необхідність в організації кооперативів, як із збору вирощеної продукції, так і по її переробці. Для вирішення наявних проблем необхідно буде визначити кількісний і якісний склад плодово-ягідних насаджень кожного населеного пункту, провести фізіолого-біологічну оцінку наявних порід дерев. Науково обґрунтувати періоди збору продукції та узгодити механізм їх переробки за термінами дозрівання (шовковиця,черешня, абрикоса, яблуня, вишня, груша, алича, слива тощо). Залежно від особливості вирощеної продукції дослідити доцільність придбання необхідного обладнання з їх переробки.

Таким чином проведення моніторингу наявних плодово-ягідних насаджень у приватному секторі сільських жителів і зацікавлення їх власників в реалізації вирощеної продукції за реальними цінами буде слугувати у забезпеченні населення екологічно безпечною продукцією.

ДЖЕРЕЛА ТА ЛІТЕРАТУРА

1. Аграрне інформаційне агенство Agravery. URL: http://agravery.com/uk/posts/show/ agrarnij-2016-j-frukti-j-ovoci-jdut-v-evropu%20

2. Шевчук Г.В. Механізм удосконалення функціонування підприємств плодово-овочевої галузі: Автореферат дисертації на здобуття наук. ступеня канд. екон. наук. Вінниця. 2020. 22 с.

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THE GREENHOUSE EFFECT. ITS CAUSES AND CONSEQUENCES

The article deals with greenhouse effect phenomenon, its causes and consequences. The reasons for the Earth's climate change have also been analyzed.

Key words: *atmosphere, carbon circulation, gases, greenhouse effect, solar energy, water vapour.*

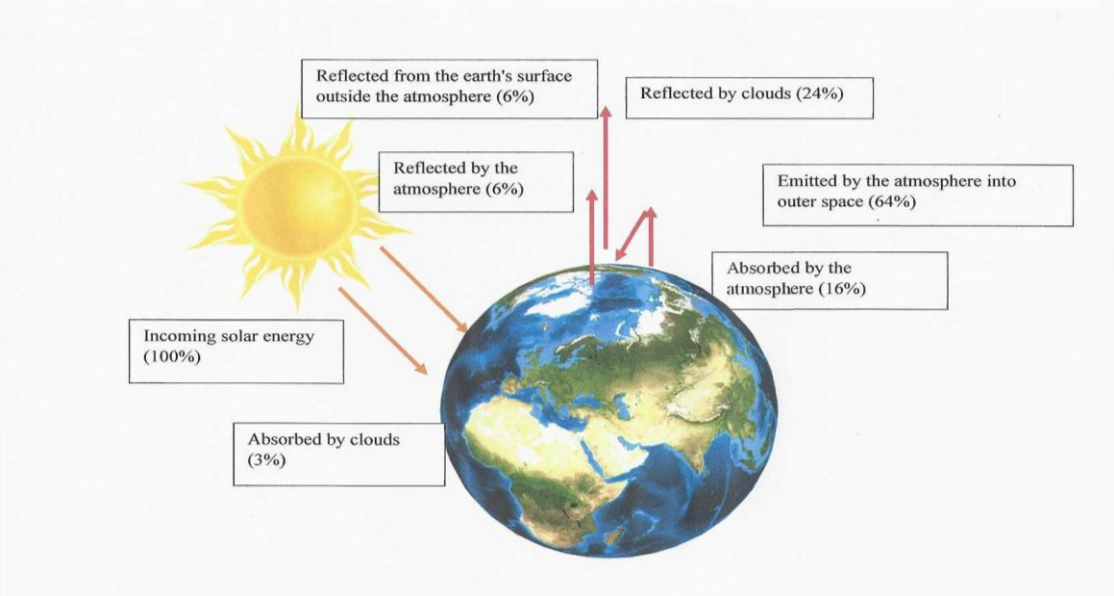
У статті розглядається феномен парникового ефекту, його причини та наслідки. Також проаналізовано причини зміни клімату Землі.

Ключові слова: *атмосфера, кругообіг карбону, гази, парниковий ефект, сонячна енергія, водяна пара.*

Our planet holds an atmosphere whose components don't leave the Earth and on the other hand no cosmic bodies fall to the Earth's surface. Thus, we can assume that Earth doesn't exchange mass with outer space.

If we talk about the exchange of energy that the Earth receives from the Sun everything is much more complicated. What happens to this energy next? What is it spent on?

The solar energy causes winds and currents, evaporation and condensation of water, growth and development of plants, animals and humans. And you have probably heard or read that the solar energy causes the greenhouse effect, which is responsible for a number of negative changes on our planet. It is not true because this effect is saving for people. To understand this we need to find out exactly how much of the Sun's energy in consumed on Earth. There is a picture, which shows the energy balance for the system "Space-Earth-Atmosphere".



