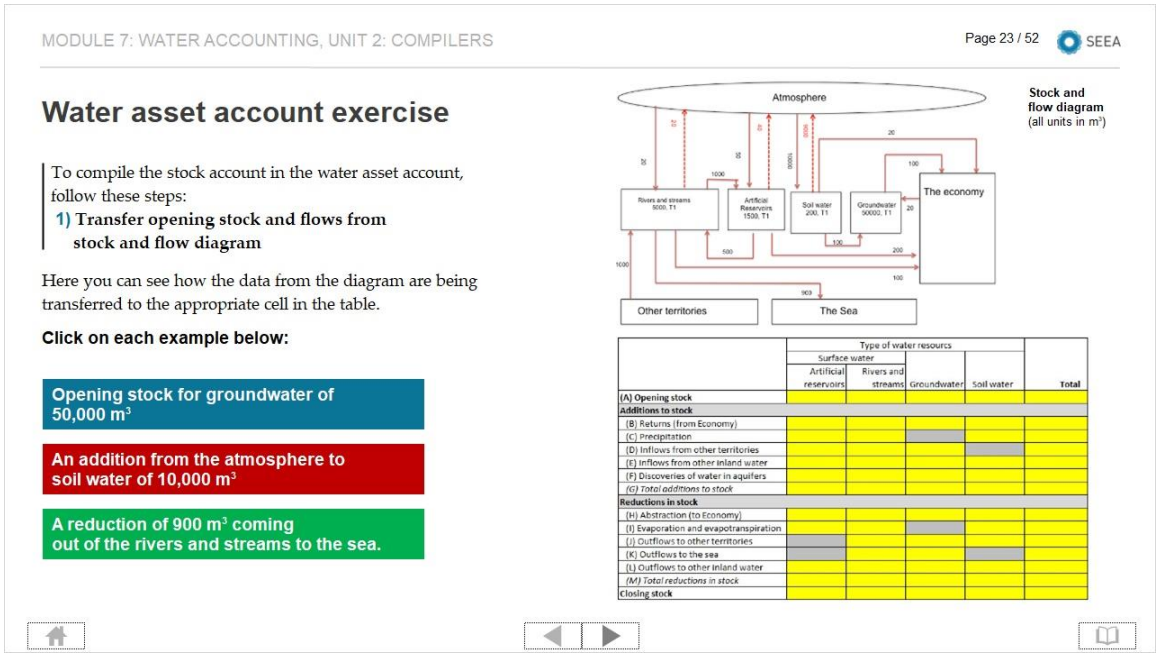
Learn more about how to compile the water asset account in the next slide.



Stock and flow diagram (all units in m³)

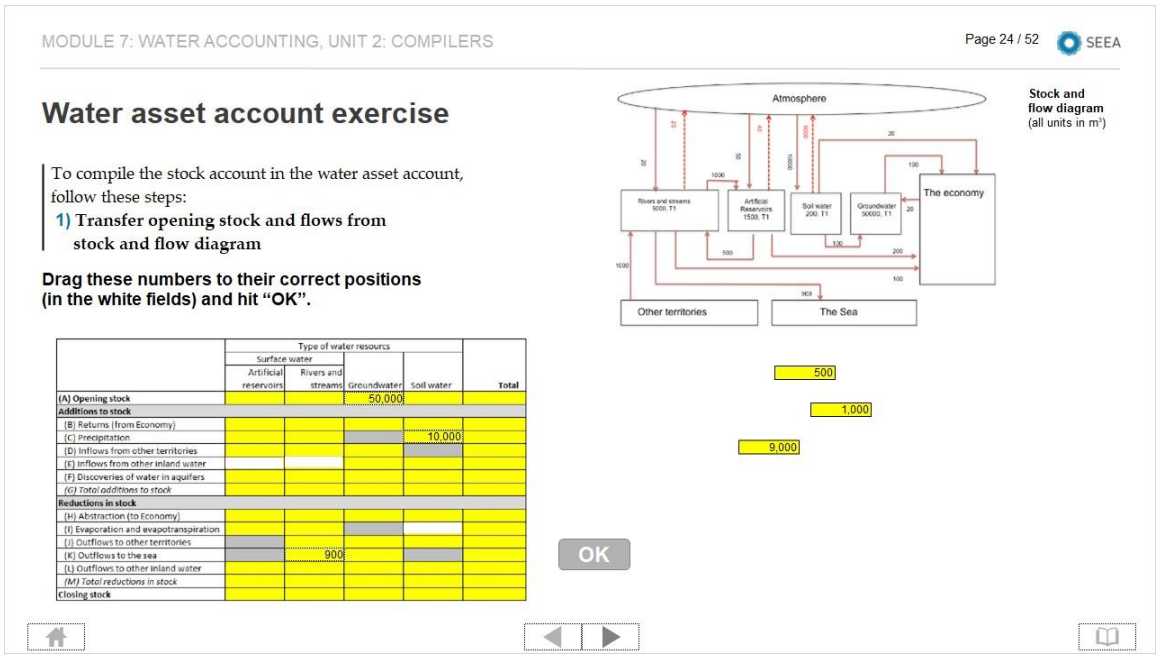
	Type of water resources				
	Surface water				
	Artificial reservoirs	Rivers and streams	Groundwater	Soil water	**Total**
(A) Opening stock					
Additions to stock					
(B) Returns (from Economy)					
(C) Precipitation					
(D) Inflows from other territories					
(E) Inflows from other inland water					
(F) Discoveries of water in aquifers					
(G) Total additions to stock					
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					
(M) Total reductions in stock					
Closing stock					

1.23 Untitled Slide



1.24 Drag and Drop

(Drag and Drop, 10 points, 1 attempt permitted)



Drag Item	Drop Target
500	Rectangle 2
1,000	Rectangle 1
9,000	Rectangle 3

Drag and drop properties
Snap dropped items to drop target (Stack random)
Delay item drop states until interaction is submitted

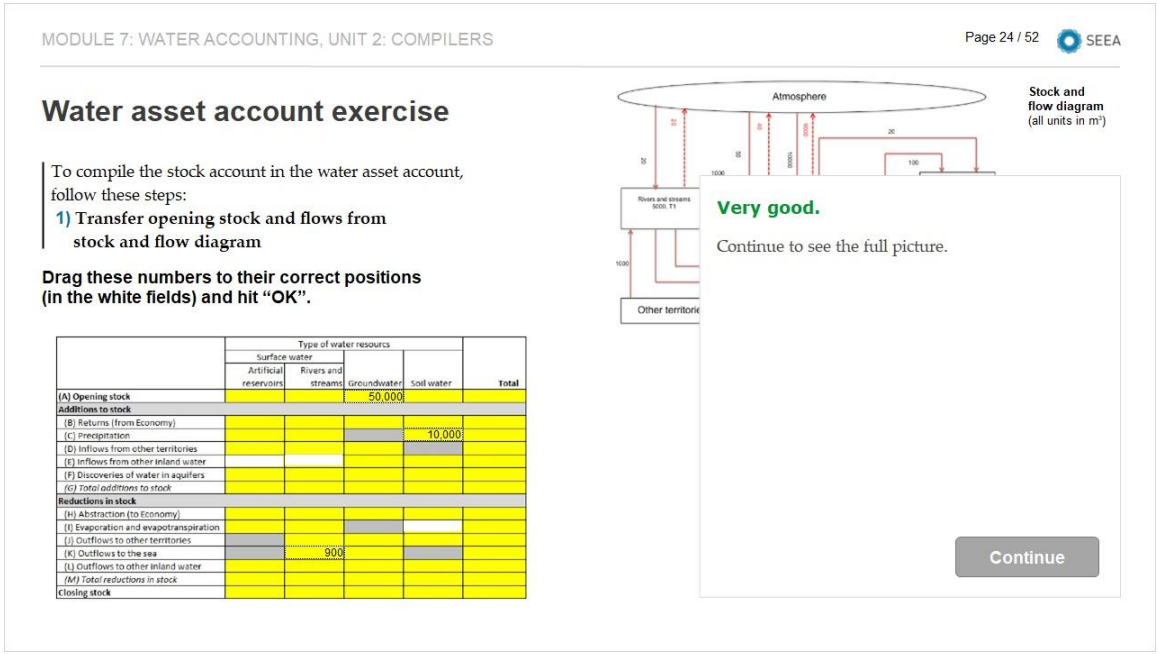
Feedback when correct:

Continue to see the full picture.

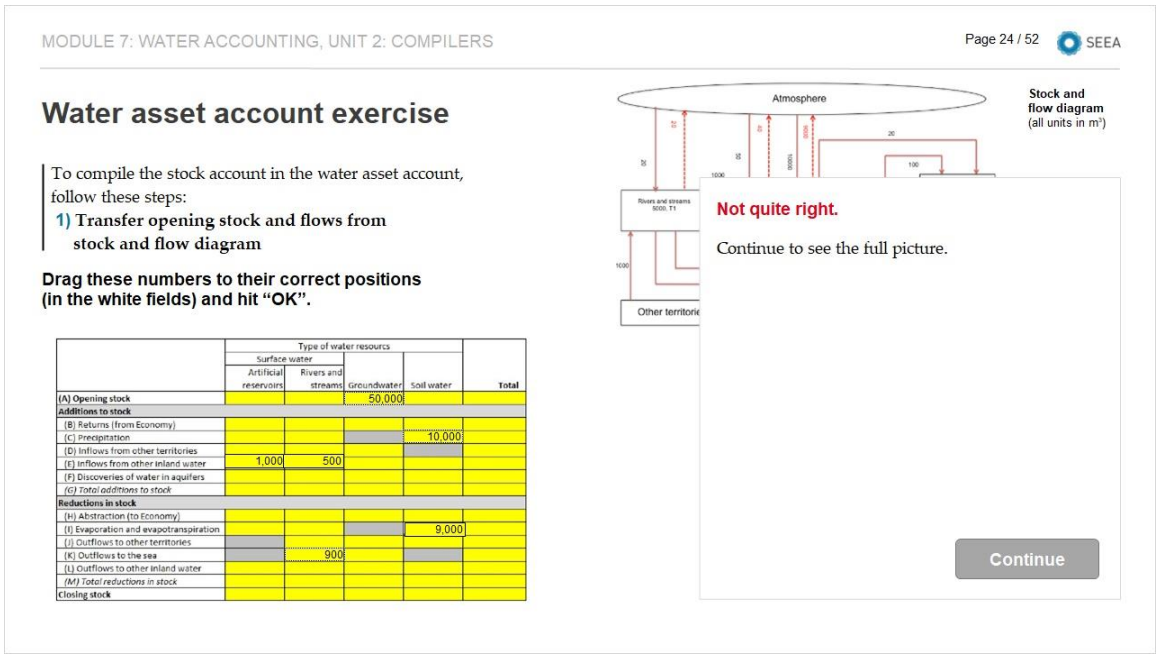
Feedback when incorrect:

Continue to see the full picture.

Very good. (Slide Layer)



Not quite right. (Slide Layer)



1.25 Untitled Slide

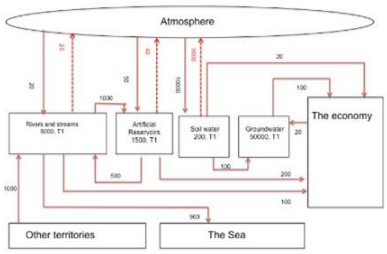
Water asset account exercise

To compile the stock account in the water asset account, follow these steps:

2) **Calculate totals and closing stock (columns and rows)**

Great! Now you have all the data needed to calculate the totals and closing stocks. Lets start by calculating the totals.

Click the highlighted boxes in the table to learn more about calculating the totals.



Stock and flow diagram (all units in m³)

	Type of water resource				
	Surface water				
	Artificial reservoirs	Rivers and streams	Groundwater	Soil water	Total
(A) Opening stock	1,500	5,000	50,000	200	56,700
Additions to stock					
(B) Returns (from Economy)	-	-	20	-	
(C) Precipitation	50	20		10,000	
(D) Inflows from other territories	-	1,000	-		
(E) Inflows from other inland water	1,000	500	100	-	
(F) Discoveries of water in aquifers	-	-	-	-	
(G) Total additions to stock		1,520			
Reductions in stock					
(H) Abstraction (to Economy)	200	100	100	20	
(I) Evaporation and evapotranspiration	40	20		9,000	9,060
(J) Outflows to other territories		-	-	-	
(K) Outflows to the sea		900	-		
(L) Outflows to other inland water	500	1,000	-	100	
(M) Total reductions in stock					
Closing stock					

1.26 Untitled Slide

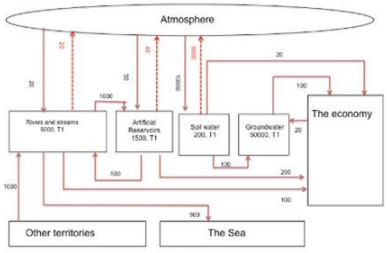
Water asset account exercise

To compile the stock account in the water asset account, follow these steps:

2) **Calculate totals and closing stock (columns and rows)**

Very good! Now you have all the data required to calculate the **closing stock.**

Click on the highlighted box to learn more about calculating the closing account.

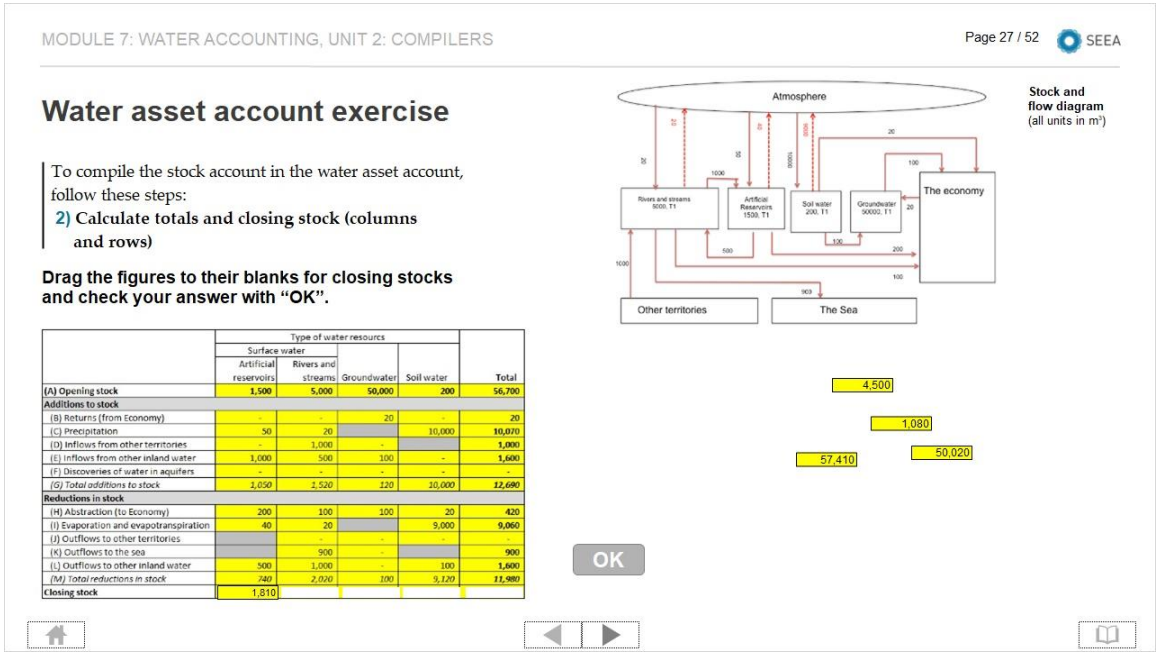


Stock and flow diagram (all units in m³)

	Type of water resource				
	Surface water				
	Artificial reservoirs	Rivers and streams	Groundwater	Soil water	Total
(A) Opening stock	1,500	5,000	50,000	200	56,700
Additions to stock					
(B) Returns (from Economy)	-	-	20	-	20
(C) Precipitation	50	20		10,000	10,070
(D) Inflows from other territories	-	1,000	-		1,000
(E) Inflows from other inland water	1,000	500	100	-	1,600
(F) Discoveries of water in aquifers	-	-	-	-	-
(G) Total additions to stock	*1,050*	*1,520*	*120*	*10,000*	*12,690*
Reductions in stock					
(H) Abstraction (to Economy)	200	100	100	20	420
(I) Evaporation and evapotranspiration	40	20		9,000	9,060
(J) Outflows to other territories		-	-	-	-
(K) Outflows to the sea		900	-		900
(L) Outflows to other inland water	500	1,000	-	100	1,600
(M) Total reductions in stock	*740*	*2,020*	*100*	*9,120*	*11,980*
Closing stock	1,810				

