REPUBLIC OF UZBEKISTAN

MINISTRY OF HEALTH

FERGANA MEDICAL INSTITUTE OF PUBLIC HEALTH

Toshmatov FR

IMPACT OF VEHICLE EXHAUST ON HUMAN HEALTH

(monograph)

Fergana – 2024

REPUBLIC OF UZBEKISTAN

MINISTRY OF HEALTH

FERGANA MEDICAL INSTITUTE OF PUBLIC HEALTH

"APPROVED"

RECTOR OF THE FERGANA PUBLIC HEALTH MEDICAL INSTITUTE

DMSc, professor _____ A.A.Sidikov

“____” _____ 2024 y.

Toshmatov FR

IMPACT OF VEHICLE EXHAUST ON HUMAN HEALTH

(monograph)

Fergana – 2024

The scientific work was carried out at the Fergana Medical Institute of Public Health

Authors:

Toshmatov FR	Senior Lecturer, Department of Traumatology and orthopedics

Reviewers:

Madaminov SM	Head of the Department of Normal Anatomy, Operative Surgery and Topographic Anatomy, Professor
Ulugbekova GJ	ASMI, Associate Professor, Department of Anatomy and Clinical Anatomy, Ph.D.

The monograph was approved by the Expert Council of the Fergana Public Health Medical Institute by the protocol No. "____"_____ of 2024 and was approved for publication and recommended for approval by the Scientific Council.

The monograph was approved by the protocol No. "____"_____ of 2024 and was approved for publication and recommended for publication.

Secretary of the Expert Council of Fergana

Public Health Medical Institute PhD: AR Muradimova

CONTENTS.

ENTRANCE

"Nature and man interact according to certain laws. Violation of these laws leads to irreversible ecological disasters ."

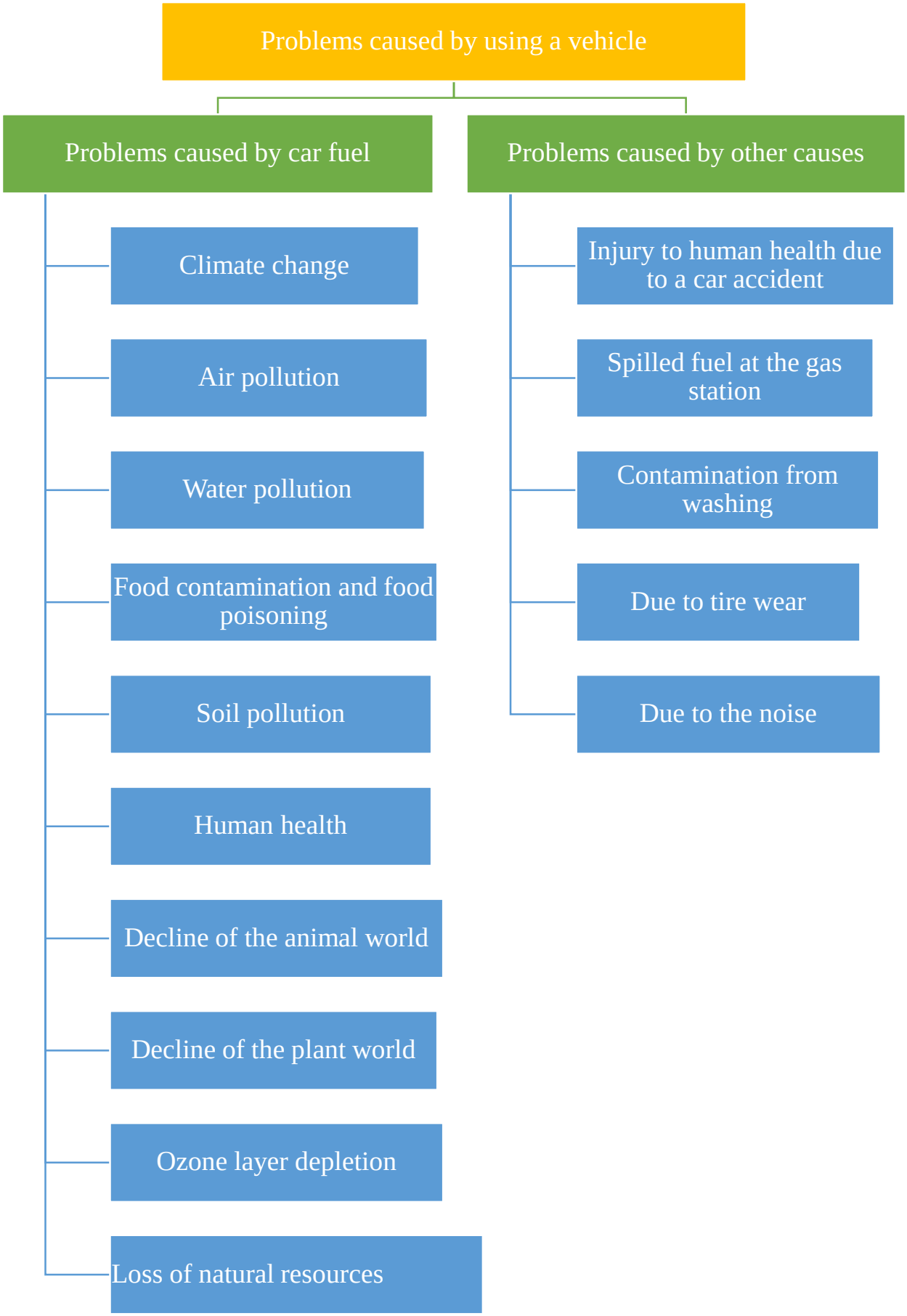
I.A. Karimov

Since ancient times, man and nature have lived together. Nature has given man all its blessings. But man has gone beyond the limits of self-sufficiency. Recently, the relationship between nature and man has deteriorated significantly. In the 19th century, great changes took place in the world, and in the 20th century, progress developed at a very rapid pace. As a result, the contract between man and nature was broken and various problems began to arise. Let us list the most important of them :

- atmospheric air pollution ;
- the occurrence of various diseases in the human body ;
- changing the composition of food products ;
- food poisoning ;
- soil pollution ;
- water pollution ;
- extinction of plants and animals ;
- temperature increase and others .

This includes, in addition to various gases emitted from factories, Emissions from vehicles running on organic fuels It is also causing . How do these gases cause problems? - You can find the answer to the question in Table 1 below. In the current era of rapid development, motor vehicles are one of the most damaging factors in the world. Exhaust gases emitted from vehicles cause great harm not only to nature but also to humanity. As a result of their effects, they cause various diseases in the human body.

Table 1


Problems caused by using a vehicle
Problems caused by car fuel
Problems caused by other causes
Climate change
Air pollution
Water pollution
Food contamination and food poisoning
Soil pollution
Human health
Decline of the animal world
Decline of the plant world
Ozone layer depletion
Loss of natural resources
Injury to human health due to a car accident
Spilled fuel at the gas station
Contamination from washing
Due to tire wear
Due to the noise

I- CHAPTER LITERATURE REVIEW.