Picture 1. The system "Space-Earth-Atmosphere"

Sunlight penetrates the Earth's atmosphere and it is particularly absorbed by the surface reflected from it. The reflected rays easily penetrate the atmosphere and leave the Earth. The absorbed rays heat the Earth and its surface emits invisible heat rays. This radiation doesn't penetrate the atmosphere because it is absorbed by greenhouse gases (water vapor, carbon dioxide, methane, nitrous oxide and CFCs). Then these gases give energy to other air parts and this process continues continuously, which causes the warming of our atmosphere. The heated atmosphere also emits. The first part of this radiation leaves the Earth and the second part is absorbed by greenhouse gases again. Then everything repeats itself: greenhouse gases give energy to air particles that radiate again [1].

We can observe this process in hothouses: a visible sunlight enters the hothouse through the glass. It is absorbed by the soil, which emits invisible thermal radiation. The latter does not penetrate the glass. It is reflected from it and heats the air in the hothouse.

So, the solar energy that enters the Earth consists of two streams of energy: immediately reflected from the Earth's surface and thermal energy, transformed into space by the system "Earth-atmosphere" [3]. Irrespective of the way in which this happens, the energy of the Sun's radiation will eventually leave the Earth, and the Earth, constantly receiving and giving energy, stays with its average temperature which is 15°C.

The greenhouse effect has begun on Earth since the atmosphere appeared. There were periods in the history of our planet when it happened more intense and the average temperature was higher. There also were times when greenhouse effect was slower and the planet was colder than it is now [1].

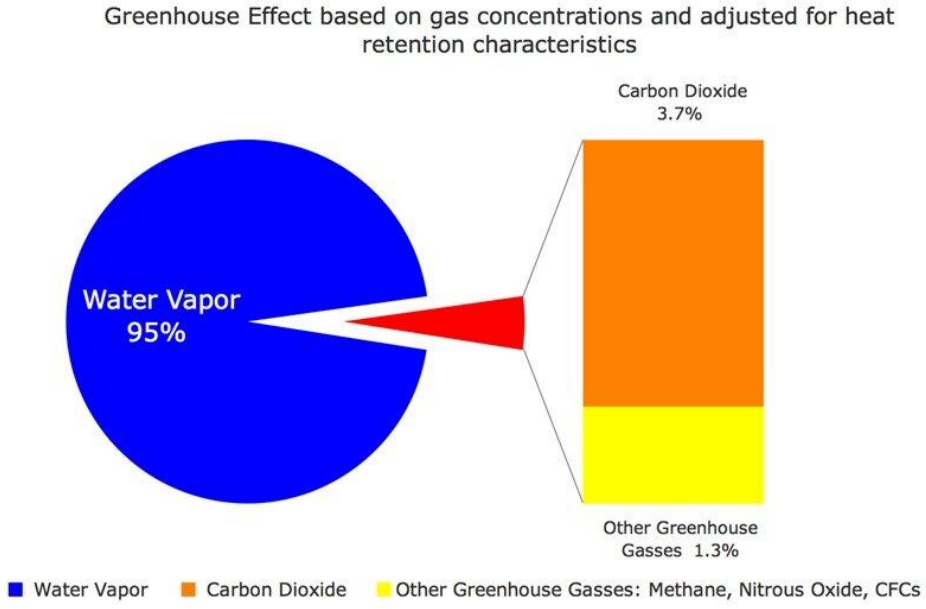
We have found that greenhouse gases slow down the return of solar energy by "warming" the atmosphere and keep it at a constant temperature. If they weren't part of the atmosphere, it would be much colder on Earth. The most important processes in nature and the peculiarities of the Earth's climate are connected with water vapour in the air, which plays the role of a thermostat on Earth, and its transition from one state to another.

Water vapour is always present in the atmosphere (picture 2). It evaporates from surface reservoirs, most soil and due to evaporation of water from the plant surface (transpiration). Air currents carry it; with decreasing it condenses and forms clouds. Clouds evaporate and then fall to Earth in the form of rain or ice crystals, changing the content of water vapour in the atmosphere. The evaporation of water from the earth's surface consumes a lot of heat. During the condensation

of water vapour in the atmosphere, this heat is given to the air. Clouds caused by condensation reflect and absorb solar radiation on its way to Earth [1].

Compound	Formula	Concentration in atmosphere (ppm)	Contribution (%)
Water vapor	H_2O	10–50,000	36–72%
Carbon dioxide	CO_2	~400	9–26%
Methane	CH_4	~1.8	4–9%
Ozone	O_3	2–8	3–7%

Picture 2. Greenhouse gases



Picture 3. Greenhouse gases

The payment of water vapour to the greenhouse effect is the most significant. If the air did not include water vapour, the temperature on Earth would be more than 20°C lower and would be -5.6°C. The media often overlook this fact when they talk about greenhouse gases. However, we have no influence on the amount of water vapour on the Earth. It depends on temperature, altitude, the presence of large bodies of water, winds, but not on human activity or inaction [3].