1.27 Drag and Drop

(Drag and Drop, 10 points, 1 attempt permitted)



	Type of water resources				
	Surface water				
	Artificial reservoirs	Rivers and streams	Groundwater	Soil water	Total
(A) Opening stock	**1,500**	**5,000**	**50,000**	**200**	**56,700**
Additions to stock					
(B) Returns (from Economy)	-	-	20	-	**20**
(C) Precipitation	50	20		10,000	**10,070**
(D) Inflows from other territories	-	1,000	-		**1,000**
(E) Inflows from other inland water	1,000	500	100	-	**1,600**
(F) Discoveries of water in aquifers	-	-	-	-	-
(G) Total additions to stock	*1,050*	*1,520*	*120*	*10,000*	***12,690***
Reductions in stock					
(H) Abstraction (to Economy)	200	100	100	20	**420**
(I) Evaporation and evapotranspiration	40	20		9,000	**9,060**
(J) Outflows to other territories		-	-	-	-
(K) Outflows to the sea		900	-		**900**
(L) Outflows to other inland water	500	1,000	-	100	**1,600**
(M) Total reductions in stock	*740*	*2,020*	*100*	*9,120*	***11,980***
Closing stock	1,810				

Drag Item	Drop Target
4,500	Rectangle 1
50,020	Rectangle 2
1,080	Rectangle 3
57,410	Rectangle 4

Drag and drop properties
Snap dropped items to drop target (Stack random)
Delay item drop states until interaction is submitted

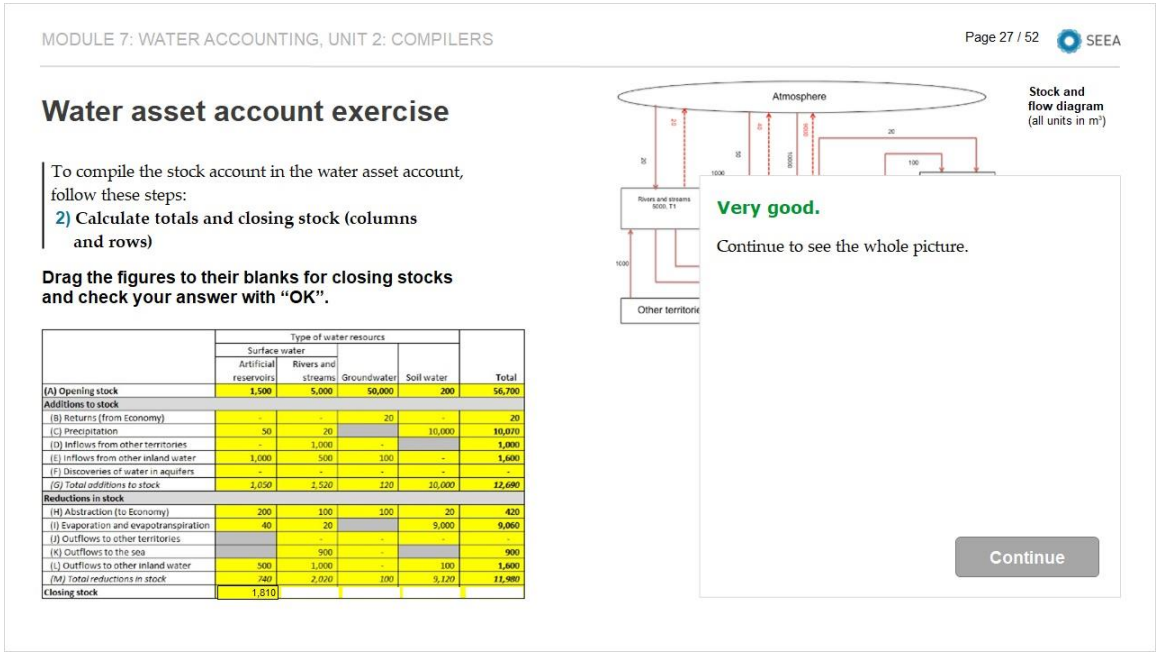
Feedback when correct:

Continue to see the whole picture.

Feedback when incorrect:

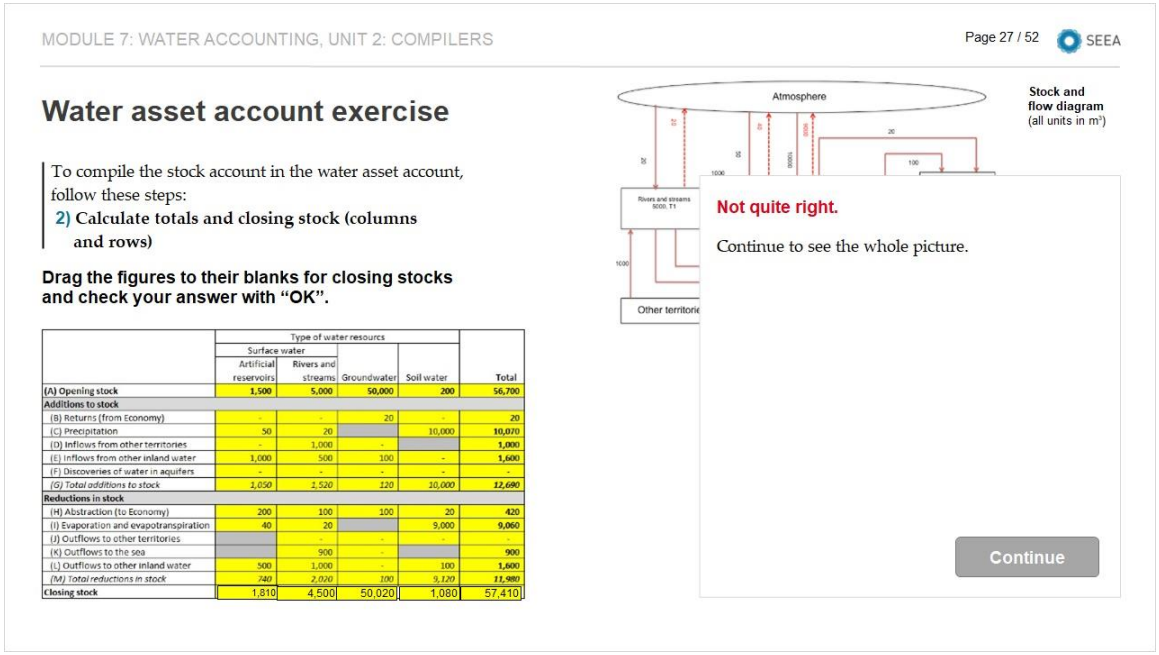
Continue to see the whole picture.

Very good. (Slide Layer)



	Type of water resources				
	Surface water				
	Artificial reservoirs	Rivers and streams	Groundwater	Soil water	Total
(A) Opening stock	**1,500**	**5,000**	**50,000**	**200**	**56,700**
Additions to stock					
(B) Returns (from Economy)	-	-	20	-	20
(C) Precipitation	50	20		10,000	10,070
(D) Inflows from other territories	-	1,000	-		1,000
(E) Inflows from other inland water	1,000	500	100	-	1,600
(F) Discoveries of water in aquifers	-	-	-	-	-
(G) Total additions to stock	*1,050*	*1,520*	*120*	*10,000*	***12,690***
Reductions in stock					
(H) Abstraction (to Economy)	200	100	100	20	420
(I) Evaporation and evapotranspiration	40	20		9,000	9,060
(J) Outflows to other territories		-	-	-	-
(K) Outflows to the sea		900	-		900
(L) Outflows to other inland water	500	1,000	-	100	1,600
(M) Total reductions in stock	*740*	*2,020*	*100*	*9,120*	***11,980***
Closing stock	1,810				

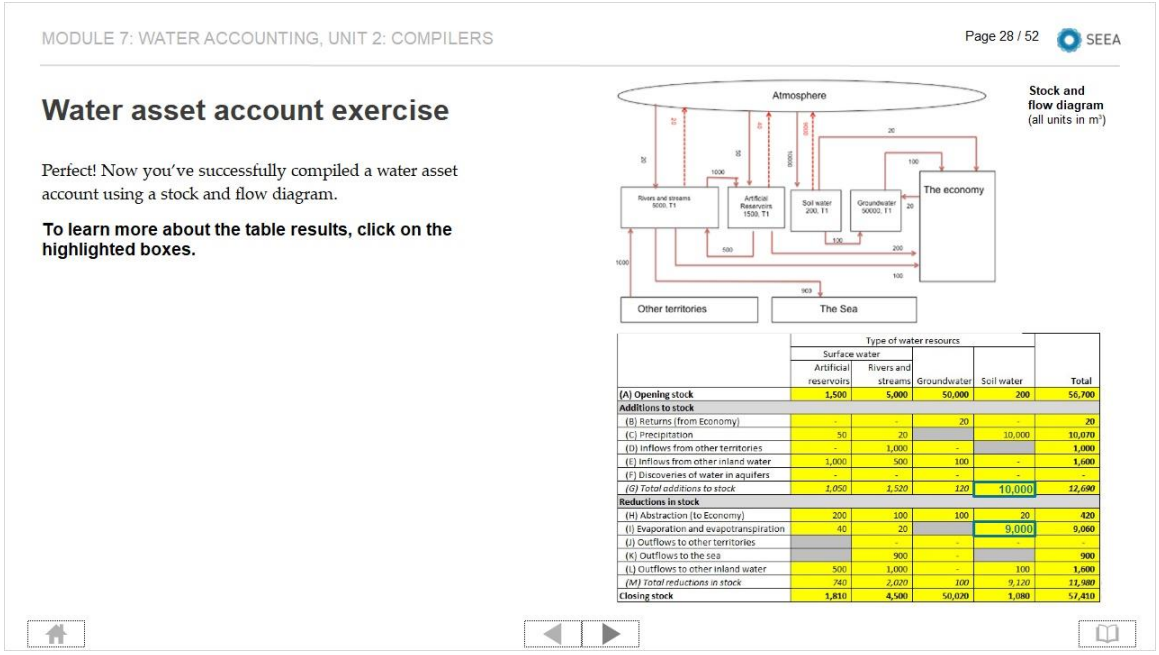
Not quite right. (Slide Layer)



	Type of water resources				
	Surface water				
	Artificial reservoirs	Rivers and streams	Groundwater	Soil water	Total
(A) Opening stock	1,500	5,000	50,000	200	56,700
Additions to stock					
(B) Returns (from Economy)	-	-	20	-	20
(C) Precipitation	50	20		10,000	10,070
(D) Inflows from other territories	-	1,000	-		1,000
(E) Inflows from other inland water	1,000	500	100	-	1,600
(F) Discoveries of water in aquifers	-	-	-	-	-
(G) Total additions to stock	*1,050*	*1,520*	*120*	*10,000*	*12,690*
Reductions in stock					
(H) Abstraction (to Economy)	200	100	100	20	420
(I) Evaporation and evapotranspiration	40	20		9,000	9,060
(J) Outflows to other territories		-	-	-	-
(K) Outflows to the sea		900	-		900
(L) Outflows to other inland water	500	1,000	-	100	1,600
(M) Total reductions in stock	*740*	*2,020*	*100*	*9,120*	*11,980*
Closing stock	1,810	4,500	50,020	1,080	57,410

1.28 Drag and Drop

(Drag and Drop, 10 points, 1 attempt permitted)

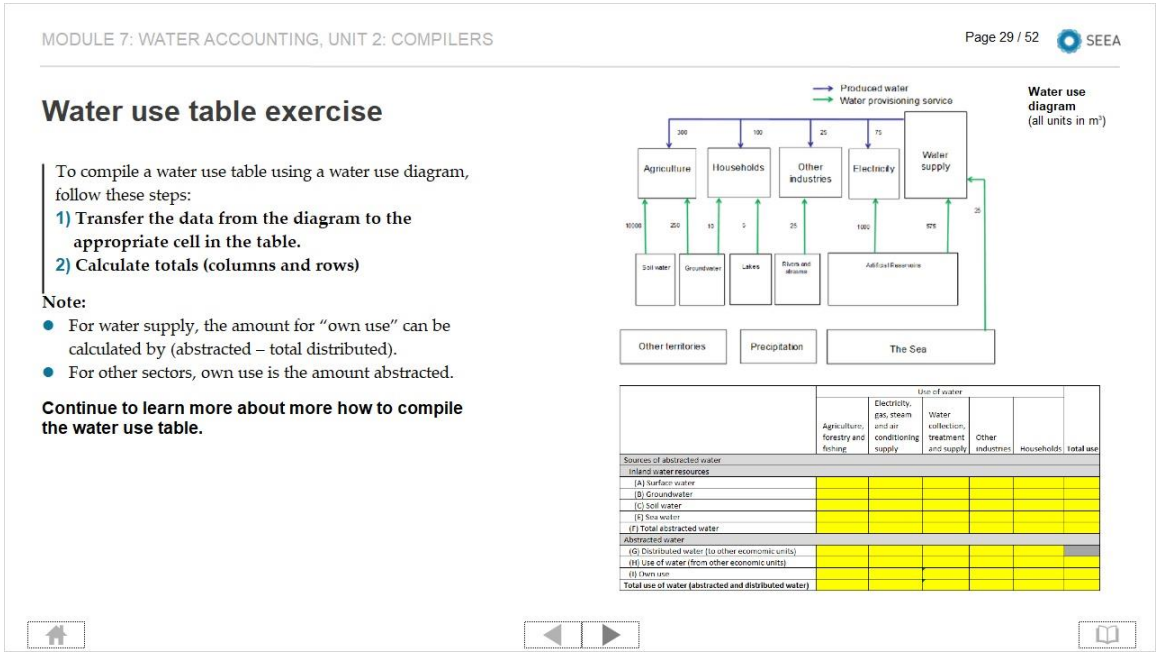


	Type of water resources				
	Surface water				
	Artificial reservoirs	Rivers and streams	Groundwater	Soil water	Total
(A) Opening stock	1,500	5,000	50,000	200	56,700
Additions to stock					
(B) Returns (from Economy)	-	-	20	-	20
(C) Precipitation	50	20		10,000	10,070
(D) Inflows from other territories	-	1,000	-		1,000
(E) Inflows from other inland water	1,000	500	100	-	1,600
(F) Discoveries of water in aquifers	-	-	-	-	-
(G) Total additions to stock	*1,050*	*1,520*	*120*	10,000	*12,690*
Reductions in stock					
(H) Abstraction (to Economy)	200	100	100	20	420
(I) Evaporation and evapotranspiration	40	20		9,000	9,060
(J) Outflows to other territories		-	-	-	-
(K) Outflows to the sea		900	-		900
(L) Outflows to other inland water	500	1,000	-	100	1,600
(M) Total reductions in stock	*740*	*2,020*	*100*	*9,120*	*11,980*
Closing stock	1,810	4,500	50,020	1,080	57,410

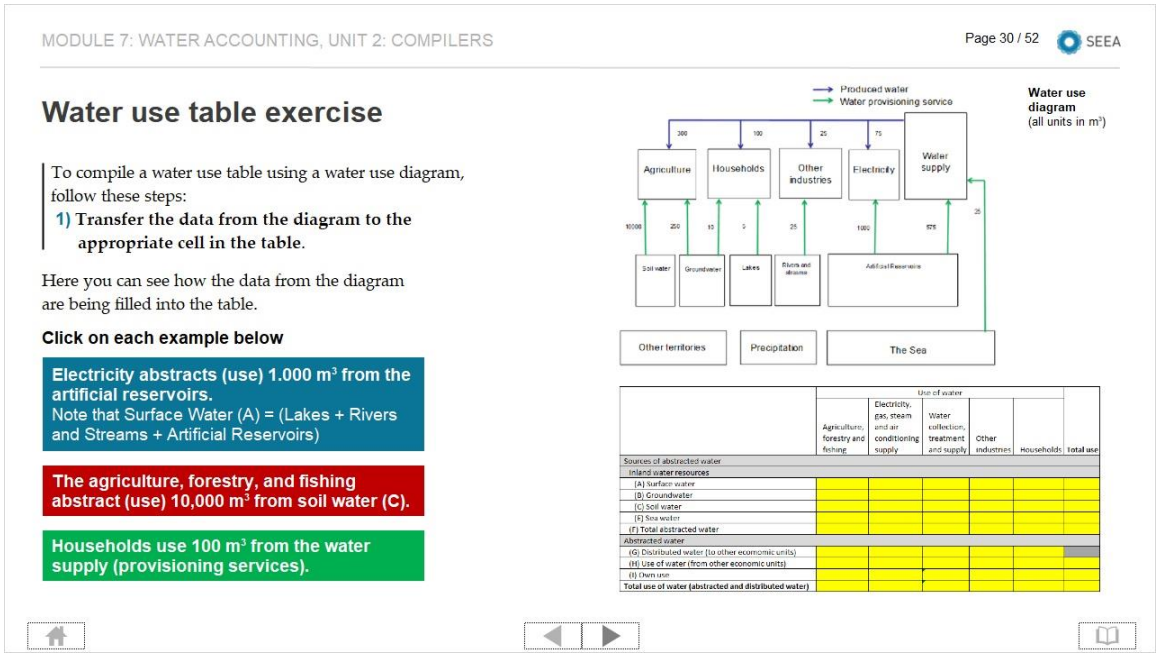
Drag Item	Drop Target

Drag and drop properties
Snap dropped items to drop target (Stack random)
Delay item drop states until interaction is submitted

