

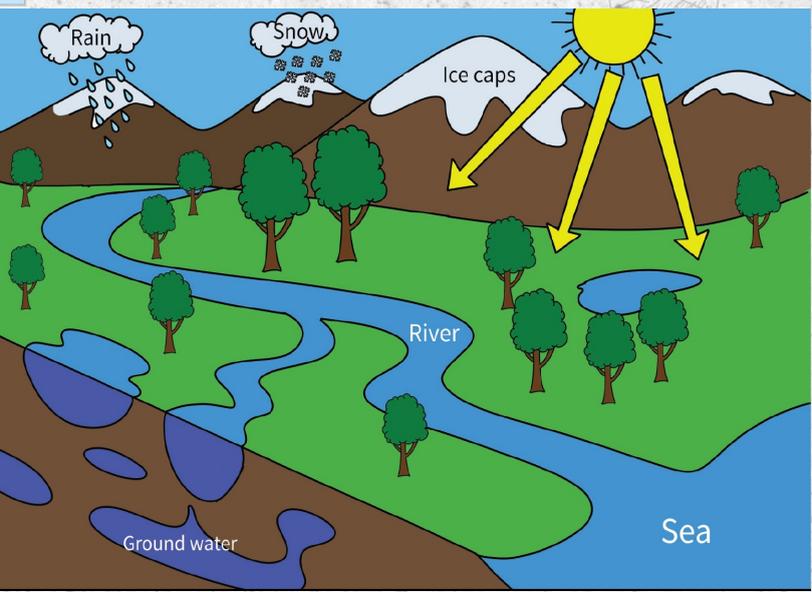
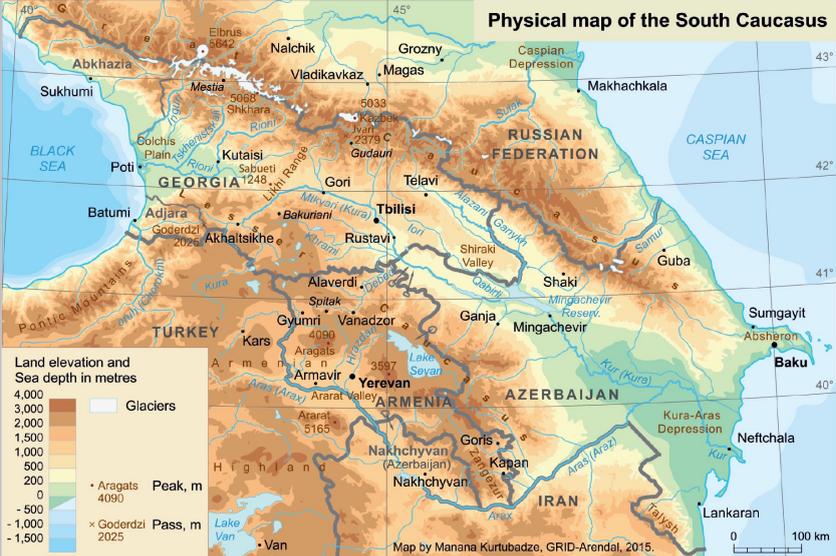


# Life in Water and Water in Ecology

IX-XI Grades



# Physical map of the South Caucasus



## Life in Water and Water in Ecology

Water is a key driver of the vital processes in the human body as well as in other living organisms, whether that be breathing, regulating human body temperature or multiplying cells. Water is also essential for ecosystems, communities of living organisms represented in the environment. Water is a key substance for the existence of ecosystems, as it is indispensable for the exchange of minerals and nutrients. We should remember that ecosystems have the same rights to water as human beings. It is in the best interest of humanity to assure that ecosystems have enough water to continue to function effectively, providing ecosystem services.



Ecosystem services refer to those benefits the ecosystem provides and contributes to maintaining and improving the well-being of humanity. Examples of ecosystem services are reducing the risk of floods and landslides through forestry, controlling erosion, facilitating pollination of plants by bees and birds, fostering optimal climate conditions, controlling the quality of air, etc. In general, humans use these services without even recognizing the 'quiet work' of ecosystems. The majority of the population takes these services for granted and do not reflect on their origin.