1.1 TYPES OF VEHICLE FUEL.

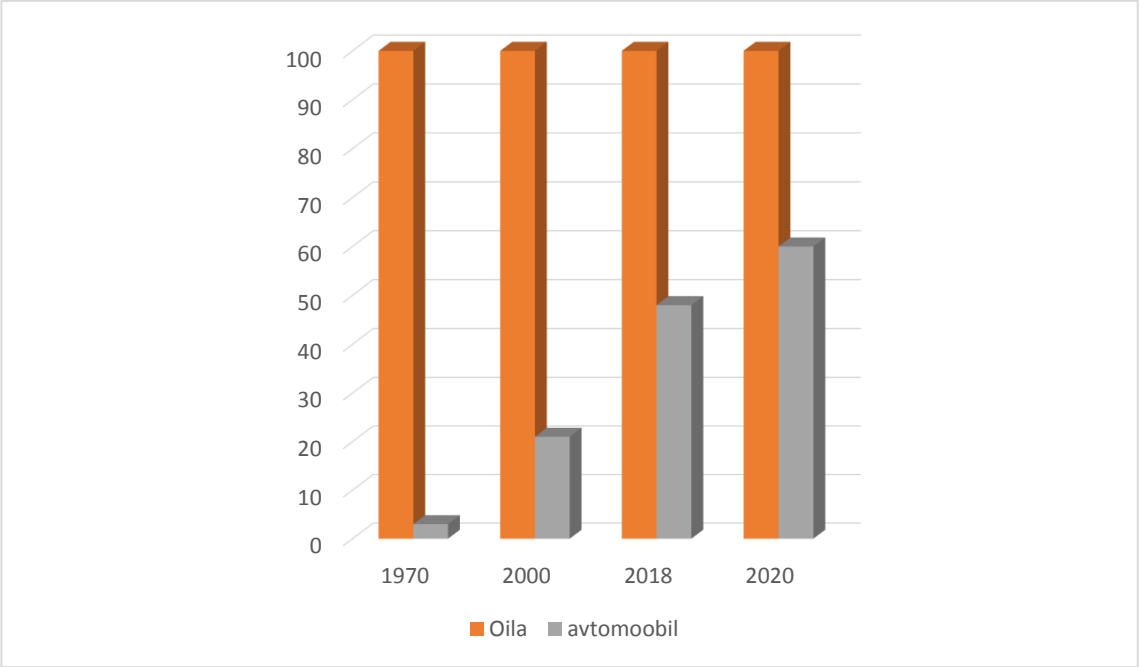
Every chemical technology must produce harmless waste, and if it cannot achieve this, it should not be used in production.

(N. Enikolopov)

After the creation of vehicles, a great gift of progress, various types of fuels began to be used. During their use, various types of exhaust gases began to be released and dispersed into the air. This also has an impact on the relationship between nature and man.

In the 1970s, 2-3 out of 100 families in Uzbekistan had a car . In 2000, it was 20-21 out of 100, in 2018 it was 40-48 out of 100, and by the end of 2020 this figure will increase further to 55-60 out of 100. In the Fergana Valley, road transport has increased by 6.6% of freight turnover (96.4% of the total regional road transport turnover). The diagram below shows the rapid development of transport vehicles.

Diagram 1

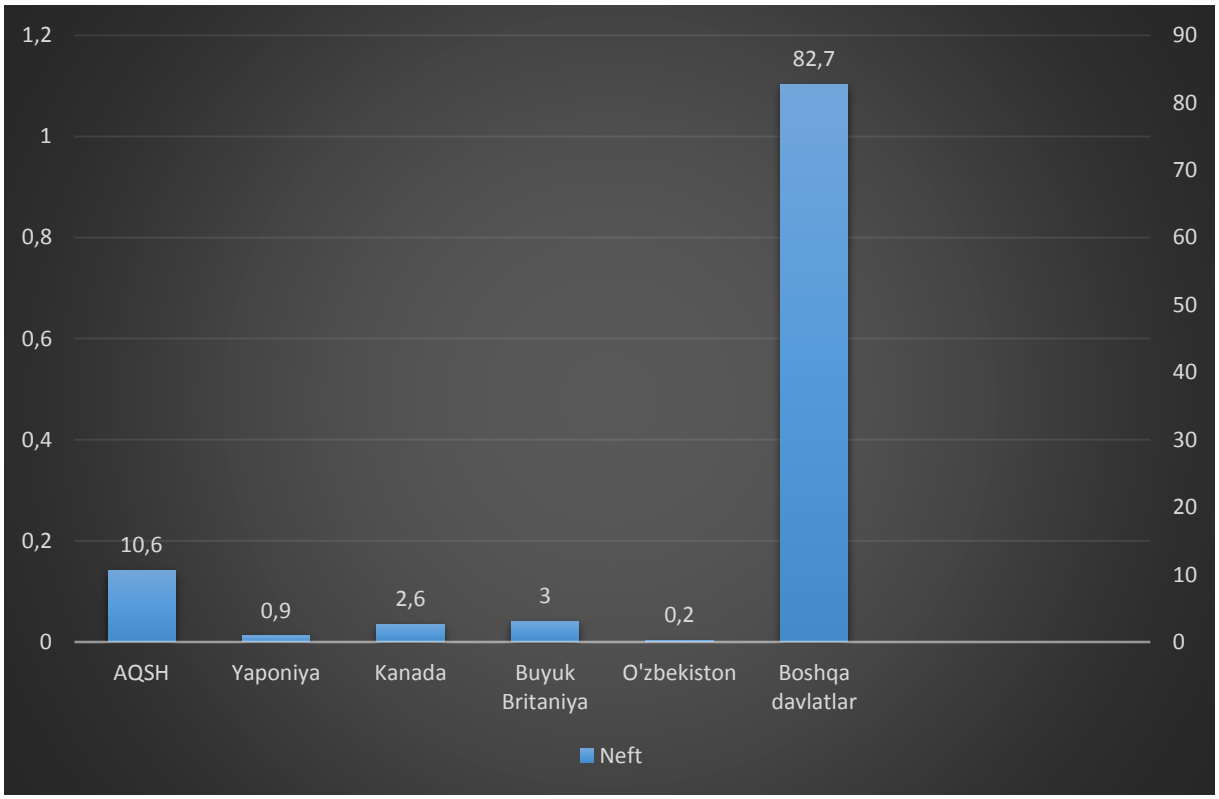


2018 figures , we can see Uzbekistan's position in the world in oil, gas, and automobile production in Table 3.

Table 2.

Hospitals	Oil extraction		Natural gas extraction		Automobile production	
	Million Tons	Percentage	Billions of M^3	Percentage	Millions of pieces	Percentage
USA	350	10.6	58	2.4	8	22.9
Japan	1	0.9	3	0.1	9	25.7
Germany	3	0.1	2	0.1	4	11.4
France	3	0.1	4	0.2	3.5	10.0
Great Britain	98	3.0	75	3.1	1.5	4.3
Italy	5	0.2	25	1.0	1.4	4.0
Canada	85	2.6	16	0.7	1.5	4.3
Uzbekistan	8	0.2	50	2.1	0.2	0.6
Worldwide	3300	100	2400	100	35	100

Diagram 2



Currently, the use of gasoline, diesel, liquefied gas and diesel fuel as fuel for vehicles is widespread. The combustion of these fuels results in the release of various gases into the atmosphere, which leads to environmental disasters. As a result of the combustion of any organic fuel, water vapor H_2O , carbon dioxide CO_2 or soot CO (with incomplete combustion) and various other toxic gases are also formed. These vapors and gases, when combined with oxygen, form a flame. During the combustion process, the temperature reaches 1500-2400 ^{O}C. 60...80% of the fuel enters the vehicle cylinder in the form of vapor , 10...15% of the fuel in the form of liquid droplets and up to 25% of the fuel in the form of liquid vapor. If the organic fuel is in a gaseous or vaporous state, it oxidizes very quickly when burned. Evaporation of fuel is a process that occurs on the surface . The amount of air supplied is of great importance in the combustion of fuel. If it is not enough , the fuel burns slowly, the temperature is low, and the formation of incomplete combustion products, i.e. carbon (II) oxide, soot, etc., increases. It is also not advisable to exceed the amount of air. The oxygen content of the air is only 21% by volume, the rest is made up of inert gases and nitrogen N_2. As a result, if too much air is supplied, most of the heat goes to heating the nitrogen and the remaining oxygen. As a result, the temperature decreases, the combustion rate decreases, and fuel is consumed excessively . The complete combustion of different fuels requires different theoretical amounts of air.