1.29 Untitled Slide

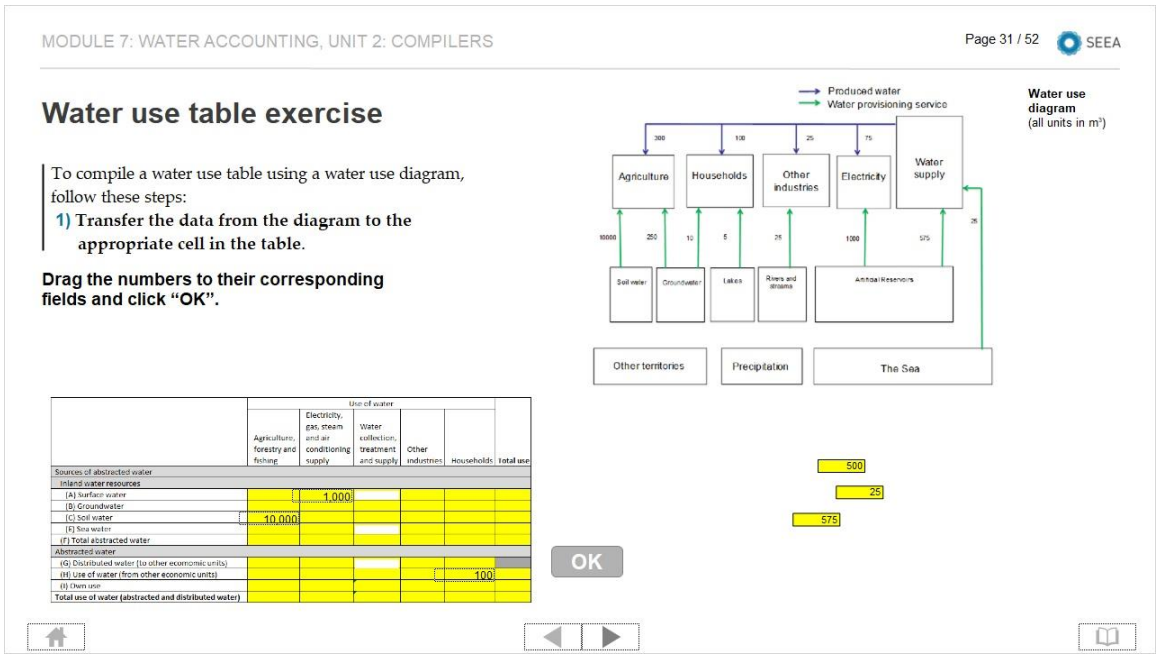


1.30 Untitled Slide



1.31 Drag and Drop

(Drag and Drop, 10 points, 1 attempt permitted)



Drag Item	Drop Target
575	Rectangle 1
25	Rectangle 2
500	Rectangle 3

Drag and drop properties
Snap dropped items to drop target (Stack random)
Delay item drop states until interaction is submitted

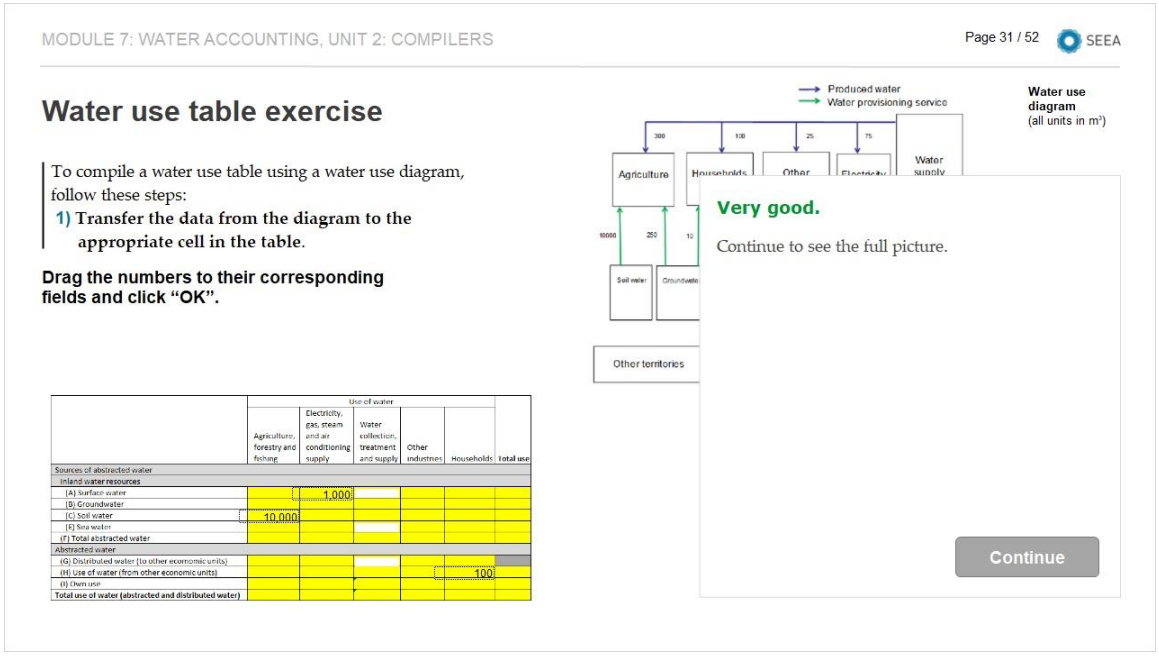
Feedback when correct:

Continue to see the full picture.

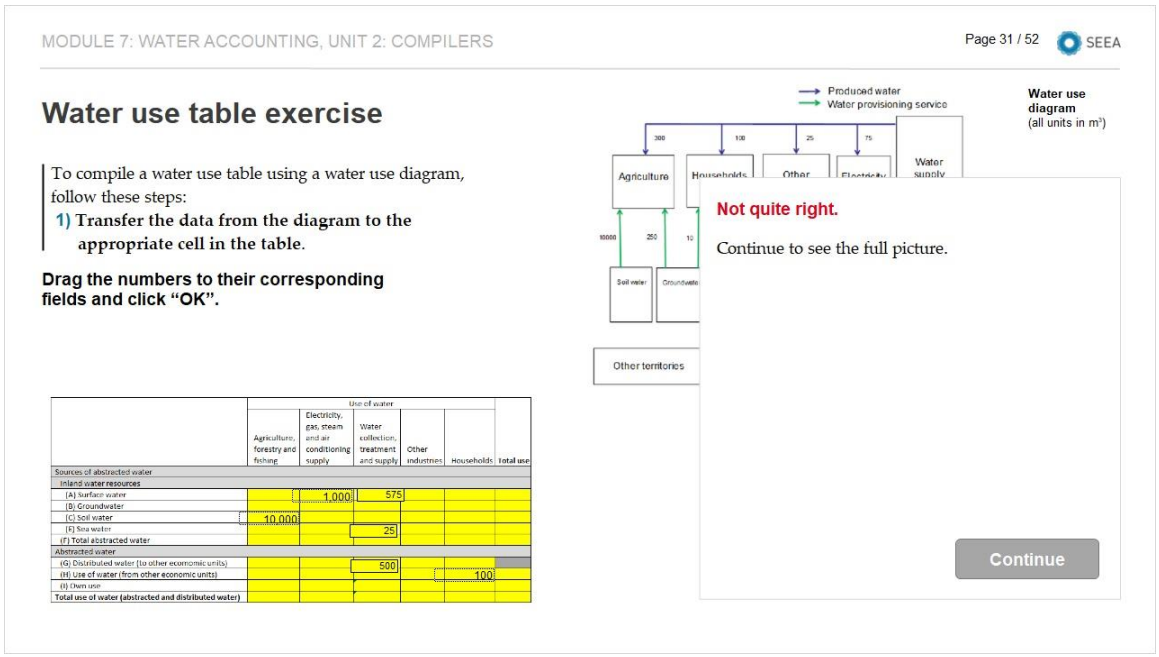
Feedback when incorrect:

Continue to see the full picture.

Very good. (Slide Layer)



Not quite right. (Slide Layer)



1.32 Untitled Slide

Water use table exercise

To compile a water use table using a water use diagram, follow these steps:

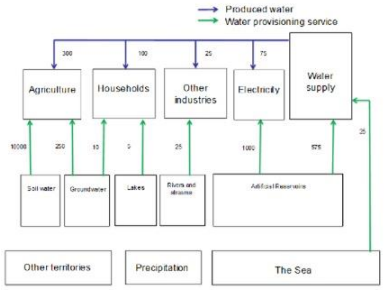
2) Calculate totals (column and rows)

Great! Now you have all the data required to calculate the totals.

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

Click the highlighted fields to learn more about the calculations of totals.

Water use diagram (all units in m³)



	Use of water					
	Agriculture, forestry and fishing	Electricity, gas, steam and air conditioning supply	Water collection, treatment and supply	Other industries	Households	total use
Sources of abstracted water						
Inland water resources						
(A) Surface water	-	1,000	575	25	5	1,605
(B) Groundwater	250	-	-	-	10	
(C) Soil water	10,000	-	-	-	-	
(E) Sea water	-	-	25	-	-	
(F) Total abstracted water	10,250	1,000	600	25	15	
Abstracted water						
(G) Distributed water (to other economic units)			500			
(H) Use of water (from other economic units)	300	75	-	25	100	
(I) Own use	10,250	1,000	100	25	15	11,390
Total use of water (abstracted and distributed water)		1,075				

1.33 Untitled Slide

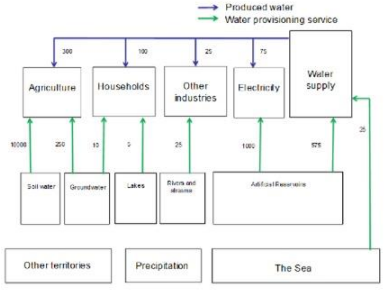
Water use table exercise

Perfect! Now you've successfully compiled a water use table using the water use diagram.

Note: For water collection, treatment and supply, the total use of water (abstracted and distributed water) is only 100 m³.

To learn more about the table results, click on the boxes. Then move on to learn about water data in Unit 3.

Water use diagram (all units in m³)



	Use of water					
	Agriculture, forestry and fishing	Electricity, gas, steam and air conditioning supply	Water collection, treatment and supply	Other industries	Households	total use
Sources of abstracted water						
Inland water resources						
(A) Surface water	-	1,000	575	25	5	1,605
(B) Groundwater	250	-	-	-	10	260
(C) Soil water	10,000	-	-	-	-	10,000
(E) Sea water	-	-	25	-	-	25
(F) Total abstracted water	10,250	1,000	600	25	15	11,890
Abstracted water						
(G) Distributed water (to other economic units)			500			
(H) Use of water (from other economic units)	300	75	-	25	100	500
(I) Own use	10,250	1,000	100	25	15	11,390
Total use of water (abstracted and distributed water)	10,550	1,075	100	50	115	11,890

1.34 Module units

Module units

The Water Accounting module will take you through four units, as listed below. We recommend completing these units in order.

Unit 1: Water account

- What is it?
- Why do we need it?
- What does it look like?
- Expertise and data required

Unit 2: Compilers

- Main water accounting concepts and the basics for compiling water accounts

Unit 3: Data providers

- Water cycle and ecosystem processes
- Data options, examples and issues

Unit 4: Review

- Quiz
- Summary

1.35 Data sources

Data sources

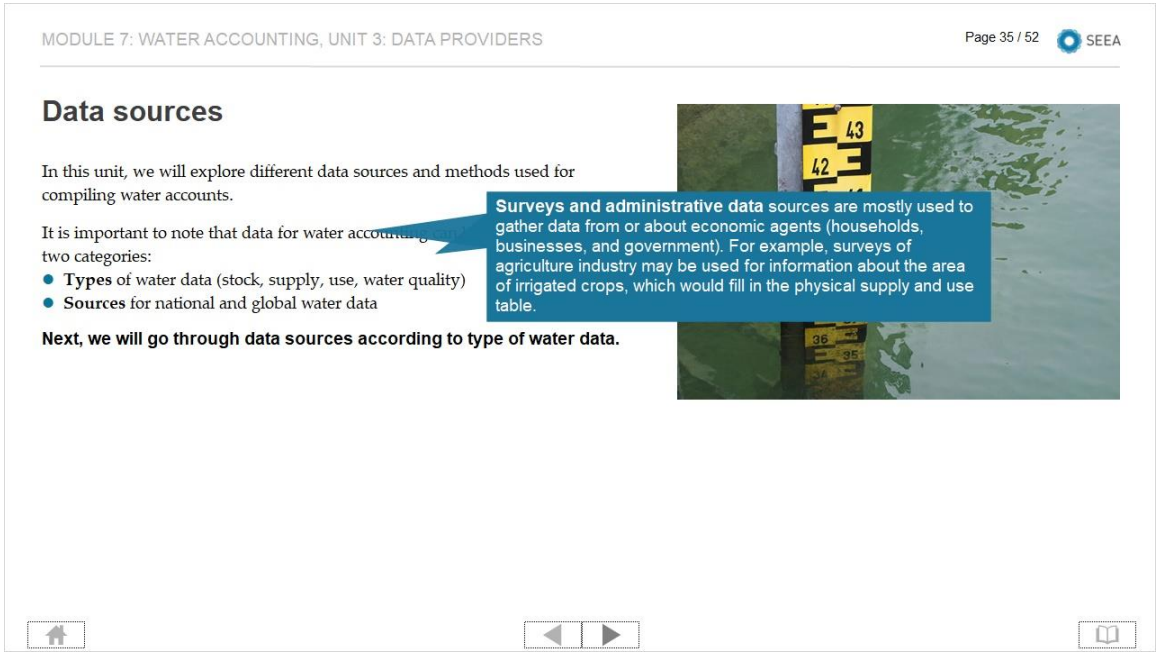
In this unit, we will explore different data sources and methods used for compiling water accounts.

It is important to note that data for water accounting can be divided according to two categories:

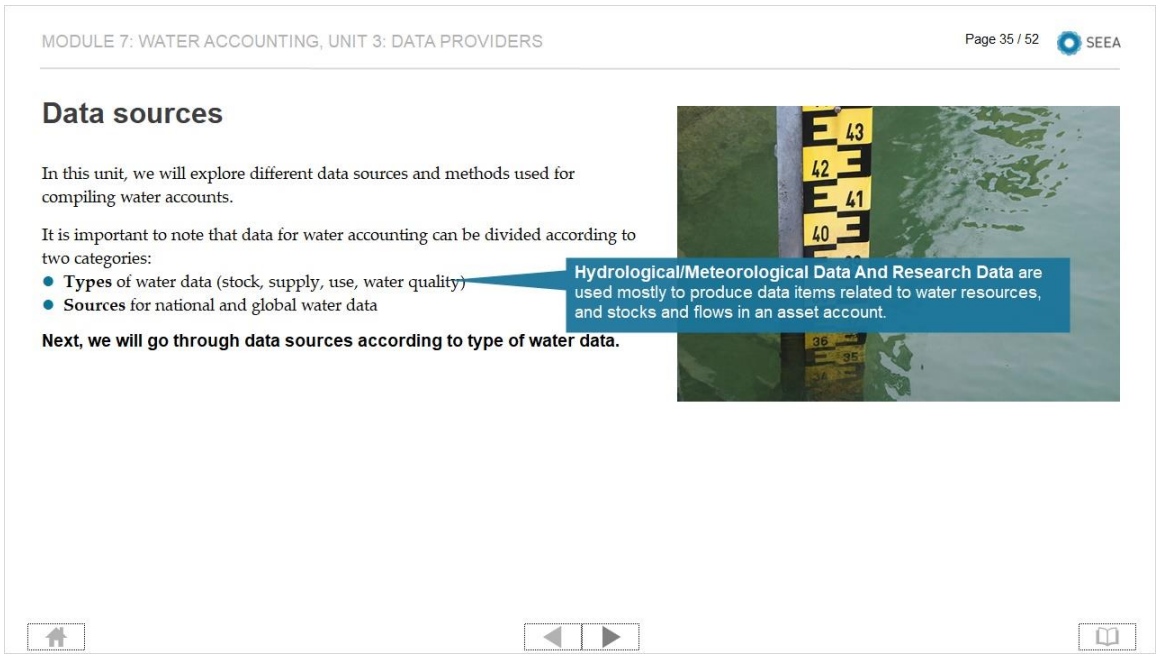
- **Types** of water data (stock, supply, use, water quality)
- **Sources** for national and global water data

Next, we will go through data sources according to type of water data.

