Water resources and use
Workshop on Environment statistics
Dakar- Senegal
28 Feb – 4 March 2005

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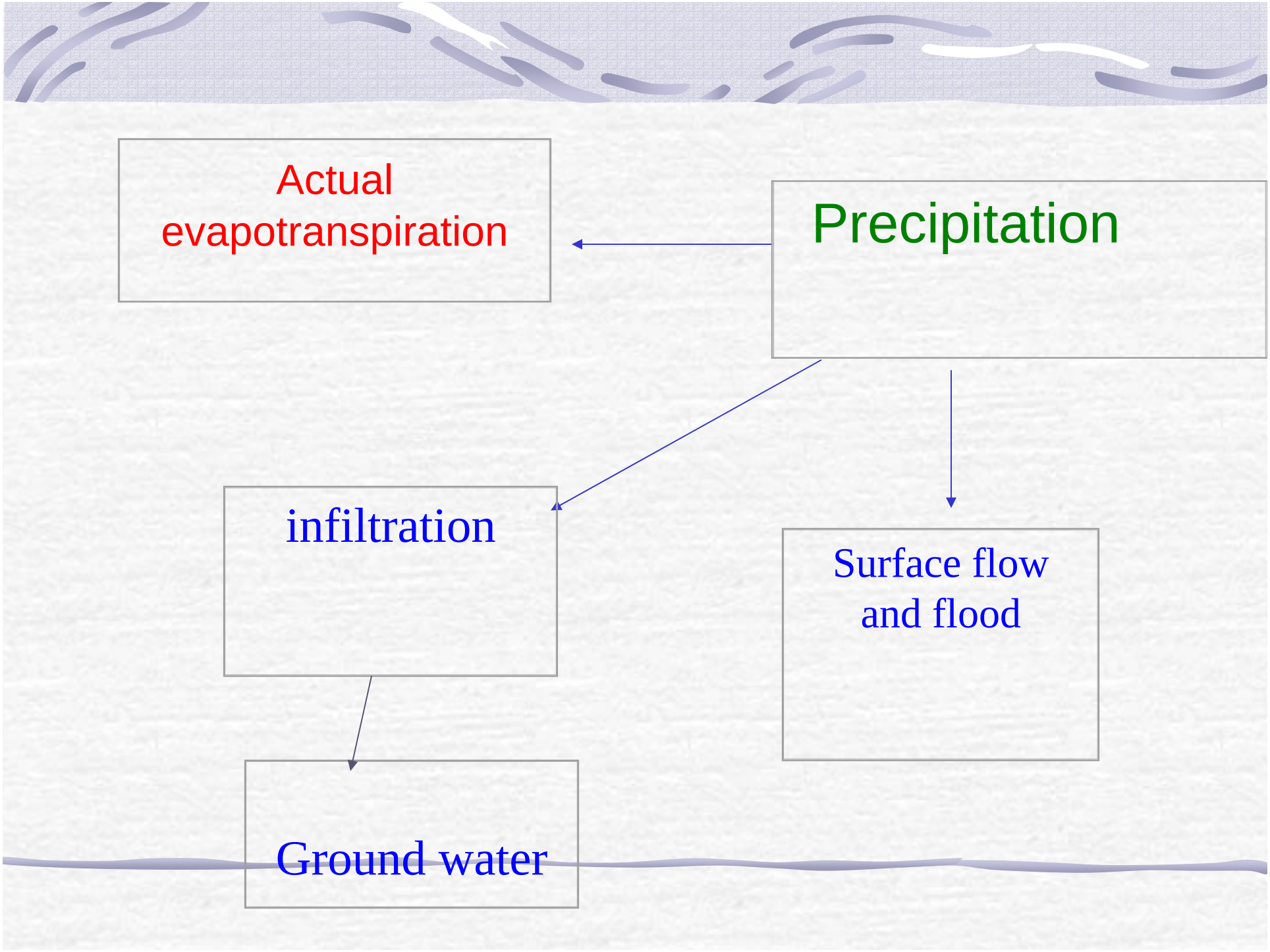
Water resources