For example: for the complete combustion of 1 kg of gasoline, theoretically, 15 kg (12.5 m^3) of air is required at constant atmospheric pressure and 293 K. In practice, gasoline does not burn completely. To ensure complete combustion, 1 kg of gasoline requires 17-18 kg (14.6 m^3) of air. For the combustion of 10 kg of carbon, 26.7 kg (22.25 m^3) of air is required, and for the combustion of 10 kg of H_2, 80 kg (66.7 m^3) of air is required. However, excess air in the mixture, while increasing the complete combustion of gasoline, also leads to a decrease in the combustion rate. As a result, it leads to a decrease in engine power.

To increase the combustion rate of the mixture, it is necessary to reduce the amount of air in the mixture. The highest combustion rate occurs when approximately 109 m^3 of air is added to 10 kg of gasoline . A mixture of this ratio provides high power

output from the engine, but fuel economy deteriorates due to incomplete combustion of gasoline .

Approximate values in kg of excess air required for fuel combustion in various engines :

Table 3

Fuel types:	
Gasoline (for gasoline engines)	0.09-1.15
Diesel fuel (for high-speed engines)	1.20-1.60
Motor fuel (for low-speed engines)	1.50-1.70
Gaseous (compressed or liquefied gases)	1.05-1.15

Gasoline of various grades and brands is used as the main fuel for carburetor and injection engines. Gasoline is a flammable liquid that evaporates easily. It is approximately 85% carbon by mass, 15% hydrogen, and very small amounts of oxygen, nitrogen, and sulfur. The density of gasoline ranges from 0.690 to 0.742 g/cm ^{3}, and the amount of heat released when it burns is approximately 3200 MJ/m ^{3}.

1.2. GASOLINE FUEL

One of the main causes of air pollution is the incomplete and incomplete combustion of fuel. Only 15% of the fuel is used to propel the car, while 85% is "blown away". The combustion chamber of a car engine is a chemical reactor that synthesizes toxic substances and releases them into the atmosphere. Even nitrogen contained in ordinary air enters the combustion chamber and turns into toxic nitrogen oxides. As a result of incomplete combustion of fuel, the following toxic components are formed :

- CO - Carbon monoxide (suffocating gas - carbon monoxide) 87-98%;
- NO, NO_2 - nitrogen oxides (19-73%);
- unburned hydrocarbons (82-96%,);
- aldehydes;
- sulfur compounds;
- Lead compounds and soot, which are very toxic, can be shown.

Nitrogen oxides in car exhaust gases can cause photochemical smog. One car emits 800 kg of carbon monoxide, 40 kg of nitrogen oxides and 200 kg of various hydrocarbons per year. Hydrocarbon carcinogens, especially those that accumulate around traffic lights at intersections, are extremely dangerous. These emissions have the ability to accumulate in the external environment and in the human body.

Gasoline brands used abroad .

Table 4

Country name	Name of gasoline	Octane number	
		Determined by the motor method	The research method - revealed
RUSSIA	Normal-80	80	76
	Regular-91	91	82.5
	Premium-95	95	85
	Super-98	98	88
AUSTRIA	Super	97-98	-
	Permanent	88-92	82-87
BRAZIL	Super	90	82
	Permanent	80	73
ENGLAND	Five-star	100	90-93
	Four-star	97	91
	Three-star	94	86
	Two-star	90	84-86
ITALY	Super	98-99	88-92
	Permanent	85-88	82-84
USA	Super	96-102	86-94
	Permanent	90-96	82-90
	Unleaded	91-93	82-85
FRANCE	Super	97-98	87-88
	Permanent	89-91	80-83
GERMANY	Super	98-99	88-89
	Permanent	91-93	84-86

Lead, ether, manganese compounds , and compounds produced by adding iron are used as anti-knock agents for gasoline . Instead of tetraethyl lead, it is better to add isopentane and alkylbenzene (which is obtained from natural gas) to gasoline, but

isopentane begins to boil at 28 ° C, so its content in gasoline does not exceed 15-20%. Since alkylbenzene is close in boiling point to automobile gasoline , its amount can be used without restrictions, but it is more expensive.

Tetraethyllead $Pb(C_2H_5)_4$ is a dark, colorless toxic liquid with a density of 1659 kg/m ^{3} , a boiling point of 200°C, easily soluble in petroleum products, insoluble in water. Tetraethyllead cannot be used in its pure form , because it accumulates in one place in the combustion chamber. Therefore, tetraethyllead is mixed with a lead carrier substance in gasoline to produce ethylated liquid. A mixture of C_2H_5Br (bromoethane) is used as the carrier substance. When they burn with gasoline, they form volatile substances, which are released from the engine with exhaust gases. Gasoline with the addition of ethylated liquid is called ethylated and is colored to distinguish such gasoline: AI-80 is yellow, AI-93 is red, AI-98 is blue.

to gasoline at a rate of 0.1 % increases the octane number by 10 units. Aviation gasoline is added at a rate of 0.3 %. However, since they are very toxic , it is necessary to limit the use of gasoline with such antiknock additives. Tetraethyl lead should not exceed 0.52 g per 10 kg of gasoline .

The working mechanism of tetraethyllead antidetonators is written as follows:

$Rb(S_2N_5)_4 = Rb + 4S_2N_5$ $Rb + O_2 = RbO_2$

$R\text{-}CH_2\text{-}COOH + PbO_2\text{-}COOH + Pb + H_2O + 1/2\ O_2$ (goes at high temperature).

Such gasoline causes great damage to the car engine and the environment. Tetraethyllead has a harmful effect on the engine . When the fuel burns, tetraethyllead decomposes and , as a result of oxidation, forms by-products:

- (C2H5)2Pb(OH)2;
- (C2H5)2Pb(OR)2;
- (C2H 5)PbOPOX ;
- PbO yield will be .

These substances accumulate in the engine, leading to the formation of soot and varnish. Lead compounds make up 60-70% of the soot in leaded gasoline , and it is very difficult to clean parts from such soot. As a result of soot, the volume of the combustion chamber decreases, thermal insulation properties and the temperature of

the combustion products increase, which can lead to an increase in the required octane number by 5-8 units. In addition, lead also settles on the electrodes of spark plugs, reducing their average mileage from 80 thousand km to 45-55 thousand km (therefore, the average mileage of spark plugs is about 40 thousand km, and it is recommended to replace them after less mileage). Currently, scientific work is underway to find a liquid that can replace tetraethyl lead.

The transition to unleaded gasoline can be achieved by changing the technology of gasoline production and adding non-toxic antiknock additives. Manganese-based compounds are more effective. For example, cyclopentadienyltricarbonyl MnC_2H_5 (abbreviated - STM) or tricarbonyl (2,3,2-cyclopentadienyl) manganese $Mn(CO)_3(C_2H_5)$, dimer carbonyl (2,3,2-cyclopentadienyl) nickel $[Ni(CO)(C_2H_5)]_2$, ferrocene $Fe(C_2H_5)_2$ have bright prospects. The toxic effect of these substances is 50 times less than that of tetraethyllead. However, despite its high cost , cyclopentadienyltricarbonyl gasoline is cheaper than leaded gasoline. However, they reduce the engine life. Similarly, high-octane methyl tert-butyl ether is also effective. Its physicochemical properties are close to those of gasoline , and when added at 10%, it increases the octane number by 5-6 units.

output , fuel economy, reliability, and efficient operation of an engine largely depend on the properties of the gasoline selected.