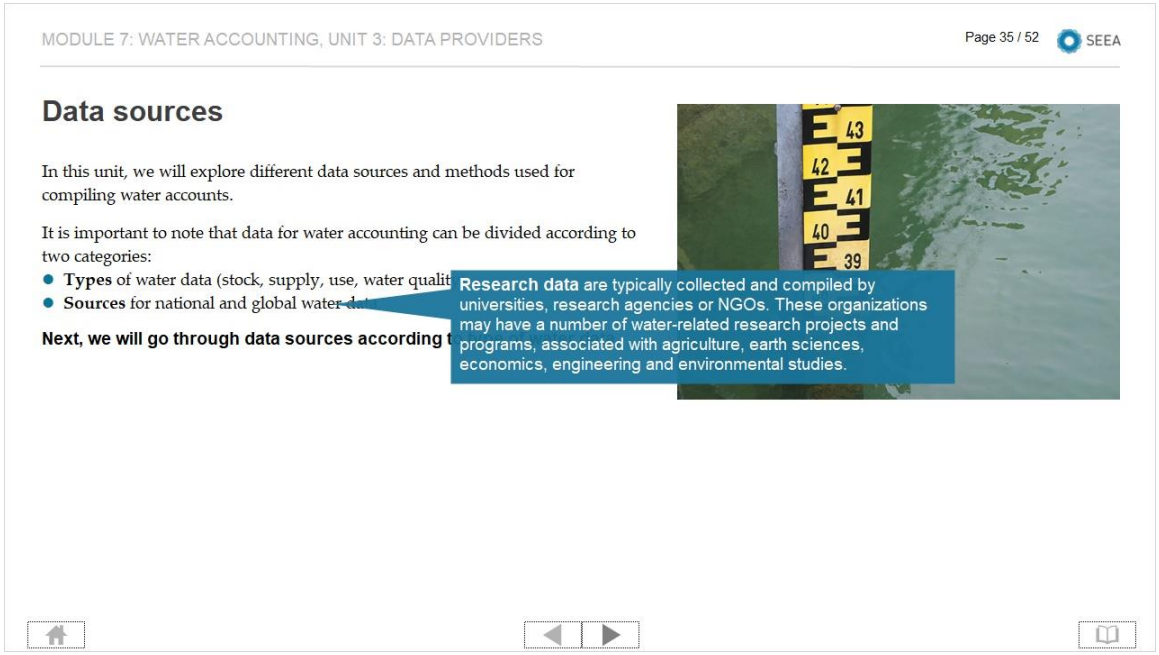
Explanation 1 (Slide Layer)



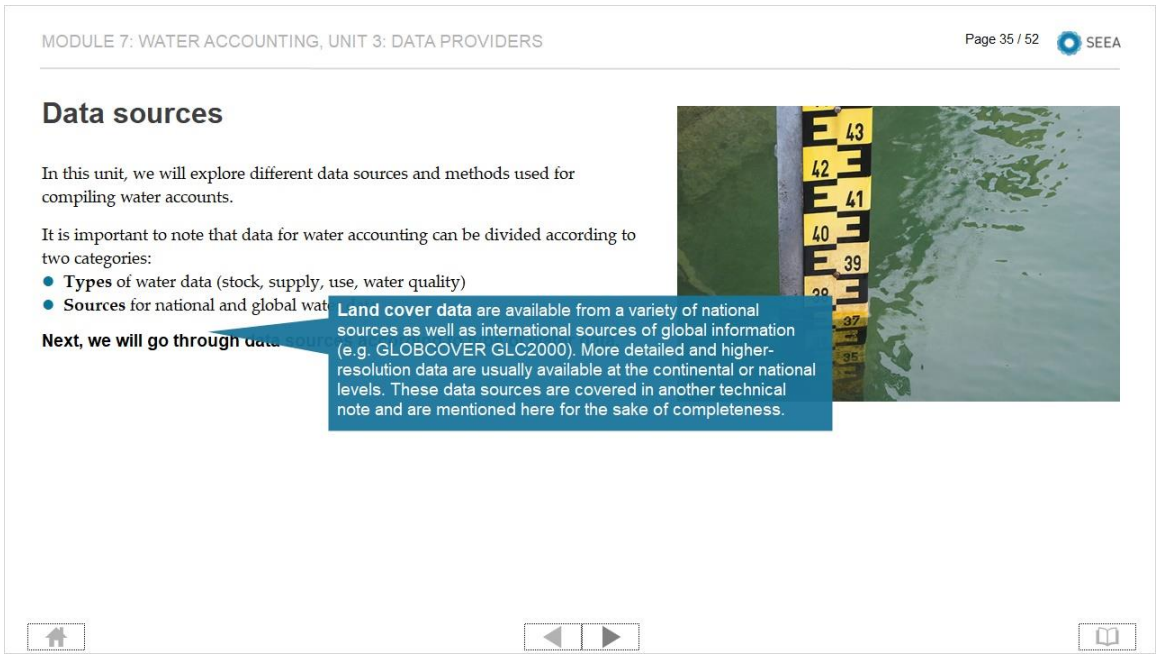
Explanation 2 (Slide Layer)



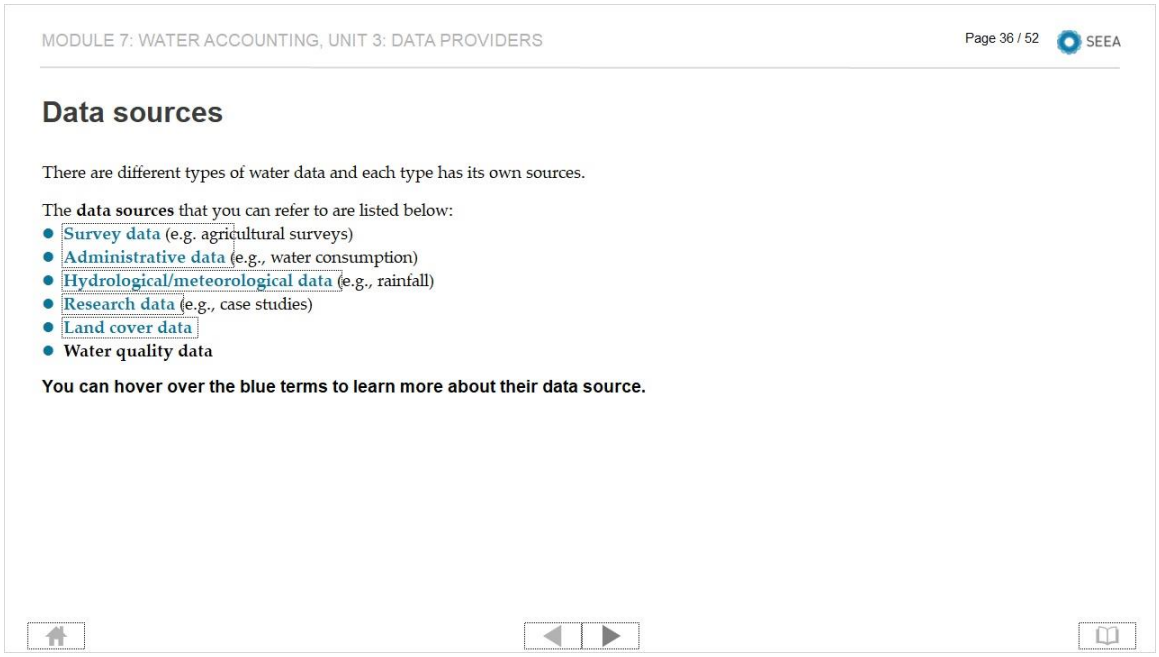
Explanation 3 (Slide Layer)



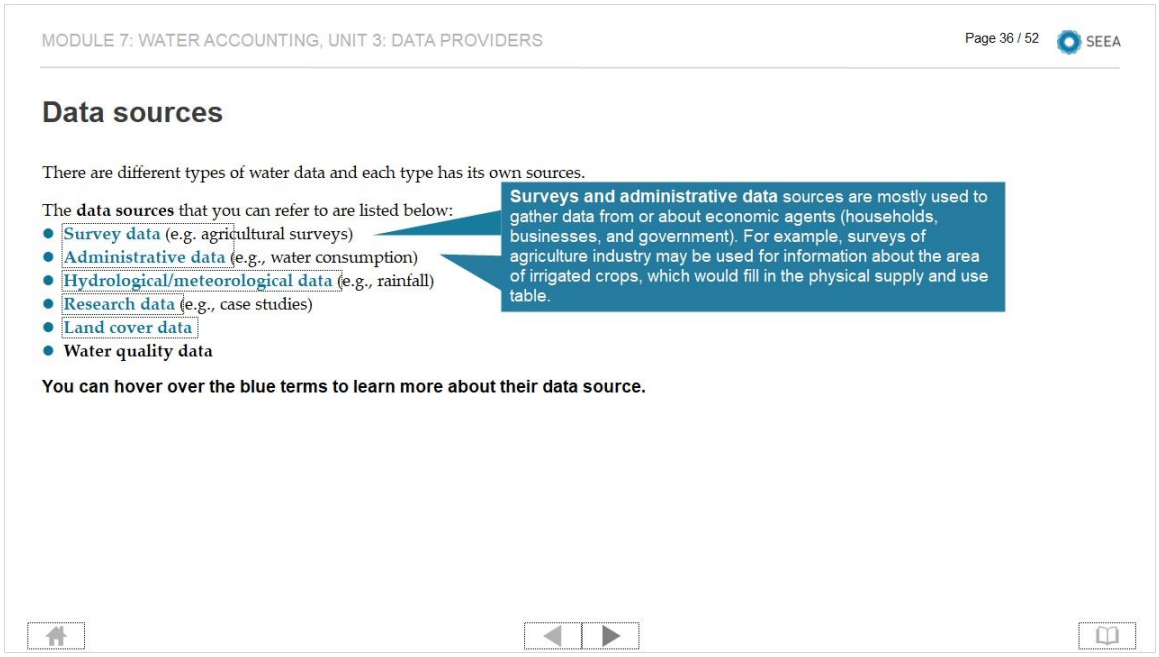
Explanation 4 (Slide Layer)



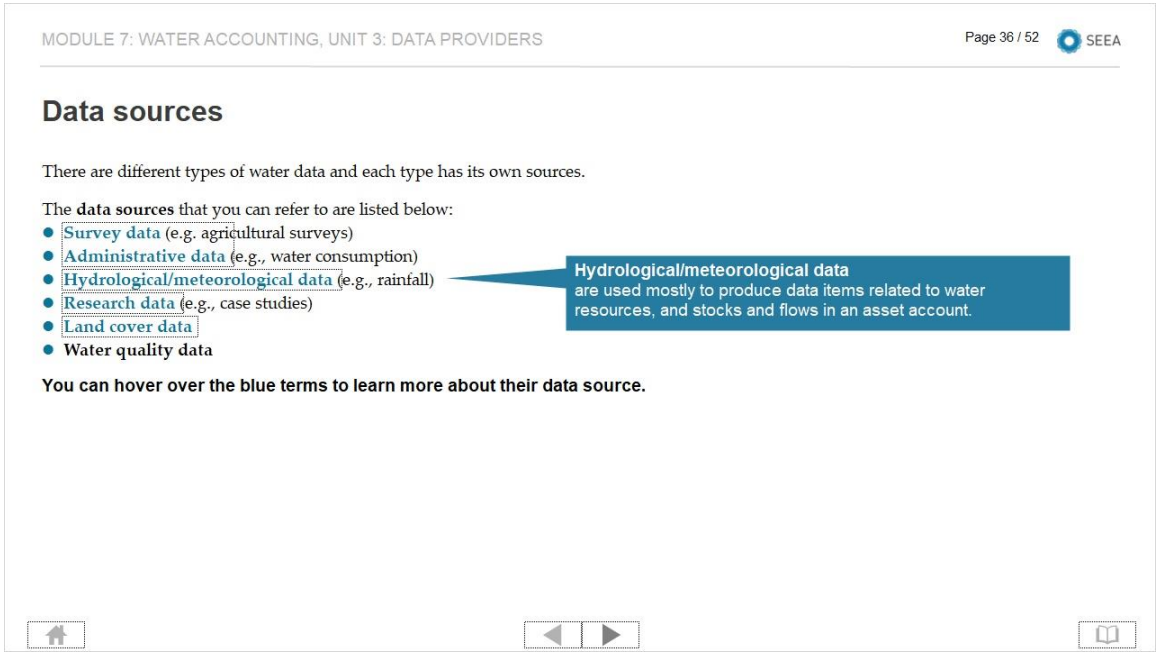
1.36 Data sources



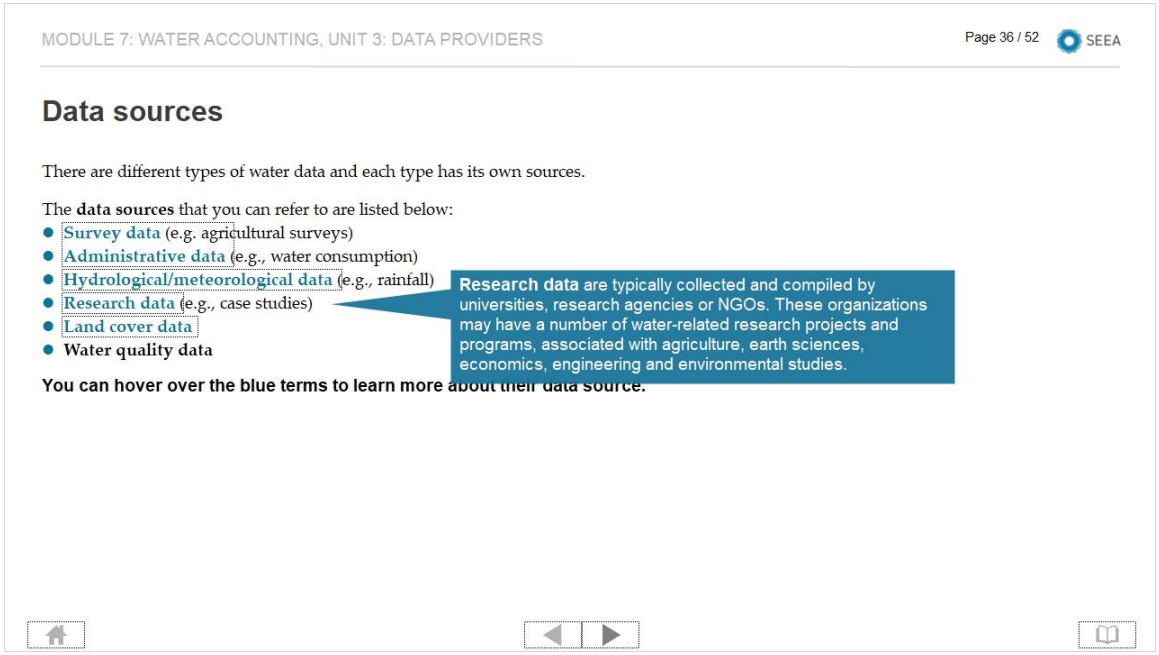
Explanation 1 (Slide Layer)