Ecosystem services are divided into four main categories: provisioning (water, food, etc.); regulating (clean air, water, soil, etc.); supporting (photosynthesis, water cycles, nitrogen and phosphorus cycles, etc.) and cultural (recreation) services.



#### It IS Interesting

An adult human being's body is around 70% water! 73% of the brain is water, 73% of the heart is water, 83% of the lungs are water, 67% of the building blocks of cells in a human body consist of water!

An adult requires from 50 to 100 liters of water a day for various needs - for drinking, meals, and hygiene, etc.

Currently human beings significantly impact both the quantity of water as well as its quality through their intense use of water resources. Virtually all areas of human activity are related to water use. Water is used in electrical energy, a basic sector of economy, and drives development of other economic sectors as well. Modern agriculture would be unimaginable without intensive water use. The majority of the world's consumer goods are transported by water, which forms the arteries of commerce.

Due to such intensive exploitation of water, water as source of life is no longer sufficient either for human beings or for other forms of life, the existence of which depend on water. This is true of virtually all living organisms on the Earth.

There are myriad examples to prove it. For instance, the continuity of rivers is disrupted as a result of various projects implemented by humans in riverbeds (e.g. hydropower stations, dams, irrigation channels). Certain sections of rivers are no longer connected, which significantly impacts the population of water species such as fish. A good example of this problem is a critical reduction of the population of sturgeon in the sea. Due to the construction of various hydro facilities they cannot swim upstream towards spawning grounds in the river during spawning periods. It means that the habitat for this species must be relocated, or the effects of the hydro facilities mitigated (fish ladders) or the species will not survive.



The problem is further exacerbated by the current change in climate, which is accompanied by a decreased flow of water in rivers, and by an increased frequency and intensity of natural disasters, such as floods and mudslides. In turn, this contributes to the desertification of land, the spread of various diseases, changes in biodiversity, and the drastic deterioration of human activities, including agriculture. Eventually, those ecosystem services, that are essentially required for life on our planet, are virtually gone.

The current situation is so critical, that it requires cooperation not only of certain countries, but of all countries worldwide. This does not exclude, and, on contrary, implies that each individual must understand the problem and introduce conservation in water use practices that are part of their daily lives, to ensure more rational use of water on the one hand, and on the other hand prevent pollution of water in the natural environment.



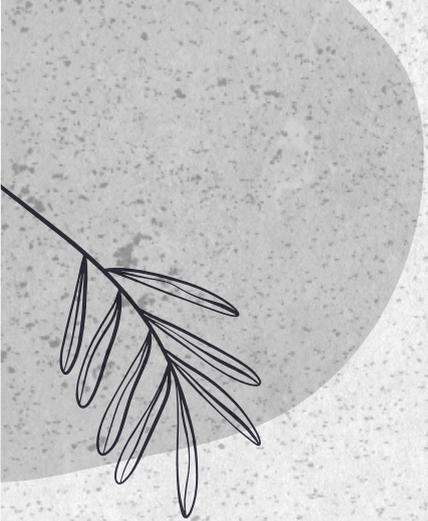
## Do It Yourself

- Break up into four groups and choose one of the following ecosystem services: 1) Photosynthesis, 2) Wood as an economic product 3) Fresh air 4) Medical plants. Discuss the benefits of each ecosystem service you selected in each group.

Discuss these services in the context of key components of human well being, such as safety, living conditions, and health and discuss how they relate to your group's selected ecosystem service. #Safety: protection from natural disasters, safe climate conditions; #Living conditions: food, hygiene, shelter, source to survive; #Health: access to clean water and air, physical well-being.

Use diagrams or informational graphs showing the links among the ecosystem services and components of human well being (safety, living conditions, health), then present the results of your group discussion to the class.





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