Physicochemical properties of different brands of gasoline .

Table 5.

Quality indicators	A-76 Unleaded gasoline	A-76 Ethylene - glycol gasoline	A-80 Ethylated gasoline	AI-91	AI-93	AI-95
Knock resistance: Octane number (minimum):						
By motor method	76	76	76	82.5	85	85
By inspection method	Unnormalized 80			91	93	95

The amount of lead in leaded gasoline, g/ dm3	0.013	0.17	0.15	0.013	0.013	0.013
Fractional composition. °C : Boiling point (minimum)						
For summer gasoline	35	35	35	35	35	30
For winter gasoline	Not normalized					
10% gasoline is burned at the indicated temperature (maximum):						
For summer gasoline	70	70	70	70	70	75
For winter gasoline	55	55	55	55	55	55
50% of gasoline burns at the indicated temperature (maximum):						
For summer gasoline	115	115	115	115	115	120
For winter gasoline	100	100	100	100	100	105
90% of gasoline burns at the indicated temperature (maximum):						
For summer gasoline	180	180	180	180	180	180
For winter gasoline	160	160	160	160	160	160
End of boiling (at most):						
For summer gasoline	195	195	195	205	205	205
For winter gasoline	185	185	185	195	195	195
Residue amount. %	1.5	1.5	1.5	1.5	1.5	1.5
Residue and loss amount of drug, %, max	4.0	4.0	4.0	4.0	4.0	4.0
Saturated vapor pressure, kPa:						
For summer gasoline	66.7					
For winter gasoline	66.7-93.3					
Acid number, KOH/IOO SM 3	3.0	1.0	3.0	3.0	0.8	2.0
Actual tar content. mg/100cm 3 :	5.0	5.0	5.0	5.0	5.0	5.0
Gasoline induction period. min (max)	1200	900	600	900	1200	900
Sulfur content. %	0.10					

Sulfur mixed with gasoline accelerates the wear of engine parts. For example, when the sulfur content in gasoline increases from 0.003 to 0.1%, the wear of parts increases by 2.7 times, and when the sulfur content is 0.2%, it increases by almost four times, and their sooting also increases, which depends on the amount of tar in gasoline. The content of sulfur and tar in AI-98 gasoline with the state quality mark is 0.05%, and in A-72 gasoline - 0.12%. In all other brands of gasoline, sulfur does not exceed 0.1 % . This is also why its impact on the human body is increasing. If we simply look at the roof or window sill of houses located along the roadside, we can see that they

quickly become dusty. The main reason for this is that heavy substances from the air contained in the exhaust gas from vehicles have settled.

1.3. DIESEL FUEL

Diesel fuel - a liquid fuel derived from petroleum; used in compression-ignition internal combustion engines (diesels) . It is divided into three groups:

1) low-viscosity distillate fuel intended for high-speed transport engines and stationary engines (revolutions per minute 1000 and above);

2) medium viscosity distillate fuel (solar oil) intended for high- power stationary engines and marine engines (revolutions per minute from 600 to 1000);

3) low-speed engines - high-viscosity, heavy fraction fuel designed for stationary and marine engines (up to 600 revolutions per minute).

One of the most important properties of diesel fuel is its autoignition temperature; how it burns depends on temperature. The quality of the fuel depends on its cetane number (how quickly it ignites spontaneously) . To facilitate its autoignition and achieve complete combustion, raw materials with the appropriate chemical composition are selected. The quality of diesel fuel also depends on the good purification of the raw materials. There are types of fuel that differ in their solidification temperature, fraction composition and other indicators for different climatic conditions (winter and summer), designed for extremely cold regions.

Diesel-powered cars are widely used in various sectors of the national economy and are now being produced in large quantities. Diesels are widespread due to a number of advantages over carburetor engines, namely, they are more economical, heavier, less prone to fire, (higher acceptability) more reliable and longer lasting. Diesel-powered cars are 25-30% more fuel-efficient than gasoline-powered cars. The heat released when the fuel burns in diesel engines is high , allowing cars to travel 600 km or more in reserve.

The working process of diesel engines is different from that of carburetor engines, in which fuel is mixed with air directly in the combustion chamber.

come in different designs depending on their power, piston speed, crankshaft rotation speed, and mixture formation conditions .

Diesel fuels are relatively viscous, volatile, flammable liquids that contain approximately 87% carbon, 15% hydrogen, up to 0.5% sulfur, and very small amounts of oxygen and nitrogen by mass. For engines to operate reliably and economically, the fuel must be selected correctly, the fuel injection advance angle must be optimal, and it must burn completely and completely during combustion. Three types of diesel fuel are used for cars:

L (summer); Z (winter); A (arctic) diesel fuels are produced. The conditional expression for all brands of diesel fuel is the sulfur content by mass and, for summer fuels, the flash point is additionally indicated, and for winter fuels, the solidification point is also indicated.

For example, L-0.2-40 is a winter diesel fuel with a sulfur content of up to 0.2% by mass and a flash point of 40 ^{0}C, 3-0.2-35 is a winter diesel fuel with a sulfur content of up to 0.2% and a solidification temperature of minus 35 ^{O}C; A-0.4 is an arctic diesel fuel with a sulfur content of 0.4% by mass. There are two types of diesel fuel according to the sulfur content: 1 - with a sulfur content of up to 0.2% by mass; 2 - diesel fuels with a sulfur content of up to 0.4% by mass.

1.4. LIQUEFIED GAS FUEL OIL.

Gaseous fuel occupies a significant place in the fuel base of our country. Its use is increasing from year to year not only in industry, but also in road transport. Gaseous fuel has a number of advantages over other types of fuel: it is widespread, cheap, has large reserves, it mixes (distributes) easily with air and is stable. Gaseous fuels have a high heat capacity. They create high temperatures when burned, and do not contain corrosive aggressive substances. Gaseous fuel is very convenient to use: because when it burns, soot and tar are not released, and ash is not formed. Gaseous fuel is stored in a centralized way, which is convenient for use, individual storage rooms, special warehouses are not required. The use of gas mains is especially important for regions where there are no reserves of solid and liquid fuel. One of the main disadvantages of gaseous fuels is their explosiveness. If safety precautions and fire safety rules are observed, as well as recommended measures are taken, gas installations can be used reliably and safely. The highest energy gases (which release 20,000 kJ/m3 ^{or} 5,000

kcal/m3 ^{of} heat when burned) include natural gases, petroleum gases, associated gases, as well as various cracking gases and other gases obtained during oil refining.

$CH_4 + O_2 = CO_2 + H_2O$ complete combustion $CH_4 + O_2 = CO + H_2O$ incomplete combustion

This is a combustion reaction of methane gas in pure oxygen. We must not forget that in addition to oxygen, air also contains nitrogen gas. Nitrogen, under the influence of heat in the combustion chamber, forms a compound with oxygen and turns into toxic nitrogen oxide. This seems to be more economical, cheaper and safer than other types of fuels. However, we cannot call it safe and high-quality because it is harmful to the environment and human health. In addition, it leads to degreasing of vehicle parts. Due to the friction of the engine parts and crankshafts of vehicles during degreasing, they become worn out and become unusable.