Fresh water resources

1- conventional water resources

- Ground water resources
- surface water resources

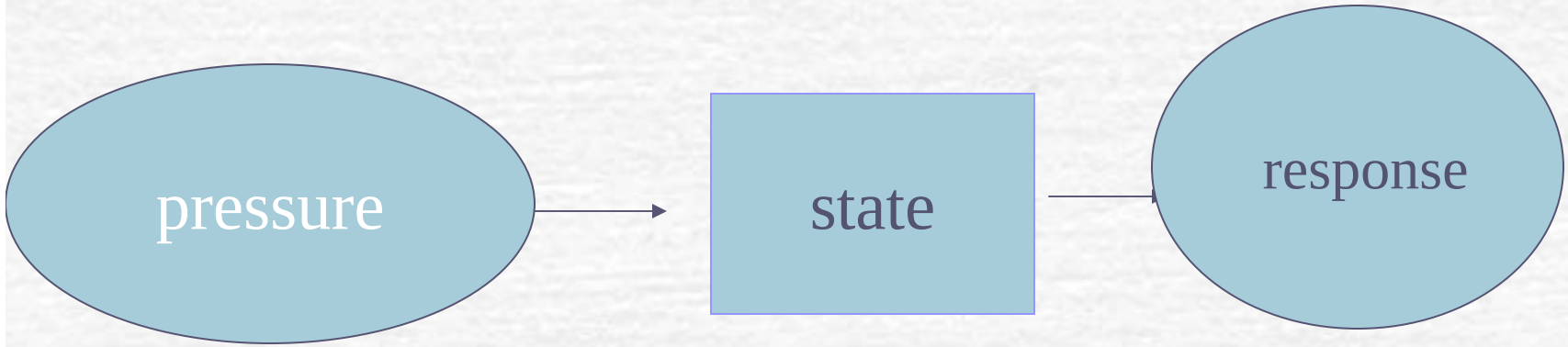
2- non conventional water resources:
Desalinated water


Actual evapotranspiration
Precipitation
infiltration
Surface flow and flood
Ground water

Water Availability Indicators in the Arab Region

Country	Water availability worldwide ranking (out of 182)	Water resources:		Population density in 2000 (Inh / km^2)
		Total renewable (Km^3/year)	Total renewable per capita (m^3/capita/year)	
Algeria	163	14.49	478	13
Bahrain	169	0.12	181	928
Comoros	140	1.20	1,700	317
Djibouti	164	0.30	475	27
Egypt	156	58.30	859	68
Emirates	178	0.15	58	31
Gaza	179	0.06	52	2,834
Iraq	108	75.42	3,287	52
Jordan	170	0.88	179	55
Kuwait	180	0.02	10	107
Lebanon	149	4.41	1,261	342
Libya	174	0.60	113	3
Mauritania	95	11.40	4,278	3
Morocco	155	29.00	971	67
Oman	165	0.99	388	12
Saudi Arabia	173	2.40	118	9
Somalia	144	13.50	1,538	14
Sudan	129	64.50	2,074	13
Syria	141	26.26	1,622	88
Tunisia	162	4.56	482	61
West Bank	181	0.75	--	--
Yemen	168	4.10	223	35

Method of water statistics



- **The Pressure-State-Response (PSIR) approach**
  - Applicable for activities focusing on a relatively large area (e.g./ a whole watershed) where project-sized objectives and specific components are not easily identified.

- It has four different aspects of environmental problems:

  i. Pressure variable describes the underlying cause of the problem, i.e. over pumping of ground water.

  ii. State variable describes some physical, measurable characteristics of the environment that results from the pressure, i.e. availability / quality state.

  iii. Response variable are the policies, actions or investments that are introduced top solve the problem, I.e. water harvest