Carbon circulation also plays a great role in temperature increasing. The main reserves of carbon on Earth are concentrated in carbon dioxide, most of which are parts of the atmosphere and dissolved in the waters of the oceans.

If we talk about carbon dioxide in the atmosphere, it should be noted that plants absorb carbon dioxide during photosynthesis. Under the influence of light from water and carbon dioxide in plants, oxygen is formed, and inedible soil elements are converted into nutrients-proteins and carbohydrates. In this way carbon enters the structure of plants and can play several "games" [2]:

1. Carbon is retained in plants until they die, and then becomes "food" for reducing agents. Eventually, carbon returns to the atmosphere as part of carbon dioxide.

2. The plant is eaten by herbivore. Carbon will return to the atmosphere during the animal's respiration (or due to its decomposition after death) or the herbivore will be eaten by a predator and then the same way back into the atmosphere.

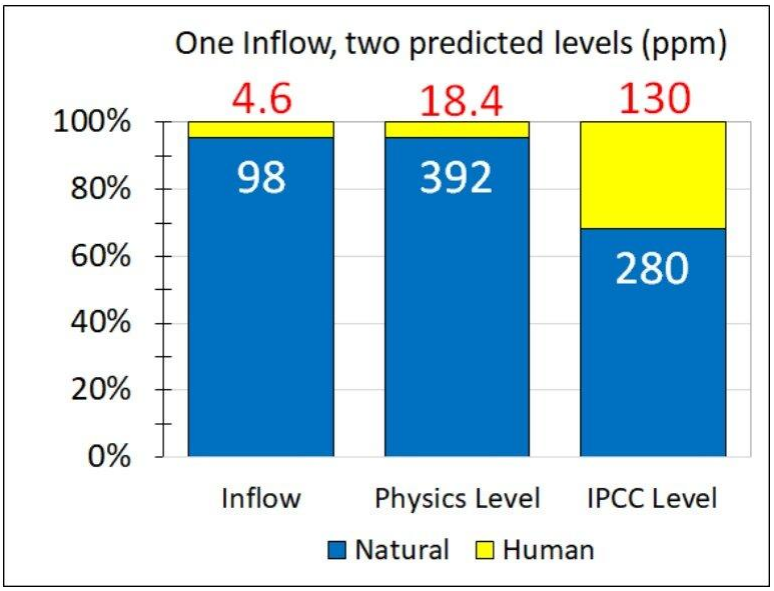
3. The plant dies and turns into fossil fuels, such as coal, underground. In this case, carbon is buried underground.

For carbon dioxide dissolved in the waters of the oceans, nature has also provided several scenarios [2].

1. Gas exchange takes place continuously between the atmosphere and the World Ocean. Dissolved carbon dioxide is returned to the atmosphere by diffusion.

2. Carbon enters the tissues of marine plants or animals and accumulates in the form of limestone deposits on the ocean floor or, conversely, from the deposits passes into the water.

If carbon is a part of sedimentary rocks or fossil fuels, it falls out of the cycle (and from the atmosphere). Moreover, it accumulates in forests for decades, and in swamps for millennia. People intervened in the natural carbon circulation. We produce food, form the habitat, but first – extract and burn fossil fuels. Processing and incineration of combustible minerals and organic waste provides more than 95% of modern energy production. At first, people burned wood, then coal, and now oil and natural gas. Throughout the year, we burn the amount of fuel that nature has created for million years! A side effect of predatory deforestation is an increase in carbon dioxide in the atmosphere.



Picture 4. The impact of human activities on carbon dioxide

If there were no forests and oceans on our planet, the carbon dioxide content would be much higher than it is today. The seas and land biosphere absorb approximately half of all anthropogenic carbon dioxide (emissions from industry, transport, energy, agriculture and other human activities) every year. On land this role is primarily performed by natural forests, which we call the green lungs of the planet.

REFERENCES

1. Daria Bida Chomu zminiuietsia klimat Zemli? Chastyna I [Why is the Earth's climate changing? Part I]. *Kolosok.* URL: https://e-kolosok.org/dariia-bida-chomu-zminiuiet-sia-klimat-zemli-chastyna-1-2/ (viewed on 21.06.2021).

2. Jason West Chomu vuhlekyslyi haz maie takyi nehatyvnyi vplyv na klimat Zemli [Why carbon dioxide has such a negative impact on the Earth's climate]. *InnerSelf Climate impact.* URL: https://uk.climateimpactnews.com/evidence/causes/3321-why-carbon-dioxide-has-such-outsized-influence-on-earth-s-climate (viewed on 20.06.2021).

3. Parnykovyi efekt i hlobalne poteplinnia klimatu [Greenhouse effect and global warming]. *Navchalni materialy onlain.* URL: https://pidru4niki.com/1854110937960/ekologiya/parnikoviy_efekt_globalne_poteplinnya_klimatu (viewed on 20.06.2021).