Liquefied gas contains at least 80±5% propane C_3H_8 and maximum 20±5% butane C_4H_{10} and up to 6% other gases. If the ratio of propane to butane changes, the composition of the combustible mixture and the amount of heat released when the gas burns change. As a result, the combustion process in the engine cylinders deteriorates and the toxicity of the gas used increases.

According to statistics, in 2018, 4 liquefied gas filling stations and 8 cars exploded due to rapid gas explosions, injuring more than 20 people and killing about 5 people.

CHAPTER II LEARNING METHODS AND MATERIALS

2.1. EXHAUST GASES FROM VEHICLES

When any organic fuel is burned to power a vehicle, it produces CO2 or CO, H2O, NxOx, and other gases, depending on the other substances in the fuel .

Carbon monoxide (CO) is a poisonous, colorless and odorless gas that is formed when there is not enough O_2 in the fuel, that is, when the fuel is incompletely burned. When using dense combustible mixtures in spark-ignited IEDs, the amount of CO released into the atmosphere can be equal to the amount of carbon dioxide and can reach 10% of the volume of all combustion products. The amount of carbon monoxide released into the air reaches 300-550 mg/m^3 and persists for 4 months.

Carbon dioxide (carbonic acid anhydride) CO_2 is a colorless, gaseous, complex substance 1.5 times heavier than air . It is formed from the decomposition of organic matter, the combustion of organic matter in factories, and the respiration of living things. It is also formed from various oxidations of glucose .

Table 6

Glucose deficiency	
Alcoholic	$S_6H_{12}O_6=2C_2H_5OH+2CO_2$
Acetone butyl alcohol	$S_6H_{12}O_6=0.5C_4H_9OH+0.5CO(CH_3)_2+2H_2O+2.5CO_2$
Oil is acidic.	$S_6H_{12}O_6=C_3H_7COOH+2H_2+2CO_2$

Nitrogen oxides - NO, NO_2 - are formed when free oxygen is produced . They are formed in the largest quantities during combustion.

Unburned hydrocarbons are formed in the exhaust gases . In gasoline engines , a large amount of unburned hydrocarbons is formed where the flame touches the cold wall (in the transition zone, which is 0.005-0.35 mm thick). The presence of large amounts of hydrocarbons is caused by the presence of gaps between the piston crown and the air intake of the cylinder head.

Aldehydes are toxic , contain oxygen molecules and are partially oxidized hydrocarbons. In diesel engines, aldehydes are formed during pre-ignition reactions during the ignition delay period . Oxidation of the oil film remaining on the cylinder wall during expansion, as well as oxidation of fuel dripping from the injector after the fuel supply is complete, can be a source of aldehydes . In gasoline engines, detonation

is released during combustion. Aldehydes are released when the engine is running at low load or when starting in a cold environment.

Sulfur dioxide is an acid gas and is a major component of acid rain. Sulfur in fuel is converted to $SO_{2\ during\ combustion.}$ and H_2SO_3. Sulfur dioxide then combines with water vapor in the atmosphere to form sulfuric acid (H_2SO_4).

Lead compounds - When using ethyl gasoline, the engine emits lead compounds, which are very toxic to the human body .

A maximum permissible concentration level (MPC) has been established for toxic substances.

Table 7.

Substance	Gasoline	Diesel fuel	CHJT $_{im}$	CHJT $_{uk}$	CHJT $_{mb}$
Carbon monoxide (CO_x)	200	45	20	3	5
Hydrocarbon (C_xH_y)	80	55	100	1.5	5
Nitrous oxide (N_xO_y)	25	35	2	0.04	0.08
Sulfur dioxide (SO_2)	2	4	10	0.05	5
Lead compounds	0.225	-	0.0003	0.0003	0.5
Composition (S)	-	8	4	0.005	0.01-0.15

- in the working area (CHJT $_{im}$);

- average daily atmospheric concentration of pollutants in populated areas (CHJT $_{uk}$);

- in the air of populated areas, maximum single (CHJT $_{mb}$).

Toxic gases emitted from the exhaust of internal combustion engines running on gasoline or diesel (based on the amount of gas emitted per liter of gasoline)

8 .

Exhaust gas composition	**Types of white ants**	
	Gasoline	**Solarium**
Greenhouse gas CO	274	7.4
Hydrocarbons C_xH_y	24	16.4
Nitrous oxide N_xO_y	13.5	26.4
Aldehydes R–CH═O	0.5	1.2
3,4 Benzopyrene	$7.2\ 10^{-1}$	$10.5 \cdot 10^{-1}$
Sulphite anhydride SO_2	1.1	4.8
Organic acids R–COOH	0.5	3.7
Solid particles	1.4	13.2
Q is the opposite of Pb.	0.4	-

Scientists have determined that more than 57% of the total amount of air pollutants comes from vehicle emissions, 90% of which are CO and CO_2 gases. According to calculations, one car emits 800 kg of CO_2 , 220 kg of CO and 40 kg of NO gas, as well as a number of toxic gases into the environment per year . Toxic emissions from cars include: sulfur dioxide and lead compounds.

Vehicle exhaust gas classes

Table 9

1	dangerous class;	Nitrogen dioxide and aldehydes
2	dangerous class;	Sulfur dioxide and sulfur dioxide
3	dangerous class;	Carbon monoxide and hydrocarbons
4	dangerous class.	Other various gases

Current analyses show that vehicle engines are not operating at the level of regulatory requirements, leading to a 5-fold increase in CO emissions.

Currently, fuel combustion is increasing, as a result of which the concentration of CO_2 gas in the atmosphere increases by 0.2% of the total amount during the year. This can lead to an increase in the temperature of the air on the Earth's surface. If the Earth's warming increases even slightly, this will lead to an increase in floods and their harm to people. Taking into account climatic conditions and their proper use is of great importance in increasing the productivity of agricultural production.

The mixture of gases that make up the atmosphere ***is air.*** The main components of air are nitrogen (N_2), oxygen (0_2), argon (Ag), carbon dioxide (CO_2) and water vapor. In addition to these gases, atmospheric air also contains other gases, but since the amount of these gases is very small, their importance in physical processes in the atmosphere is very small and they are not taken into account in solving agrometeorological problems.

Dry ***air,*** when the water vapor content of atmospheric air is not taken into account is called. The composition of dry air in the lower part of the atmosphere is characterized by the fact that it is always the same and unchanged. (Table 1). The

reason why the composition of air in the lower layer of the atmosphere remains constant is that the air is constantly moving in vertical and horizontal directions. Due to this movement, the air is constantly mixed. However, the amount of carbon dioxide, ozone and some other gases in the atmosphere is small and changes over time as you rise to altitude.

$_2$ in the atmosphere has increased by 10-12% compared to the constant content, and around large cities it is 0.1-0.2%. This is due to the rapid development of transport and industry.

As mentioned above, the composition of the atmosphere is taken relative to dry air. In fact, dry air cannot exist in nature. The air always contains a certain amount of water in the gaseous state, from one thousandth of a percent to 4%. At the poles it is 0.02%, in the tropics 2.5%. The amount of water vapor decreases with increasing altitude, at an altitude of 10-15 km there is almost no water vapor.

Although ozone is present in very small quantities in the atmosphere, it is essential for the existence of humanity and agricultural facilities. At an altitude of 18-60 km in the atmosphere, under the influence of ultraviolet rays from the sun, oxygen passes into an atomic state and combines with a neighboring molecule to form ozone. This reaction can be expressed according to the following scheme:

$3O_2 = 2O_3$

Ozone absorbs ultraviolet rays from the sun, which are very dangerous to living organisms. Above 60 km, ozone is almost nonexistent. Below 15 km, it is very small.

The mixture of various gases and volatile organic compounds that fill the water-free pores of the soil is called soil air.