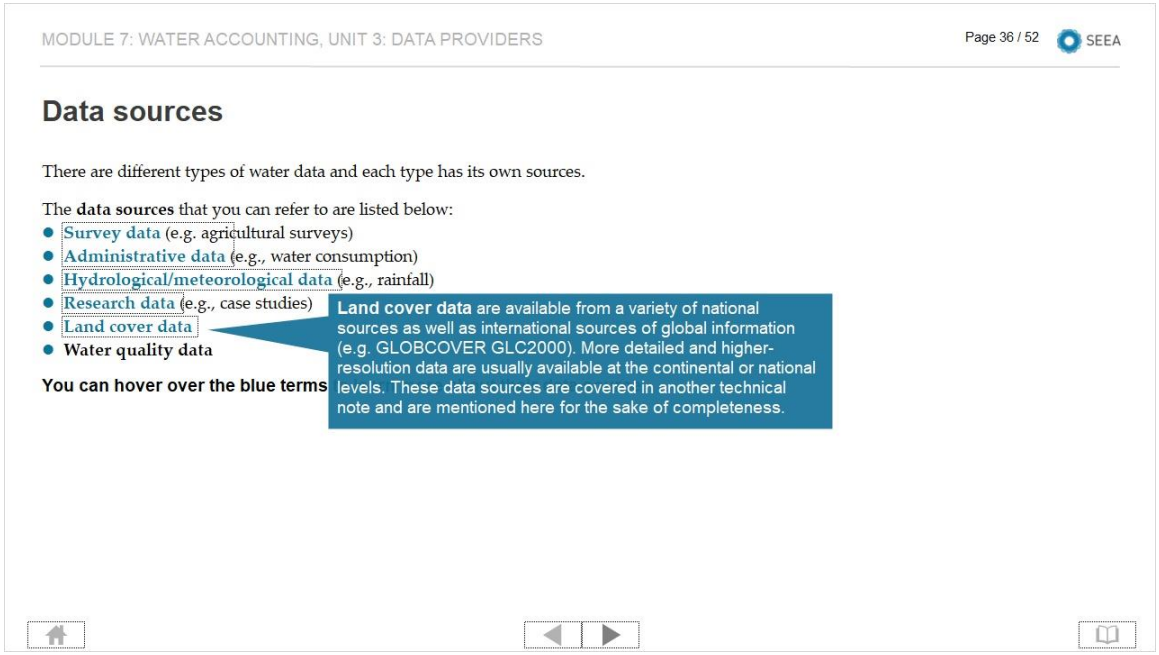
Explanation 2 (Slide Layer)



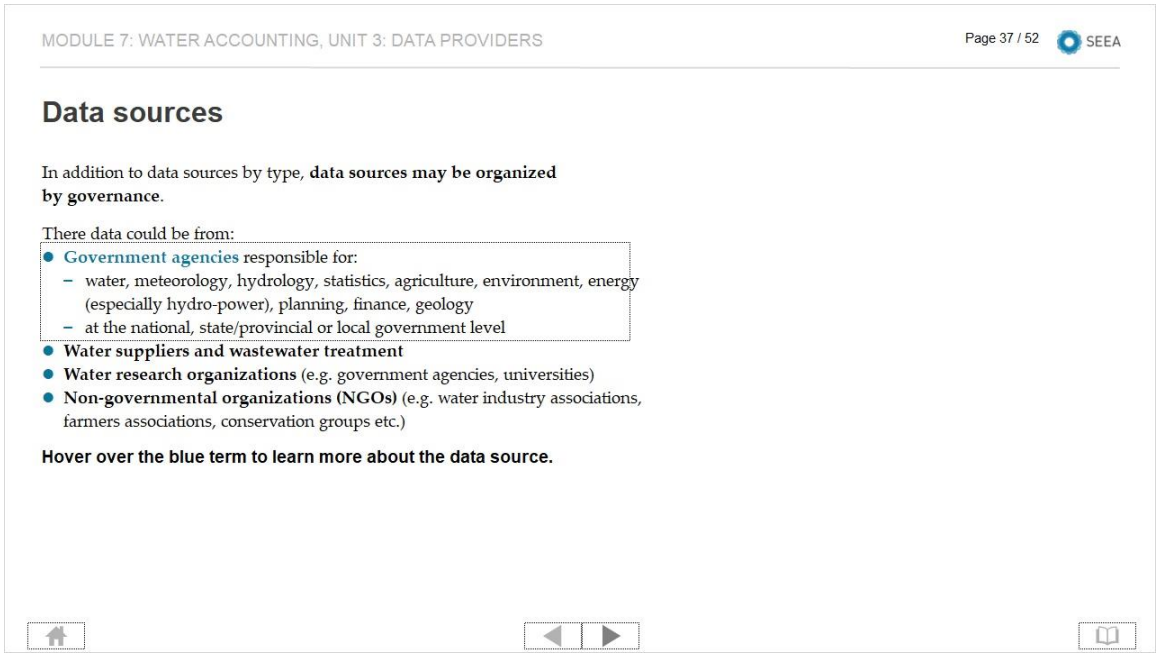
Explanation 3 (Slide Layer)



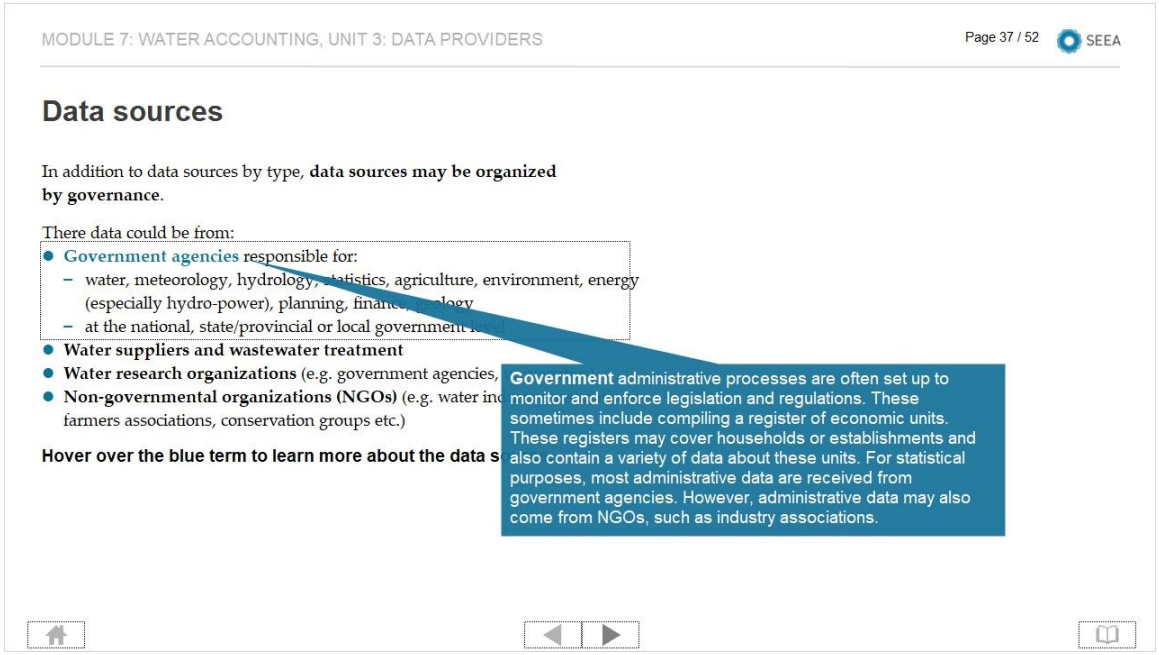
Explanation 4 (Slide Layer)



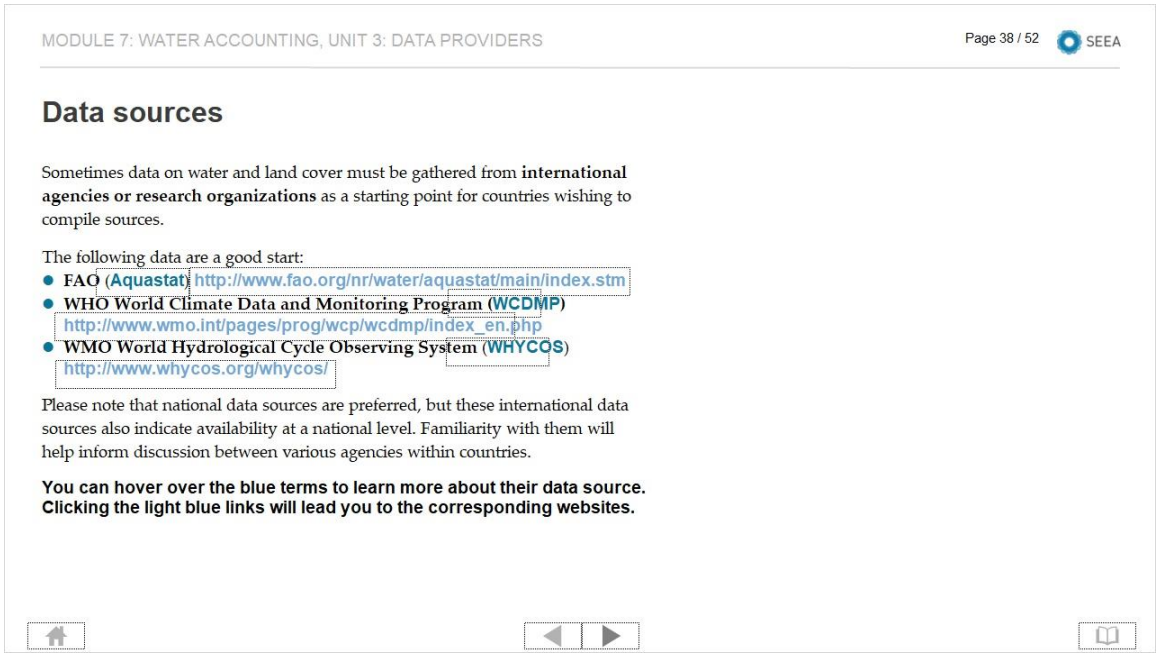
1.37 Data sources



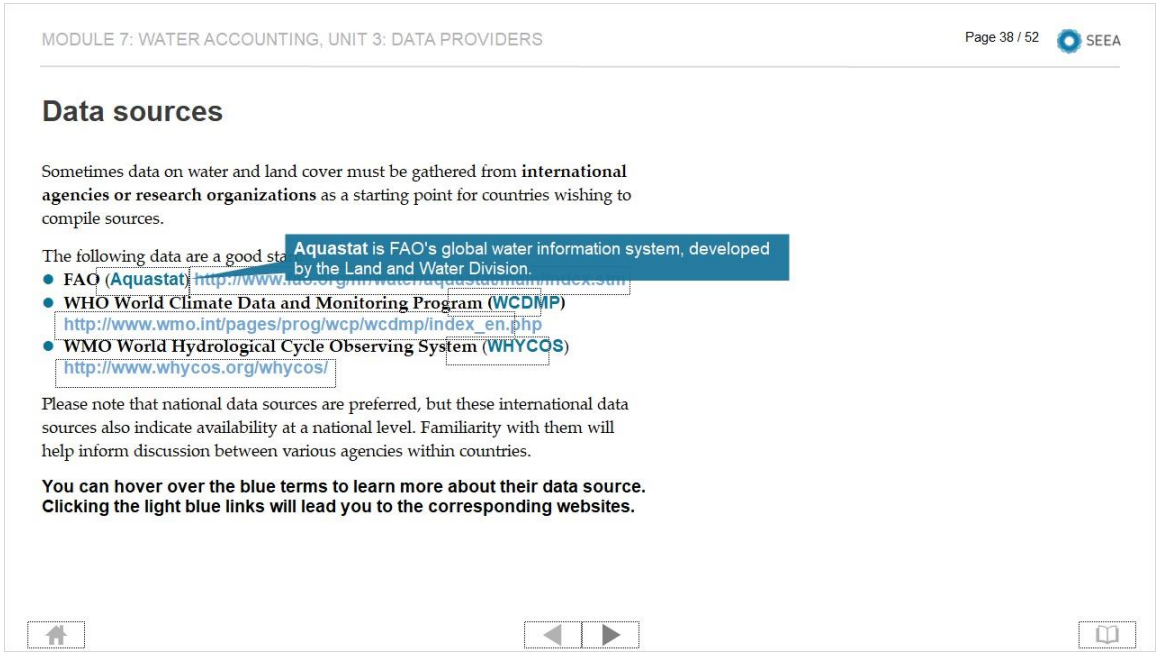
Explanation 1 (Slide Layer)



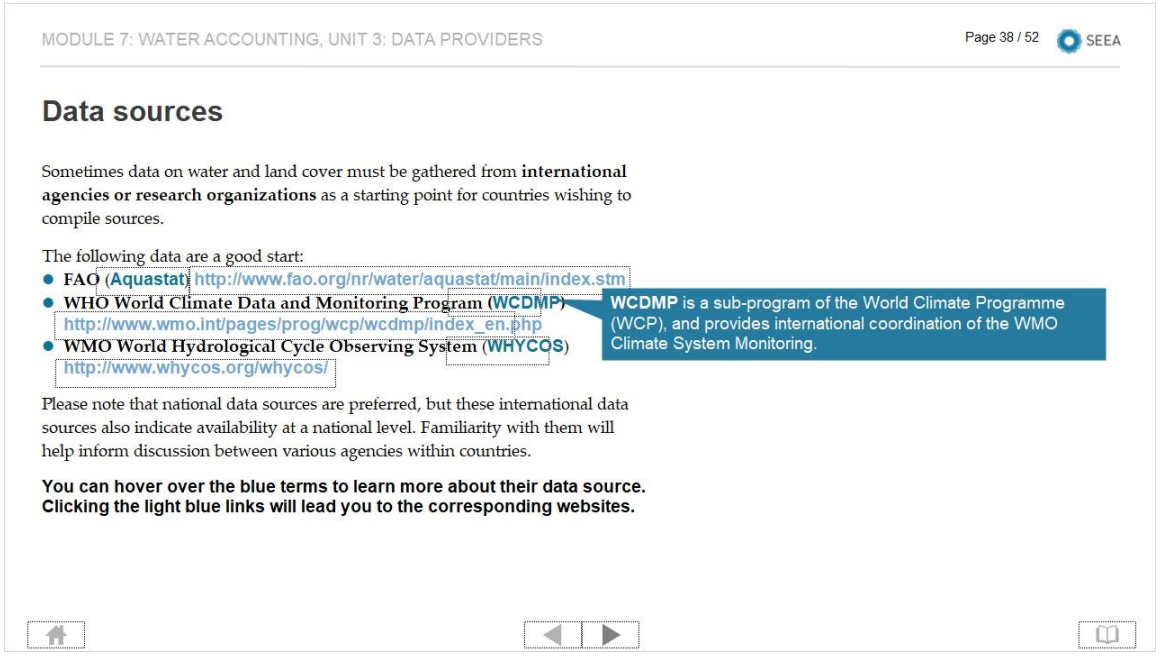
1.38 Data sources



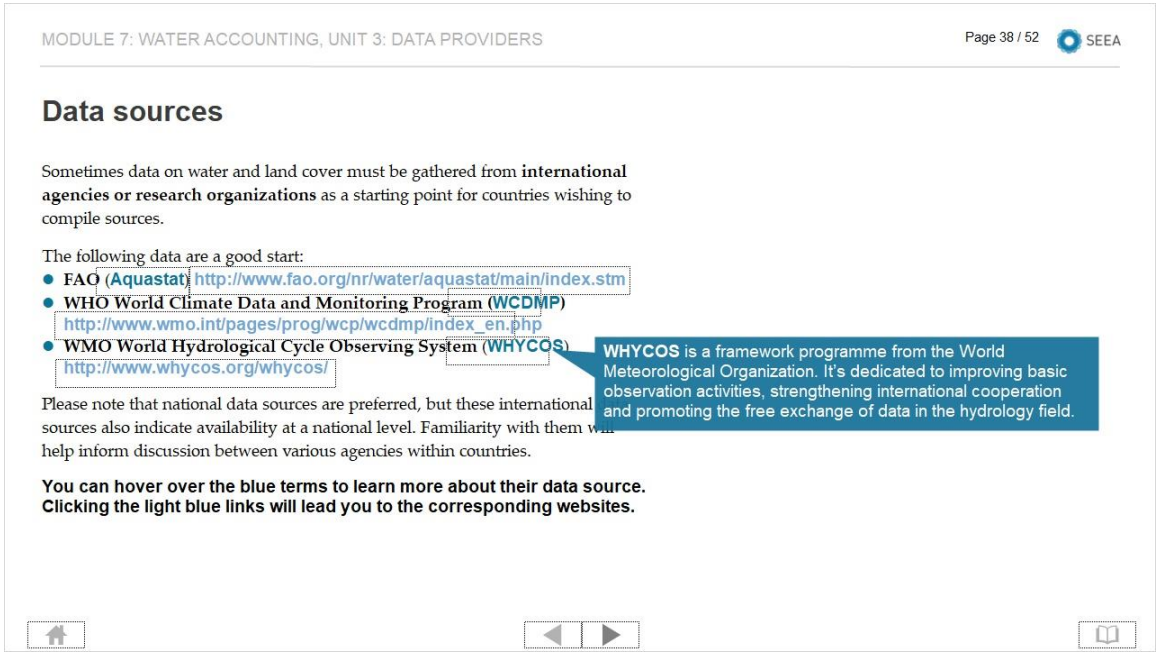
Explanation 1 (Slide Layer)