1- Fresh renewable water resources statistics

- **precipitation volume**
- **evapotranspiration**

internal flow

Actual external Inflow of surface and ground waters

Total renewable fresh water resources

Outflow of surface and ground waters

Renewable groundwater available for annual abstraction

Regular freshwater resources 95% of the time

+ **p**recipitation •

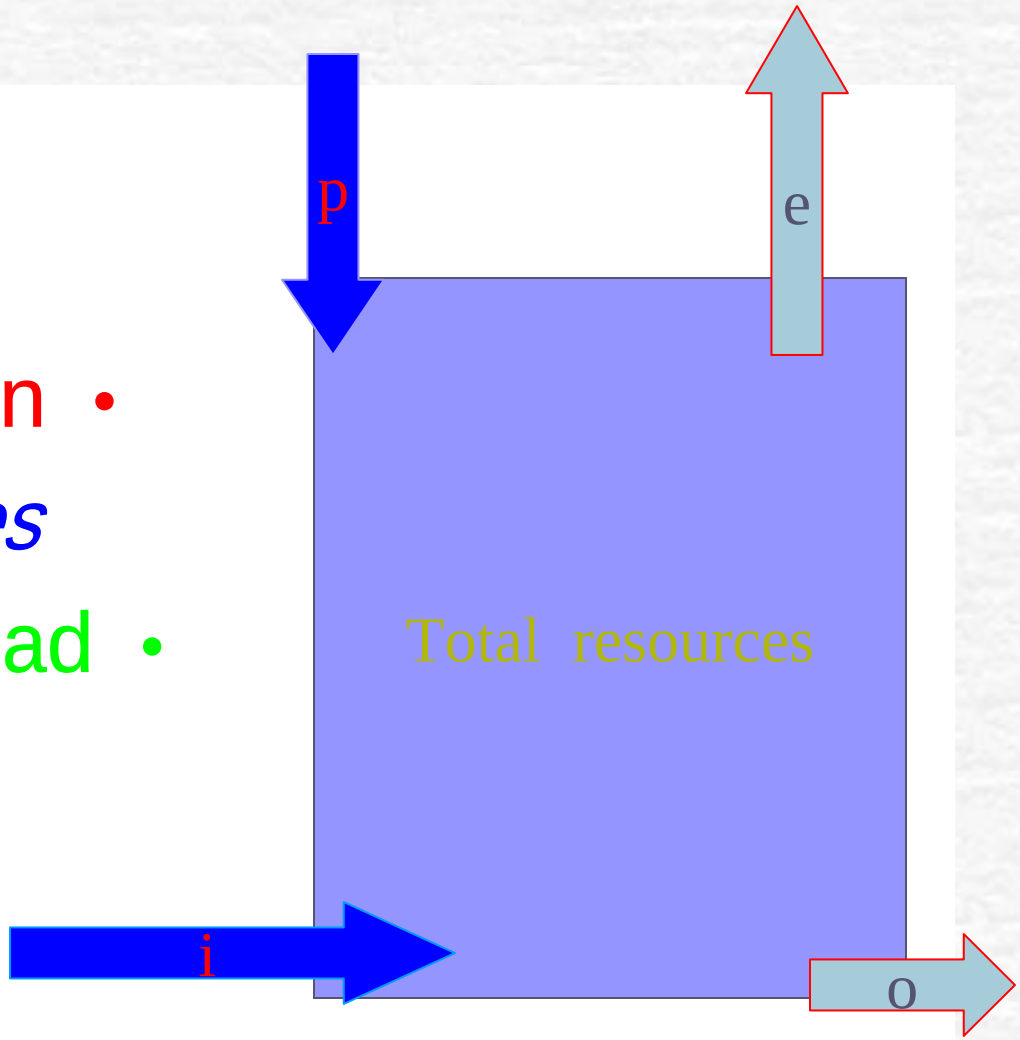
- **e**vapotranspiration •

= *internal resources*

+ **i**nflow from abroad •

(- **o**utflow) •

= *total resources*



Sources of data

- Official governmental source
- Ministry of water, Metrology department.
- Inter national organization like FAO.
- Regional organization like Plane Blue.

Methods of data collection

Gathering data from different sources.