The first information about the composition of soil air was given by the French scientist J. Boussingo. In 1853, Boussingo and Levi determined that the composition of soil air is: O_2 -10.35-20.03, N_2 -78.8-80.24, CO_2 -0.74-9.74 % . Free air in the soil, despite being constantly in contact with atmospheric air, differs in a number of its properties.

The composition of atmospheric air is almost stable, its main components do not change.

The composition of soil air is variable. O_2 and $CO_{2\ in\ soil\ air}$ are particularly dynamic, and their amounts change sharply depending on the processes of oxygen consumption and carbon dioxide formation, as well as the rate of gas exchange with the atmosphere. The amount of $SO_{2\ in\ soil\ air}$ can be tens and hundreds of times higher than in the atmosphere, and the concentration of oxygen can decrease from 20.9 to 15-10 percent. This is also evidenced by the above-mentioned data of Bussengo and Levy

Dry air composition

Table 10

Gases	Formula	Molecular mass	Volumetric share (%)	Dry into the air relatively density
Nitrogen	**N_2**	**28,106**	**78,084**	**0.967**
Oxygen	**O2**	**32,000**	**20,946**	**1,105**
Argon	**A r**	**39,944**	**0.934**	**1,379**
Carbon dioxide	**CO2**	**44,010**	**0.033**	**1,529**
Neon	**N**	**20,183**	**$18.18*10^{-4}$**	**0.695**
Helium	**What?**	**4,003**	**$5.24*10^{-4}$**	**0.138**
Krypton	**K r**	**83,700**	**$1.14*10^{-4}$**	**2,868**
Hydrogen	**H_2**	**2,016**	**$0.5*10^{-4}$**	**0.070**
Xenon	**Hehe**	**131,300**	**$0.087*10^{-4}$**	**4,524**
Ozone	**O_3**	**48,000**	**variable 0-0.07 $*10^{-4}$**	
Dry gas		**28,966**	**100**	**1,000**

favorable physical conditions and good air permeability, the amount of $C0_{2\ in\ soil\ air}$ during the vegetation period of plants does not exceed 1-2 percent, and 0_2 is not less than 18 percent.

In soils with heavy mechanical composition, when moisture increases, the $S0_2$ content can reach 4-6 percent or more. In waterlogged soils, the $S0_2$ concentration is even higher, and 0_2 decreases.

The process of gas exchange or aeration is the continuous and constant exchange of atmospheric air with the gaseous part of the soil at a certain rate. Gas exchange, or aeration, occurs through individual air-retaining soil pores that are connected to each other and to the atmosphere.

Diffusion **-** is the exchange of gases under the influence of specific partial pressures in soil layers. Since soil air contains less O_2 and more SO_2 than atmospheric air , *O 2 enters the soil through diffusion. Conditions are created for* continuous entry of CO and release of SO2 into the atmosphere .

Water entering the soil pores as a result of rainfall and irrigation causes air to be compressed and pushed upward, and then replaced by atmospheric air.

Changes in soil temperature and atmospheric pressure, wind effects, and changes in groundwater levels also change the volume of air in the soil, including the flow of air entering and leaving the soil.

All agrotechnical treatments applied to the soil are aimed at improving air exchange in the soil, or soil aeration.

$_2$, O_2, and N_2O, which are the permanent components of air in the atmosphere, there are many gaseous, liquid, and solid particles suspended in the air. These particles are ***called aerosols.*** Aerosols are formed from dust raised from the ground, dust and gases emitted from volcanoes, factories, factories and transport activities, precipitation, sea salts and cosmic dust. In addition, microorganisms and plant spores also form aerosols.

The amount of aerosols is large in the atmosphere of large cities, reaching several hundred thousand per cm 3 of air. Over the ocean and in forests, it is much less, there can be several hundred particles per cm^3 of air. The size of such particles in the air is very small, 95% of them have a diameter of 0.01-0.001 μm. Therefore, they remain in the air for a long time. They can only fall to the surface due to precipitation. Many gases (CO_2, nitrogen oxides, etc.) that are part of aerosols have a very negative effect on humanity and agricultural objects. They sharply reduce the yield of agricultural crops and lead to a deterioration in their quality. The amount of aerosol mixtures has a significant effect on the arrival and distribution of solar radiation. The cleaner the air, the greater the light. Large aerosols (with hygroscopic properties) act as condensation. Water vapor molecules adhere to these particles and increase in size. Aerosol mixtures are carried by air currents over distances of thousands, even tens of thousands of

kilometers. In our country, too, atmospheric pollution is currently harming the productivity of agricultural crops.

In his work “Uzbekistan on the threshold of the 21st century: threats to security, conditions for stability and guarantees of development”, our President I.A. Karimov paid attention to important environmental problems in our Republic, showing that agriculture and people are suffering from the extreme salinization of the land, as well as the Aral Sea problem, radioactive waste, and the effects of the Tajik aluminum plant. In addition, in this work, he said the following words: “… all of humanity, the population of our country is facing a great ecological danger. Not noticing this, sitting idly by is tantamount to condemning oneself to death.” There are a lot of dust particles in the atmosphere, which pollutes the environment. In particular, salt dust rising from the drying up of the Aral Sea increases the salt content in cultivated areas and slows down the development of the root system of plants.

One of the sources of radioactive pollution that poses a dangerous threat to our republic is the "graveyard" of radioactivity "Oily Water" in the Kyrgyz Republic. In addition, the environment is being polluted to a greater or lesser extent as a result of the mining of radioactive uranium in some regions of our republic. The Tajik aluminum plant is also polluting the air of some farms in the Sariosiyo, Uzun, Denov, and Altinsoy districts of Surkhandarya region with fluorine compounds, causing damage to agricultural crops.

One of the main tasks of the science of agrometeorology is to prevent and combat air pollution, to apply correct agrotechnical methods even in difficult environmental conditions, and to take measures to increase productivity by properly managing factors such as light, temperature, and humidity.

2.2. AIR POLLUTION BY VEHICLE EXHAUST.

Air is a mixture of gases in the atmosphere , and its composition changes with altitude. Oxygen is the most important of the gases in the air. It is part of the proteins, fats, and carbohydrates that make up organisms. Organisms obtain the energy they need

to survive through oxidation. Carbon dioxide is of great importance in nature, as it is necessary for the nutrition of green plants. Despite the abundance of nitrogen in the air , organisms cannot absorb it directly. Organisms can only absorb it in the form of nitrogen compounds. Sulphite dioxide, nitrogen oxides, hydrogen halides, ammonia, and others in the air are considered harmful substances and cause its pollution. Plant leaves and cells that absorb such toxic substances in the air begin to die. The water absorption mechanism of trees fails and their leaves fall off. The increase in the amount of various gases in the air is at different levels in different parts of the world.

polluted atmospheric air on the environment , human health and lifestyle. Circulation of industrial and other economic waste in the external environment. The negative impact of toxic fumes in industrial centers on human health. The harmful effects of dust particles in atmospheric air on the human body. Changes in the gas composition of the air are considered dangerous from a hygienic point of view. As a result, smog may form in the atmospheric air