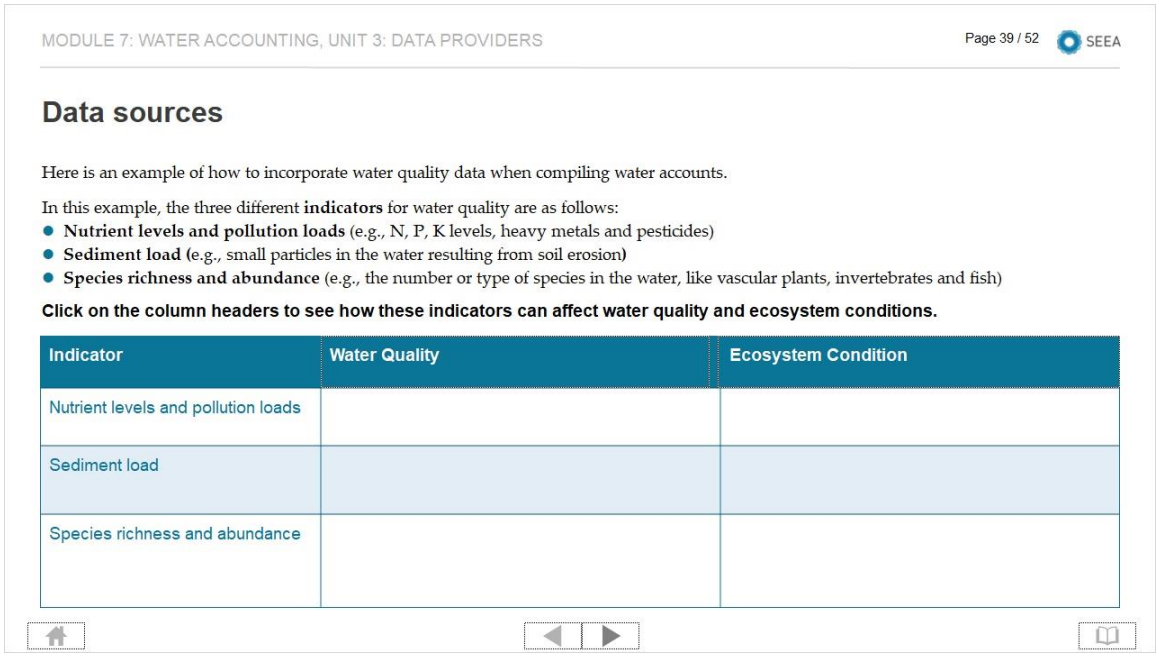
Explanation 2 (Slide Layer)



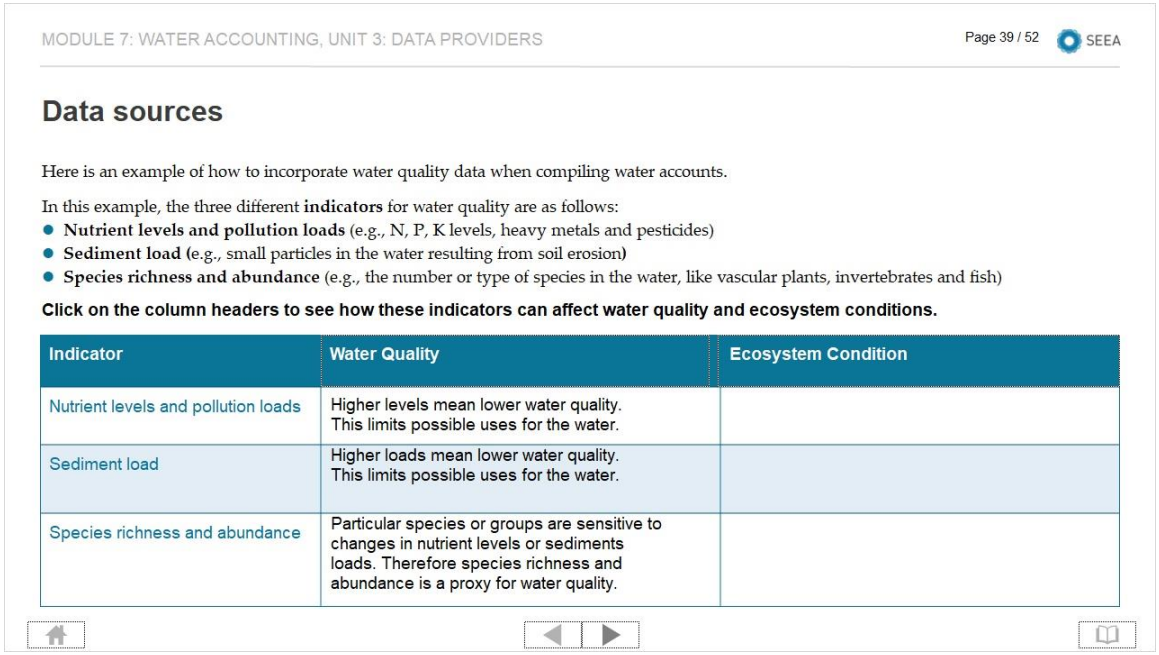
Explanation 3 (Slide Layer)



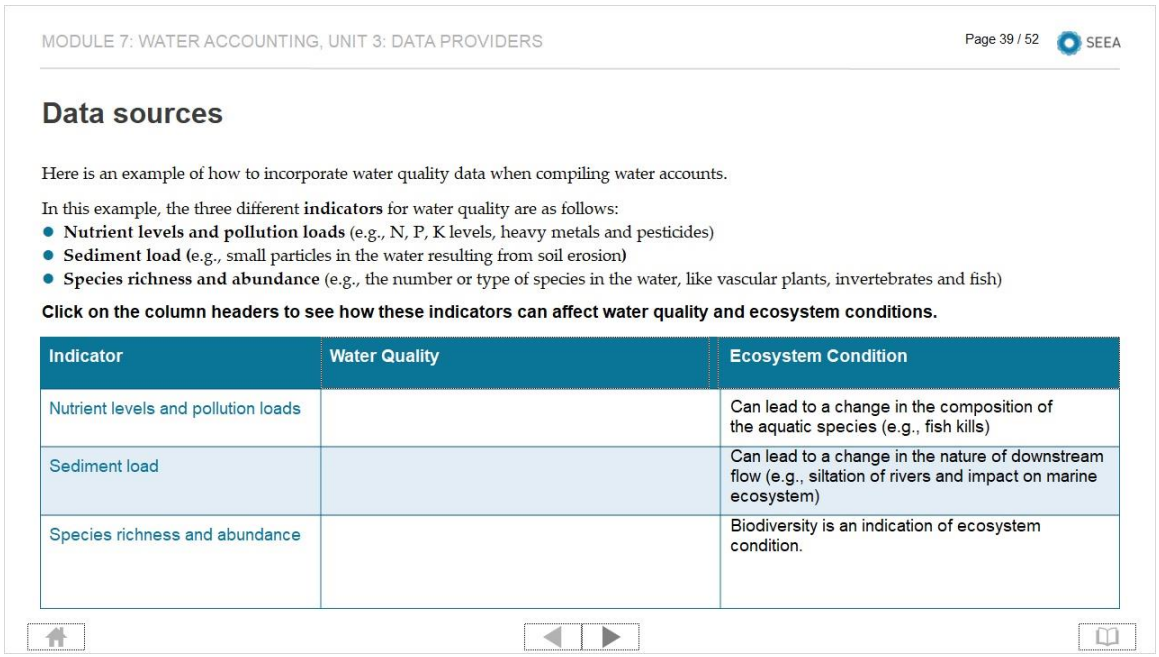
1.39 Data sources



Explanation 1 (Slide Layer)



Explanation 2 (Slide Layer)

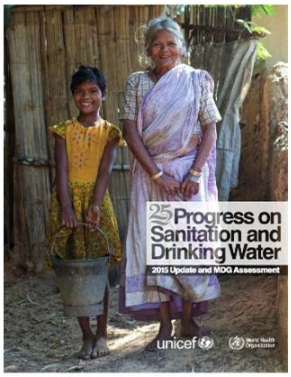


1.40 Data collection

Data collection

It's important to take note of the **guidelines** for water data collection methods. Some of them are listed and linked below:

- International Recommendations for Water Statistics (IRWS)
- Guide to Meteorological Instruments and Methods of Observation (CIMO Guide)
- Guidelines on the Role, Operation and Management of National Hydrological Services (NMS)
- International Benchmarking Network for Water and Sanitation Utilities (IBNET)
- A System of Integrated Agricultural Censuses and Surveys (by FAO)
- ISO (e.g. ISO 19115 for geographic information) (Standards catalogue)
- Statistical Data and Metadata Exchange (SDMX)
- World Meteorological Organisation Core Metadata Standard (WMO Metadata Standard)
- Infrastructure for Spatial Information in the European Community (INSPIRE)
- Global Annual Assessment of Sanitation and Drinking Water (GLAAS)
- Sustainable Development Goals (SDGs) metadata for water management and sanitation

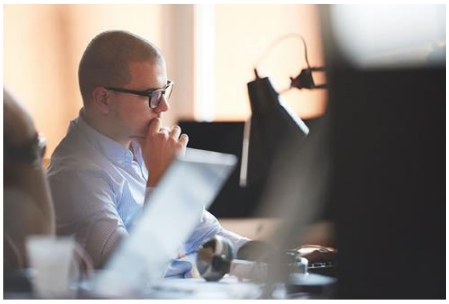


1.41 Common issues

Common issues

When compiling water accounts, a few problems and **challenges** may come up. Some of the more frequent ones are listed below:

- **Classifying units to industry,** especially those engaged in multiple activities (e.g. water supply, sewerage and hydro-electricity generation)
- In most countries national accounts do not separate the **water supply and sewerage industries**
- Recording **losses in distribution** and the flows for water use in **hydro-electricity** and water for **cooling**
- Determining the boundary between the **environment and the economy**, especially for artificial reservoirs
- **Spatial referencing** – economic data refers to administrative boundaries, while hydrological data refers to river basins
- **Confidentiality** of business data
- **Quality** of collected/measured data
- **Scale** of data (national level data may hide regional variation)
- **Seasonality:** annual averages may hide seasonal variation and extremes (e.g., floods and droughts)



1.42 Common issues

Common issues

Additionally, some conceptual issues may present themselves, such as:

- **Inter-ecosystem flows**: Since ecosystems are suppliers and users of water
- **Treatment of rivers, coasts, marine areas** (in terms of spatial units in the water account): Where a coherent spatial database is needed to analyze flows from these sources
- **Treatment of snow and permafrost** as they may or may not be included as stocks.
- **Large stocks**: These could be difficult to measure (e.g., in Canada there are over one million lakes)

1.43 Global and Country Examples

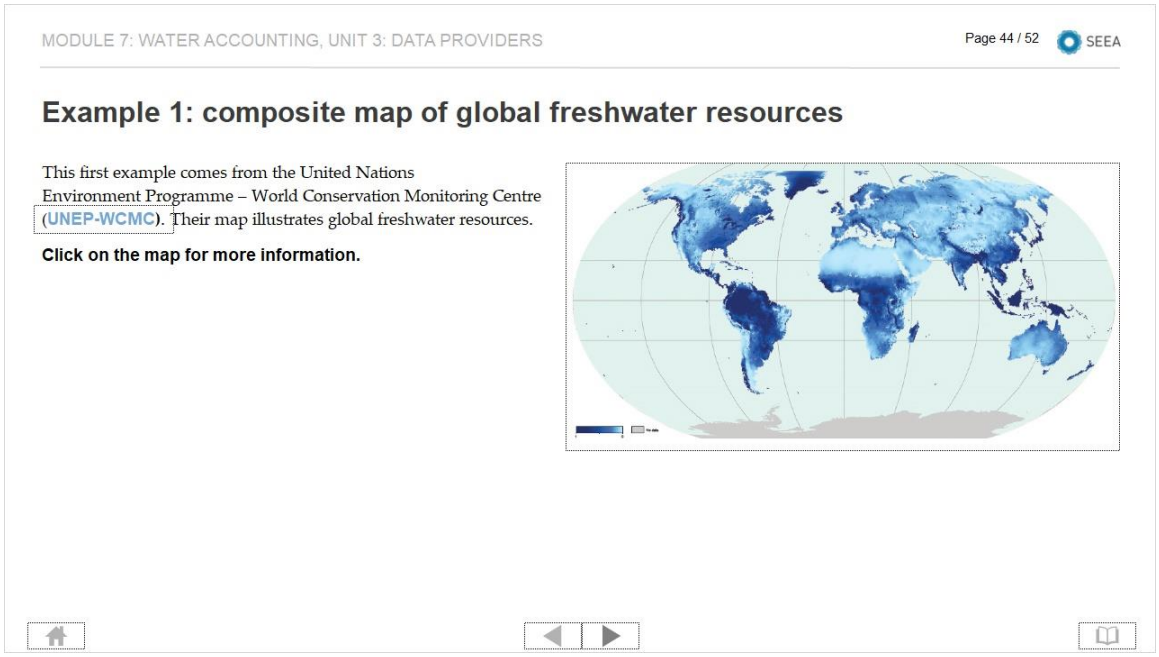
Global and country examples

The next slides present a couple of global and country examples for water accounting.

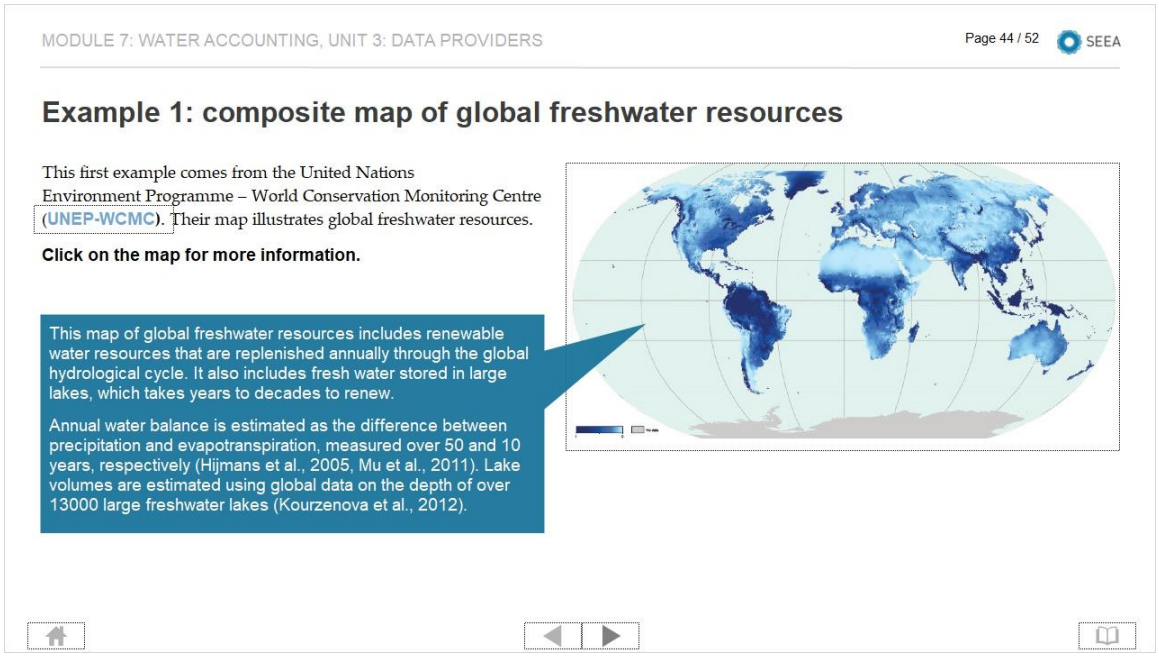
We begin with a composite map of global ecosystem assets made by UNEP-WCMC. Next we'll take a look at a water accounts case study from Australia. A freshwater supply and demand example from Canada will close out this section.

Let's move on and check out these examples!