Apply some statistical methods

The data should be : comparable, consistence, up to date

Water abstraction

1- Total fresh surface water abstracted

2- Total fresh ground water abstracted

3- Water returned without use

4- Imports of water

5- Exports of water

6- Desalinated water

7- Total reuse of fresh water

8- Total fresh water available for use

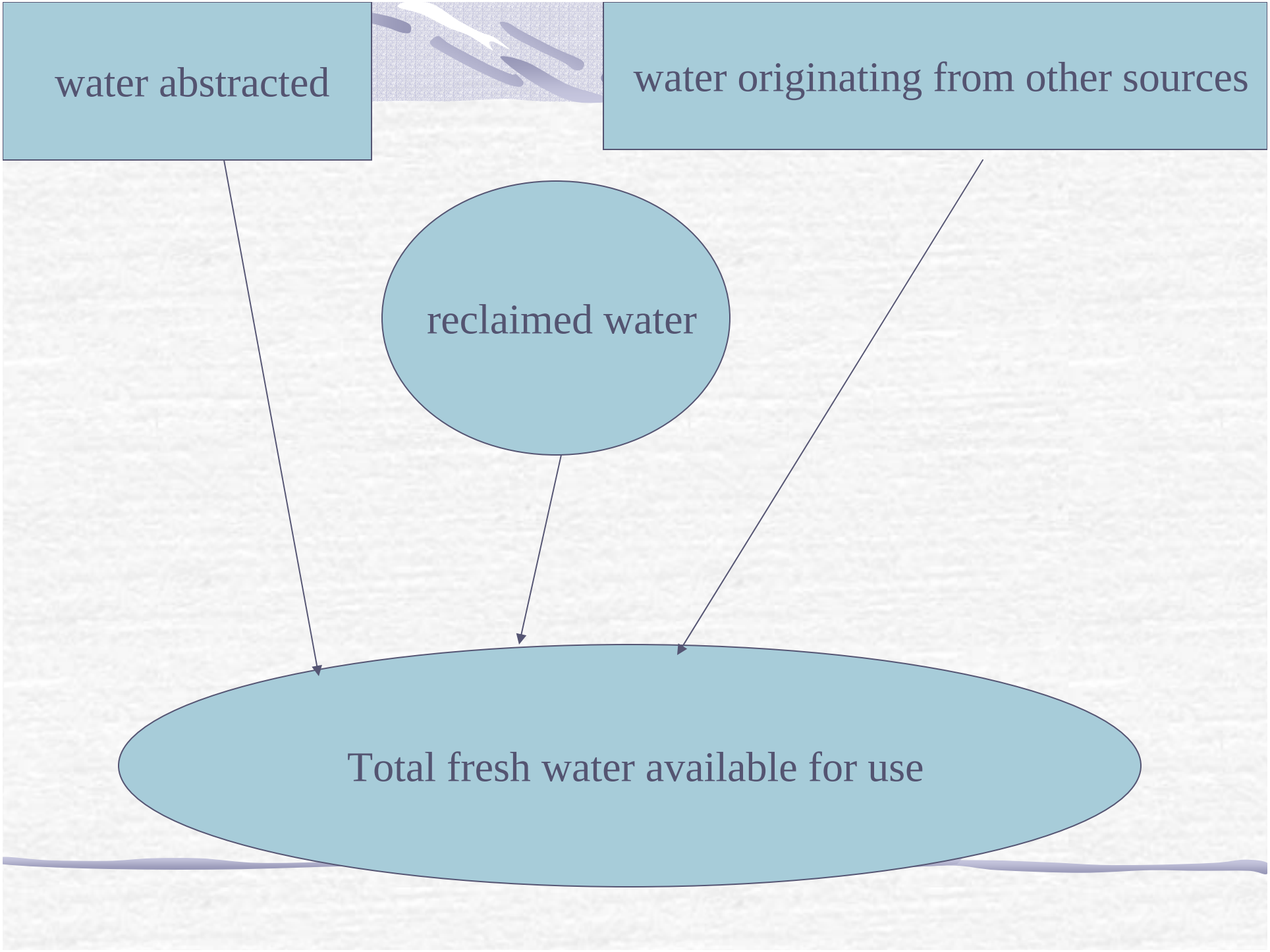
Sources of data

- official data.
- the economic enterprises survey.
- the agriculture surveys and census.
- scientific institutions.
-house hold survey.

Methods of data collection from different source

Compile official data and survey weighted results.

The data could be collected by there usual activities or additional questions in the questionnaire or specialist questionnaire


water abstracted
water originating from other sources
reclaimed water
Total fresh water available for use

Water supply

1-Total public water supply

2-Self-supply

3-Other supply

4-Total water supply

5-Water losses during transport

6-Population connected to public water supply %:

Sources of data for water supply

- official records.
- privet sector in this field (water distributor).
-house hold surveys.

Methods of data collection

-collect data from different sources.
- make aggregation of the collected data.
-Make quality control for the collected data