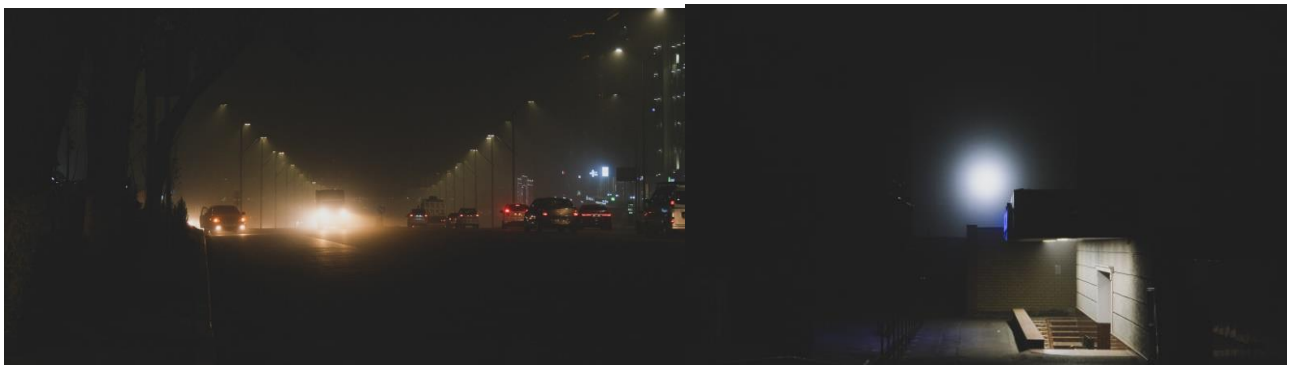
The term "smog" was first used by English doctor Henry Antoine de Vaux in his article "Fog and **Smoke** " published in 1905. In his article, the author combines the words **smoke** and fog to form the term **smog** . Simply put, smog is the process by which industrial waste products released into the atmosphere combine with air and pollute it (chemists call this a photochemical reaction).

Smog occurs in cities with high pollution , industrial centers, and places where fuel and fuel products are used a lot. Smog accumulates in one place due to hot weather conditions and low wind circulation. In areas on the slopes of mountains and hills, polluted air often accumulates in one place due to the obstruction of the wind path. Unlike ordinary fog, smog is extremely harmful to human life. Because smog contains toxic elements of industrial waste (nitrogen dioxide, nitrate, fluorine , etc.). Smog causes difficulty breathing, insomnia, headaches, and coughing. During smog, inflammation of the mucous membranes of the eyes and nose, and a decrease in immunity are also observed. To date, major smogs have been observed in Moscow, St. Petersburg, Almaty, Los Angeles, Mexico City, Tehran, and London. The smog that struck London in 1952 was unique in that it was denser, lasted longer , and caused

thousands of deaths. Due to the above factors, the London smog went down in history as the "Great Smog." In addition, changes in the composition of the air caused various unpleasant sensations. During the "Great Smog," 1,000 tons of smoke particles, 2,000 tons of carbon dioxide, 140 tons of chlorides, and 14 tons of fluorine were released into the atmosphere of London. It was determined that the smog contained 370 tons of sulfur dioxide and 800 tons of sulfuric acid .

In 2023, a very large sandstorm -like smog formed in the Tashkent, Syrdarya, and Andijan regions of Uzbekistan. As a result, attempts were made to illuminate the streets by turning on street lights during the day (Figure 1). The main reason for this is that the drive for rapid economic development has led to a lack of attention to the ecological environment. As a result, nature has suffered greatly.

Figure 1



In addition, such toxic air also depletes the ozone layer. According to scientists , the depletion of the ozone layer began to occur in the 1970s . The main reason for this phenomenon is that at that time, the smoke from fast-flying aircraft and rockets combined with ozone gas to form O^2.

depleted by the formation of ozone-depleting substances . This threat became public knowledge in 1985. Scientist Joseph C. Farman and his colleagues found that the ozone layer over Antarctica had been reduced by 40 percent. Some of the man-made substances had reached the stratosphere and had depleted the ozone layer to the point of depletion, creating a very thin patch of land known as the ozone hole. The hole was formed at the South Pole due to the unique meteorological and chemical conditions of the region .[2]

The Antarctic ozone hole has grown in size since 2020. It was the longest-lasting, largest, and deepest hole since ozone layer monitoring began 40 years ago. It was driven by a strong, stable, and cold polar vortex and extremely cold temperatures in the stratosphere (the layer of the atmosphere between about 10 km and 50 km high). The same meteorological factors also contributed to the record-breaking Arctic ozone hole in 2020.[3] This was in contrast to the unusually small and short-lived Antarctic ozone hole in 2019. It can be said that this depletion was followed by warming temperatures in Antarctica, many animal deaths, and extensive environmental damage. Today, humans are the main cause of this depletion. That is, we can include the following:

1. The increase in livestock in agriculture is also a reason for this. Uzbekistan is one of the world leaders in livestock breeding, increasing their species and breeds. The strong methane gas emitted from livestock manure also damages the ozone layer. Therefore , livestock in foreign countries is decreasing.
2. As the industrial sector develops, the construction of factories and plants increases. The smoke from them quickly spreads into the air, harming not only the ozone layer, but also people.
3. Substances emitted from oil, gas , and especially coal also contribute to erosion.
4. We should also mention that the increase in waste, the number of cars has increased even more than in previous years, and the various fumes and substances they emit into the environment also damage the ozone layer.

2.3 . WATER POLLUTION BY VEHICLE WASTE

Water is the most necessary substance for human life and the most unique of all existing minerals. Human life is unimaginable without water. If a person can live for a long time without food (up to 1 month or more during fasting), then without water he cannot live more than 4-5 days. The human body is about 65% water. But over the years, its amount decreases. For example, a newborn baby's body is 70% water, while an elderly person's body is 60%.

Water is considered the source of life, because all life processes occur with the participation of water. Water is one of the main factors determining the activity of life processes in living organisms.

A lack of water in the human body leads to high blood viscosity, an excess of it leads to a strong leaching of salts from the body, and a strain on the heart and kidneys. Excessive water consumption leads to rapid protein breakdown.

The human body is very sensitive to water balance disorders. An 8% loss of water leads to a semi-conscious state, a 10% loss of water impairs the swallowing reflex and causes convulsions, and a 20% loss of water leads to death, as the human heart cannot pump the thickened blood through the vessels.

Water is part of all human organs and tissues. For example, it makes up 80% of cell protoplasm and 85% of the brain. Human muscle tissue is 76% water. Water is the medium in which all the basic processes of the body take place - blood circulation, breathing, digestion, etc. A person consumes 1.75-2.20 liters of water per day: it 0,7 lenters the body in the form of food ( ), drinks (0.8-1.0 l), and soups (0.25-).1 l

Providing the body with water is a basic condition for human life. A person can survive longer without food than without water. The amount of water affects the quality of food products, the activity of microbiological and biochemical processes, and their shelf life. Products that deteriorate quickly with an increase in the proportion of water mass cannot be stored for a long time without preservation.

There is no chemically pure water in the body. Many substances are dissolved in it: proteins, sugars, vitamins and minerals. Minerals have a great influence on water metabolism. Their concentration and ratio determine the osmotic pressure, the distribution of water in the fluids and tissues of the body. The physicochemical state of colloids, primarily proteins, enzymes, and therefore their functional activity, depends on this.