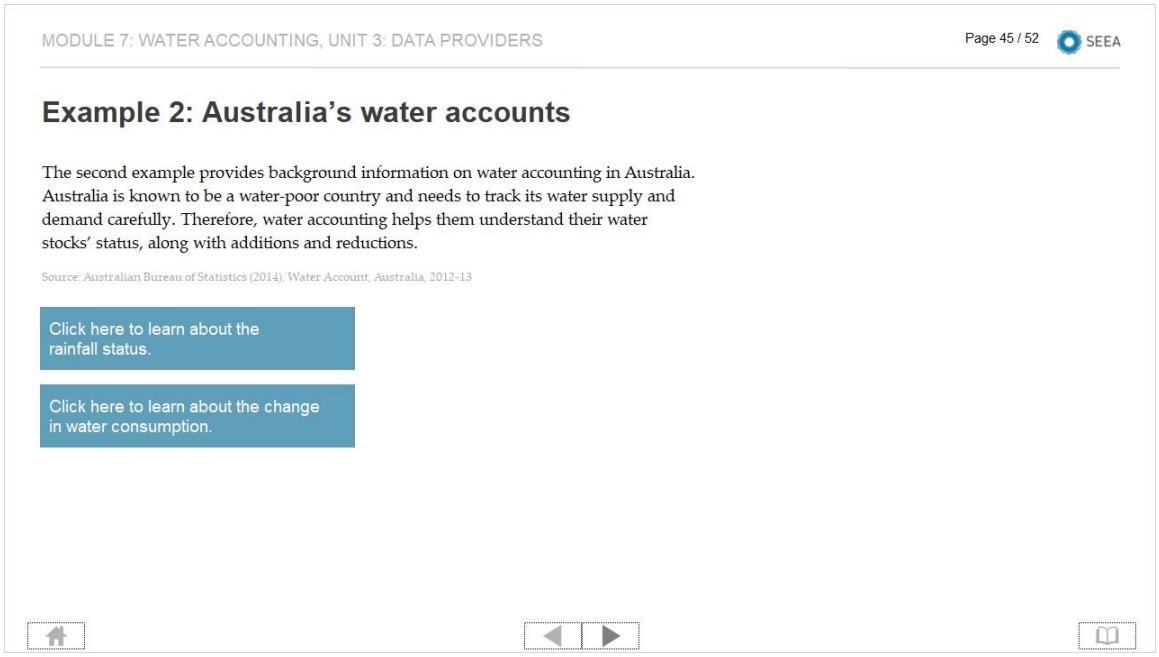
1.44 Global and Country Examples



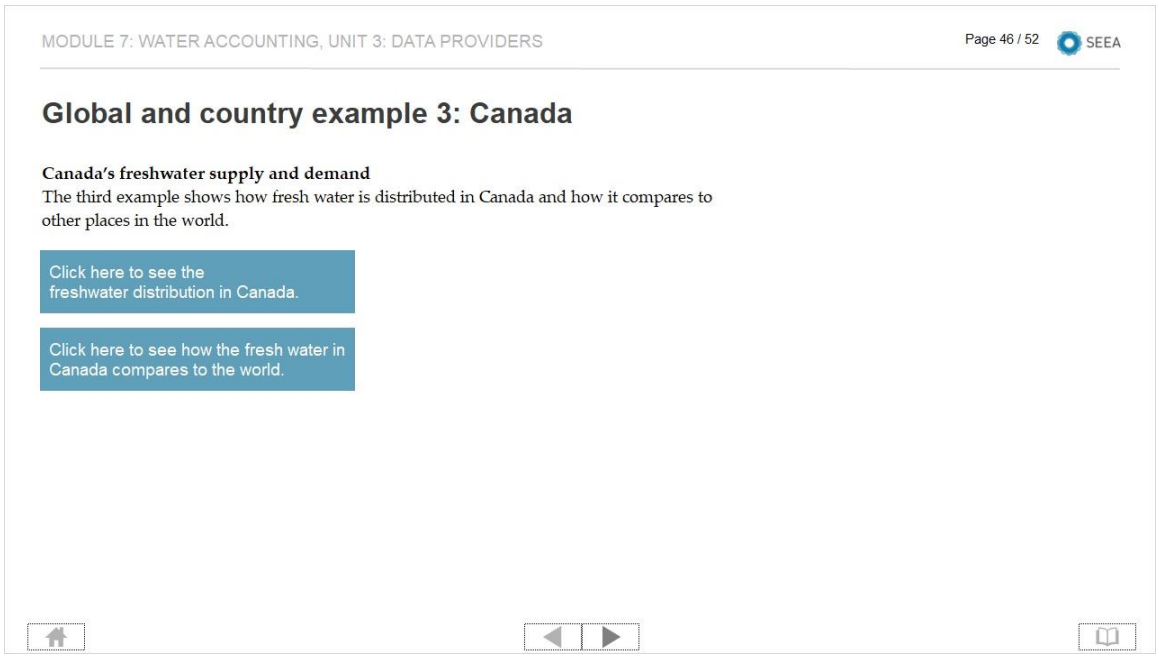
Explanation 1 (Slide Layer)



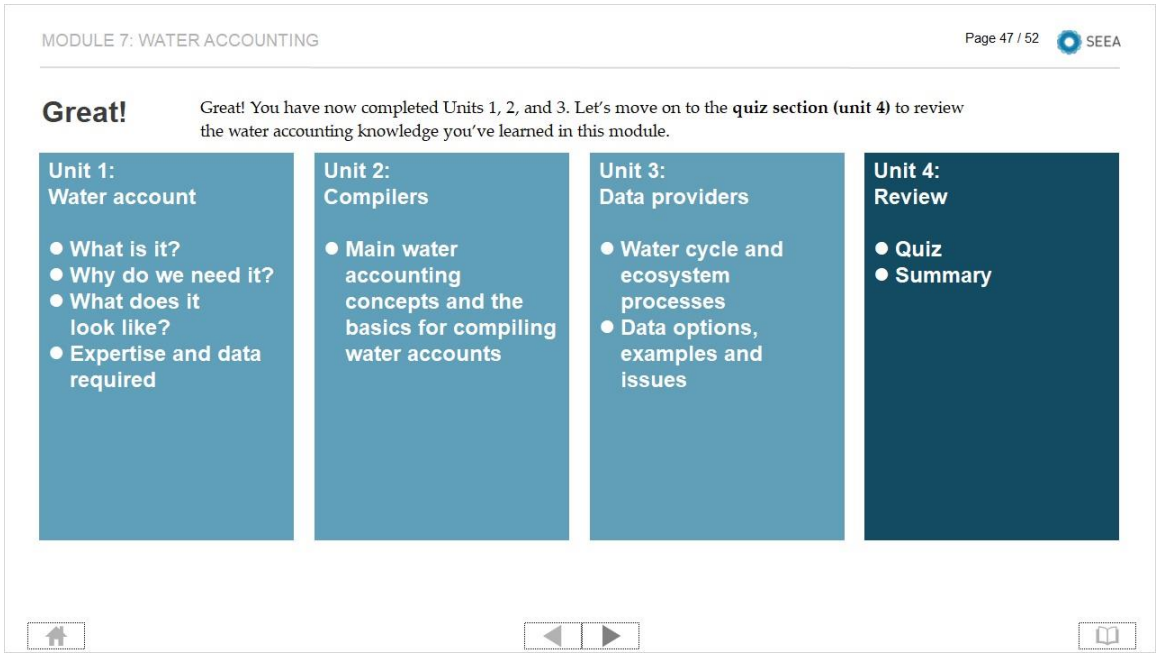
1.45 Global and Country Examples



1.46 Global and Country Examples

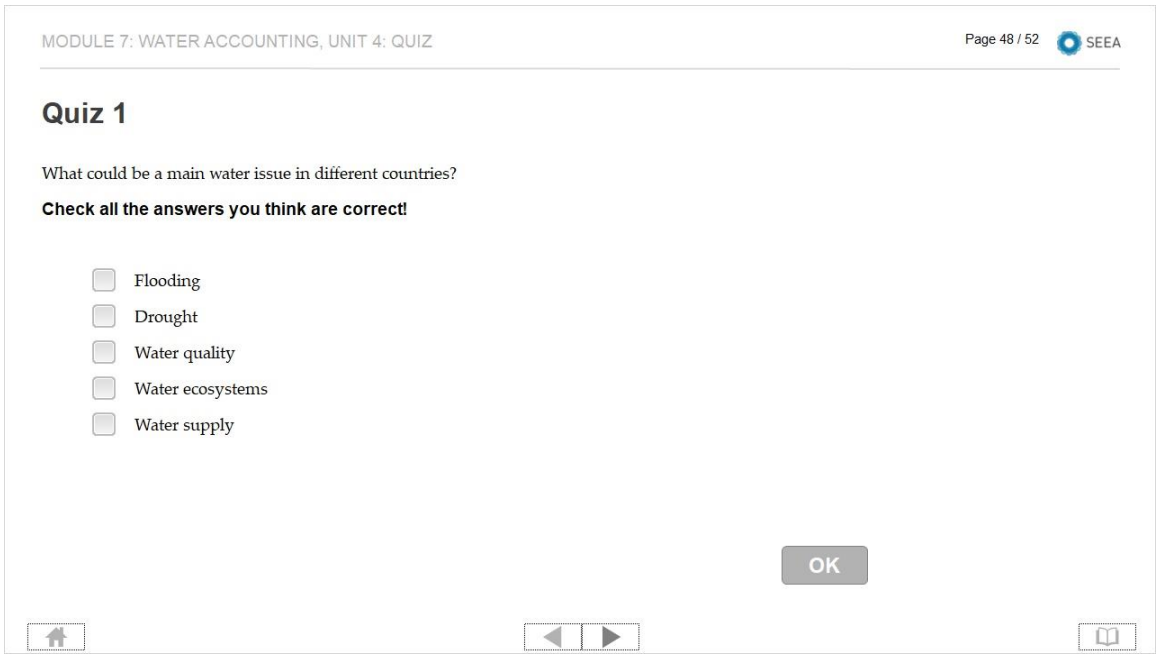


1.47 Module units



1.48 Pick Many

(Pick Many, 10 points, 1 attempt permitted)



Correct	Choice
X	Flooding
X	Drought
X	Water quality
X	Water ecosystems
X	Water supply

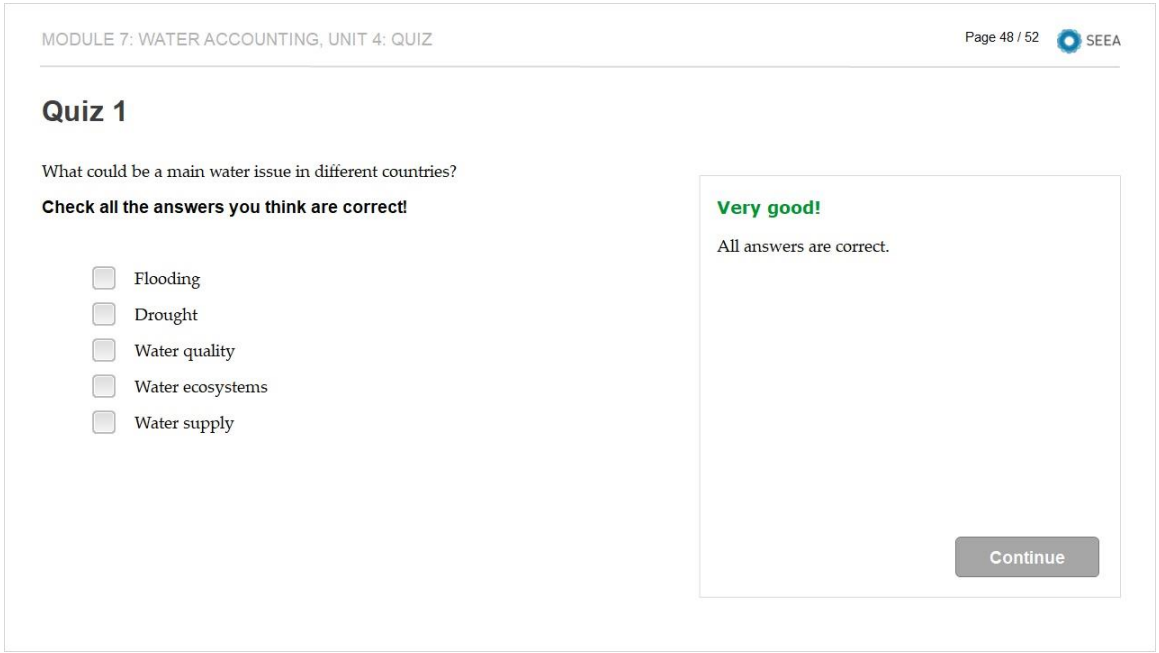
Feedback when correct:

All answers are correct.

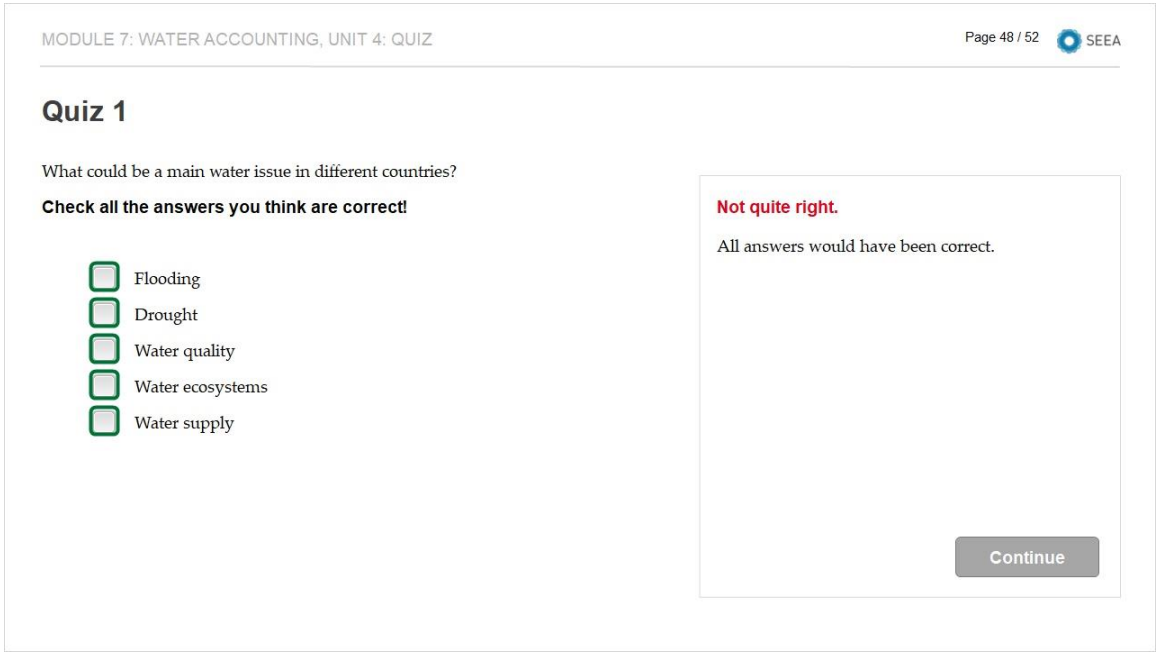
Feedback when incorrect:

All answers would have been correct.

Very good! (Slide Layer)

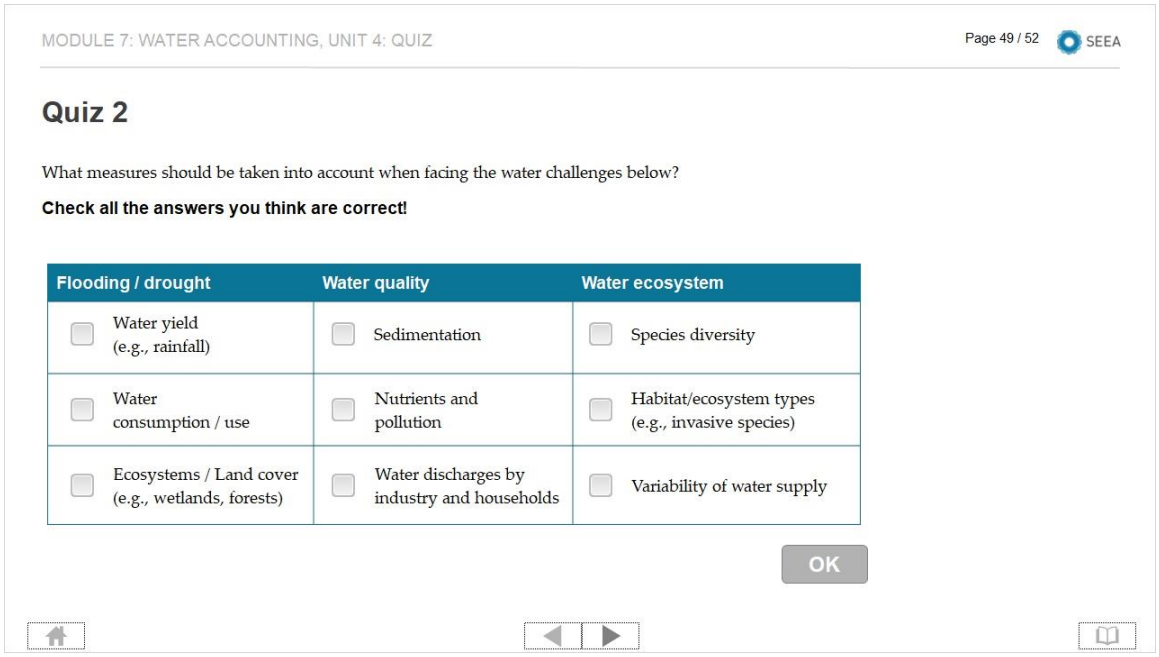


Not quite right. (Slide Layer)



1.49 Pick Many

(Pick Many, 10 points, 1 attempt permitted)



Correct	Choice
X	Water yield (e.g., rainfall)
X	Water consumption / use
X	Ecosystems / Land cover (e.g., wetlands, forests)
X	Sedimentation
X	Nutrients and pollution
X	Water discharges by industry and households
X	Species diversity
X	Habitat/ecosystem types (e.g., invasive species)
X	Variability of water supply

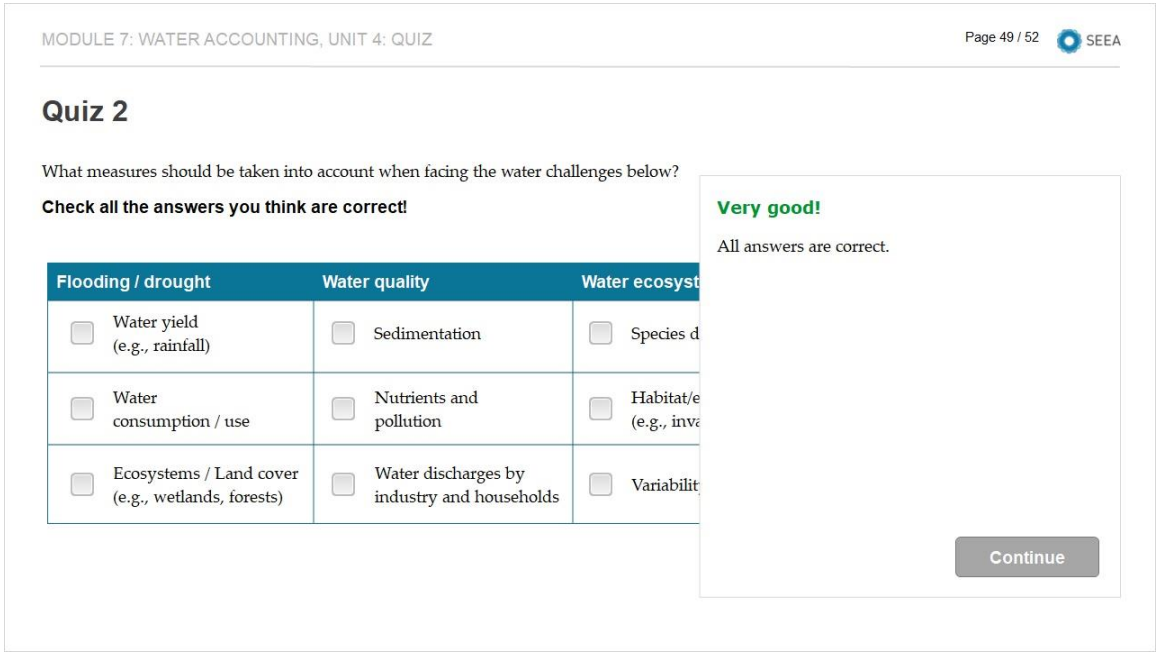
Feedback when correct:

All answers are correct.

Feedback when incorrect:

All answers would have been correct.

Very good! (Slide Layer)



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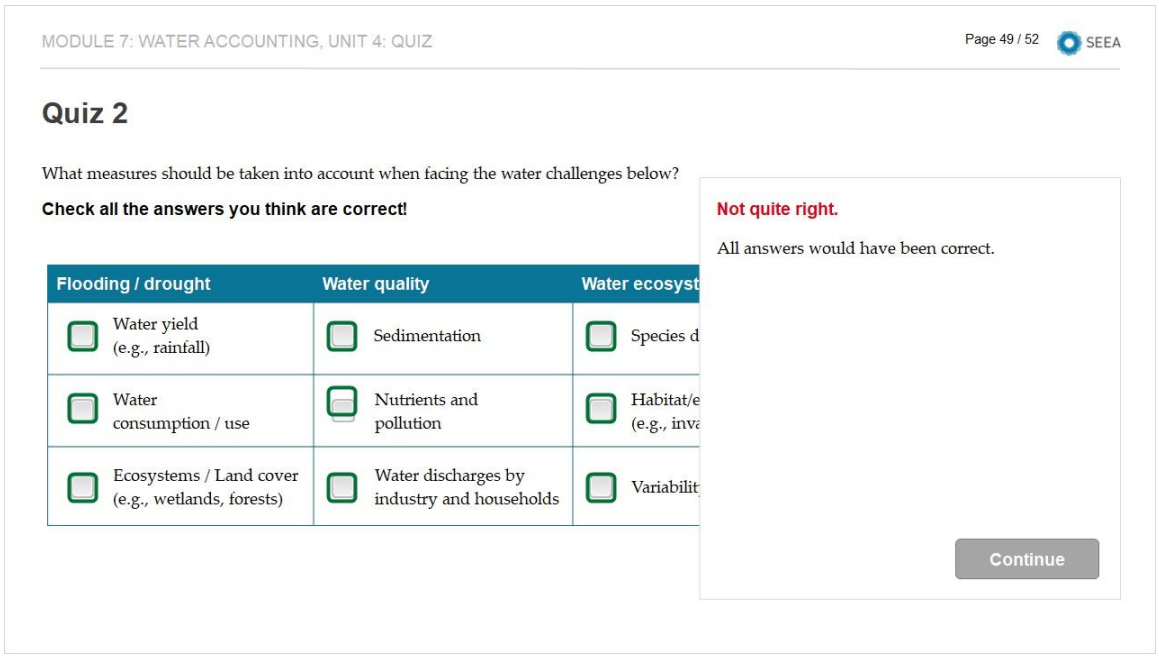
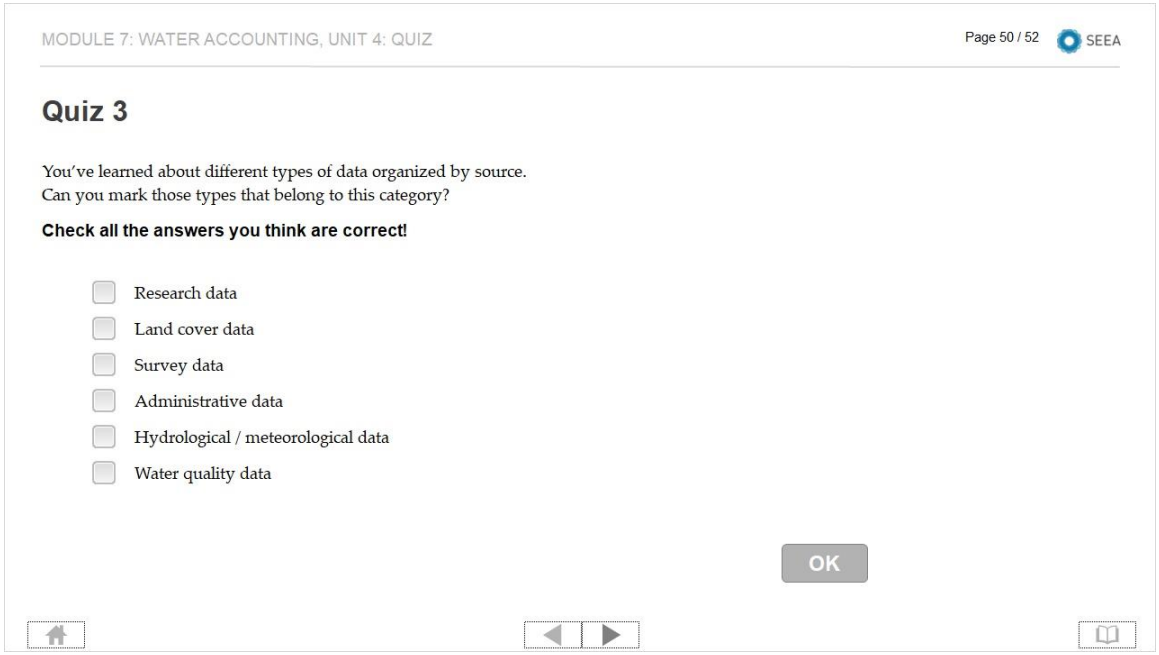


1.50 Pick Many

(Pick Many, 10 points, 1 attempt permitted)



Correct	Choice
X	Research data
X	Land cover data
X	Survey data
X	Administrative data
X	Hydrological / meteorological data
X	Water quality data

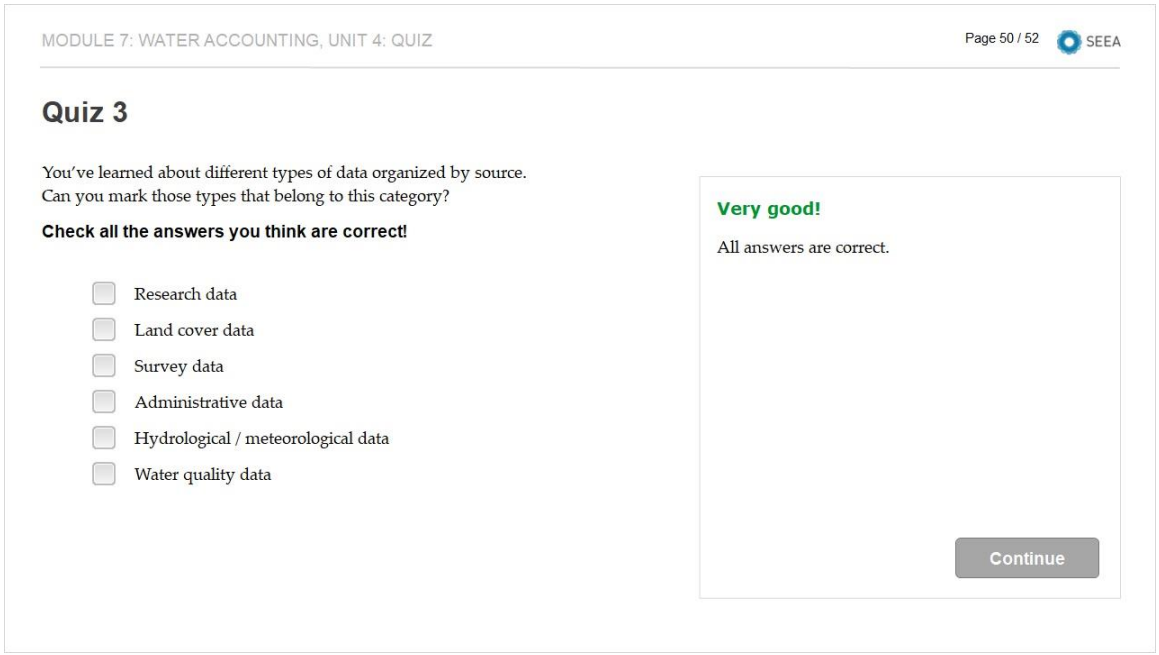
Feedback when correct:

All answers are correct.

Feedback when incorrect:

All answers would have been correct.

Very good! (Slide Layer)



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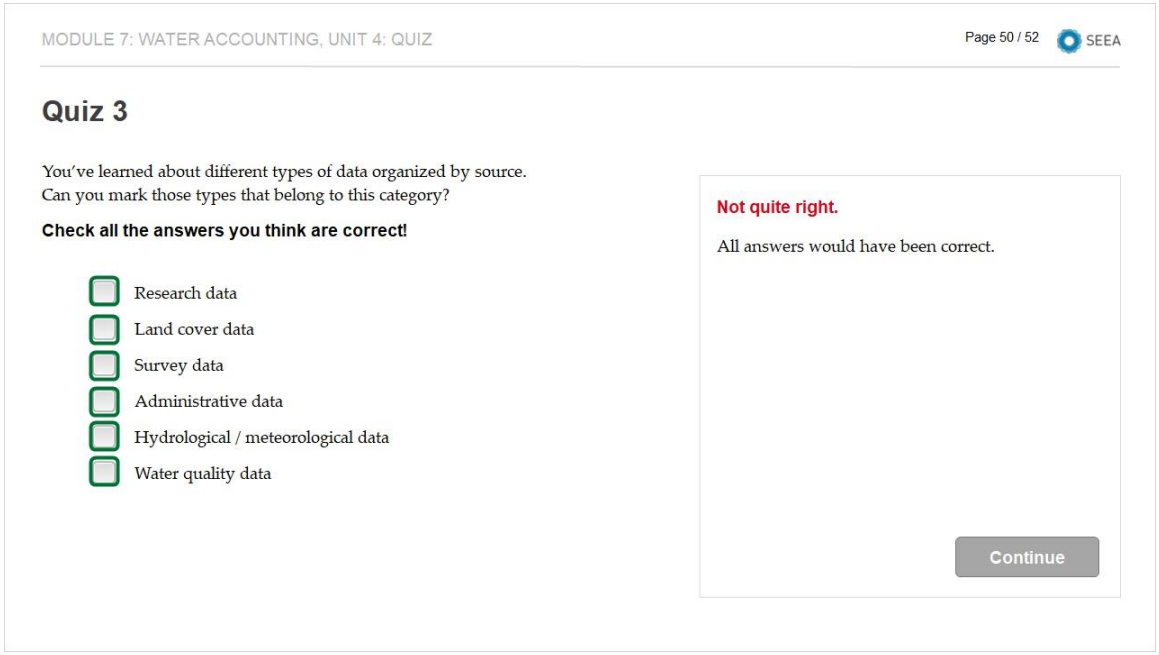
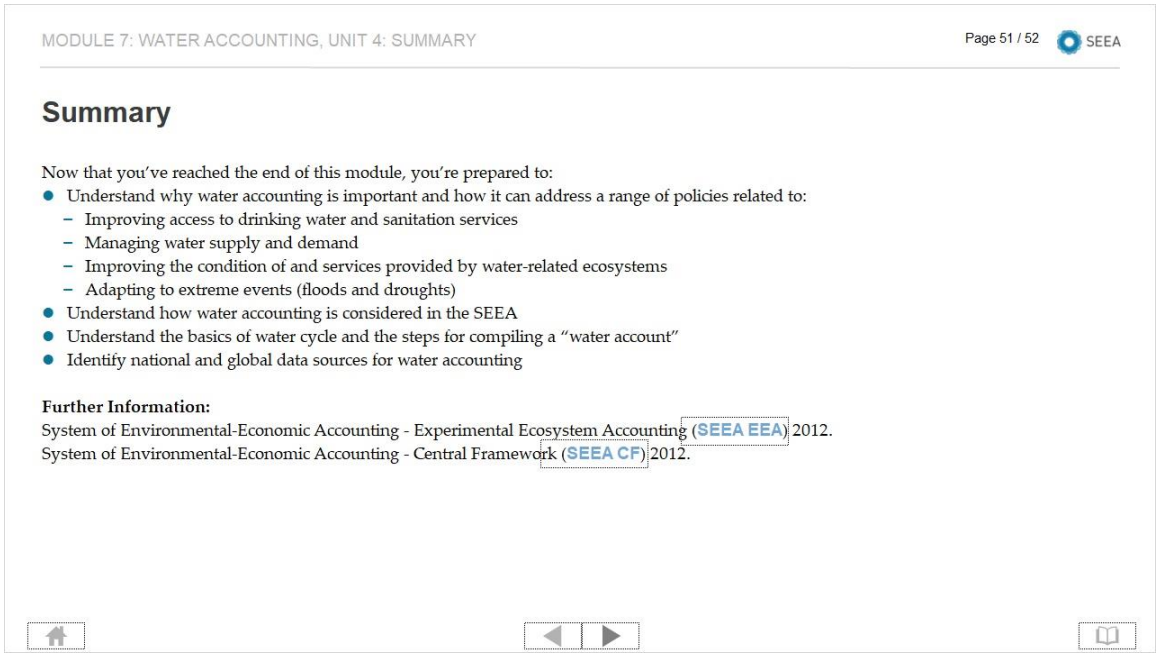


1.51 Data sources



1.52 Data sources