Water -salt balance plays an important role in maintaining the constancy of all parameters in the internal environment, and many physiological mechanisms play a role in the activity of neurohumoral , digestive , excretory and other systems . Their

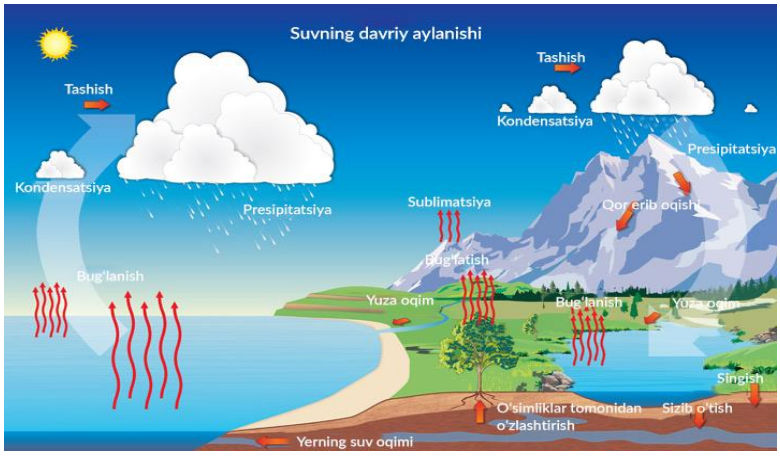
activity is associated with the sensation of thirst , which is a signal to the central nervous system of the body about the lack of water . The news is .

Although the oceans cover 70% of the Earth's surface, they contain 0.13 % of the Earth's biomass. Plants account for 21% of known species of organisms and 99% of the Earth's biomass. Although animal species account for 79% of all organisms, their share in the biomass is less than 1%. Of the animals, 96% are invertebrates, and 4 % are vertebrates. Only 10% of the vertebrates are mammals . The data presented indicate that the vast majority of organisms living on land have not yet reached a high level of evolution. Although living matter accounts for only 0.001-0.02 % of dead matter by mass , it plays the most important role in implementing the main functions of the biosphere. Living matter is the most important component of the biosphere and has a huge impact on other Earth's crusts through geochemical processes.

Land biomass. The amount of biomass in different parts of the land surface is not the same. From the poles to the equator, the amount of biomass and the number of species of organisms are increasing. Especially in tropical forests, plant species are very numerous , dense and grow in several tiers. Animals also settle in different tiers. In equatorial biogeocenoses, the density of life is very high. There is strong competition between organisms for habitat, food, light, oxygen. At the poles, we see the opposite. Under the influence of man, the areas where biomass is produced can change dramatically. Therefore, rational use of natural resources is necessary for industrial and agricultural purposes. The main part of the land surface is occupied by soil biogeocenoses. Soil formation is a very complex process, and rocks are of primary importance in its composition . The soil layer of the earth is gradually formed under the influence of microorganisms, plants and animals on rocks . Organisms accumulate biogenic elements in their composition. After plants and animals die and decompose, the elements in them pass into the soil composition, and biogenic elements accumulate. In addition, organic matter that has not yet decomposed accumulates in the soil. Living organisms are also densely located in the soil. For example, the number of microorganisms in 1 ton of black soil can reach 25x108, and it has been determined that about 2.5 million earthworms can live in 1 ha of soil. Gas exchange in the soil also

continues continuously. Oxygen in the air is absorbed by plants and is included in chemical compounds. Nitrogen is absorbed by some bacteria. When the soil heats up during the day, carbon dioxide, hydrogen sulfide, and ammonia are released from it. Thus, the soil is formed in a biogenic way . It consists of inorganic and organic substances and living organisms. Soil cannot be formed outside the biosphere. Soil is the habitat of living organisms , from which plants absorb nutrients and water. The processes occurring in the soil are part of the cycle of substances in the biosphere. Human economic activity can often lead to a gradual change in the composition of the soil and the death of microorganisms in it. Therefore, it is necessary to develop measures for the rational use of soil. Ocean biomass. Water is an important component of the biosphere and is one of the most necessary factors for the survival of living organisms. The main part of water is in the oceans and seas. Ocean and sea water consists of mineral salts consisting of about 60 chemical elements. Oxygen and carbon dioxide gases, which are very necessary for the life of organisms , are well soluble in water. Aquatic animals release carbon dioxide during respiration. As a result of plant photosynthesis, water is enriched with oxygen. In the upper layer of ocean waters, up to 200 m , there are a lot of unicellular algae, which produce microplankton (from the Greek word "planktos" - moving, migrating). About 30 percent of the photosynthesis process on our planet takes place in water. Water is constantly circulating (Figure 2).

Figure 2



As you can see from the picture below, the exhaust gases emitted by the vehicles, which are the darlings of humanity, not only pollute water, but also affect its composition and

quality. They cause a huge amount of damage during precipitation and when vehicles are washed (Picture 3).

Figure 3

2.4. SOIL POLLUTION BY VEHICLES.

One of the main problems of environmental pollution is **soil pollution.** It is the alteration of the surface of the earth by the release or emission of chemicals that are harmful to any living being. This alteration of the soil also affects its quality and nutritional elements, making it unsuitable for agricultural and food production.

There are two major branches of soil pollution, the first is pollution caused by nature itself and the second is pollution caused by humans. However, in both of them, human waste is not excluded.

occurs at gas stations, various waste products from vehicles (tires, seats, covers, etc.) and during vehicle washing (Figure 4.5). During vehicle washing, various waste products from vehicles fall into the soil through water . Due to the soil infiltration process, they are absorbed into the soil and as a result, they have a significant impact on the quality and fertility of the soil.

Figure 4

Figure 5

Natural pollution is the process by which natural chemical elements are drawn into the soil and filtered. The natural deposition of chemicals into the soil causes the concentration of these chemicals to be too high to maintain soil fertility. Exhaust gases

from vehicles are carried to the surface by cold air and, as a result, they enter the soil during tillage operations to improve soil fertility, reducing soil fertility. In addition, various airborne exhaust gases mixed with water droplets during precipitation also enter the soil and cause soil quality damage (Figure 6).

Figure 6 

2.5. FOOD POLLUTION WITH VEHICLE WASTE .

The global food problem is one of the oldest problems of mankind. Famine has been one of the greatest misfortunes that have befallen people in ancient times, in the Middle Ages, and even today. Famine manifests itself in 2 forms . In the first form, famine continues chronically, as a result of which people's health deteriorates, their health dries up, and the likelihood of contracting various diseases increases. This form of famine is also called "undernourishment". In the second form, millions, tens of millions of people die at a time, in a certain region, as a result of famine associated with drought or other reasons.

According to the FAO (International Food Security Organization), WHO (World Health Organization) and other organizations, the daily food intake of a person should not be less than 2400-2500 kcal. Some authors believe that this figure should be equal to 2700-2800 kcal. At the same time, the minimum figure may vary depending on the age, gender, work activity, profession, natural and social conditions of people. The state of “undernourishment” begins to be felt when the above norm falls below 1800 kcal, and starvation is observed when this figure is less than 1000 kcal.

According to FAO, 35 percent of the world's population is undernourished, 15 percent consumes the required amount of calories, but does not consume enough protein. 20 percent of the population does not meet its protein requirement, and 30 percent is chronically undernourished or hungry. Currently, 580-650 million people are

suffering from hunger. 1-1.3 billion people are undernourished. In developing countries, 13 million to 18 million people die from hunger every year, ¾ of whom are children. Of the total population currently facing hunger, 200 million live in Africa, 370 million in South and Southeast Asia, 70 million in South America, and 30 million in the Near and Middle East.

The above data cannot be solved even with the provision of very large amounts of food aid. For this, it is necessary to lift developing countries out of economic backwardness, ensure their economic and social development, and demonstrate agriculture.

Food products (especially dried ones) absorb moisture from the environment , that is, from the moisture in the air. Dry and relatively dry products (dried milk, dried fruits, tea, coffee), products rich in proteins, starches, fructose and invert sugar can absorb moisture, while products rich in fats and oils or with a very high moisture content cannot. However, they absorb dust and other toxic gases in the air onto their surface.

Toxic elements in food products permissible limit values

Table 11

Products	Pb	Cadmium	Arsenic	Mercury	Copper	Spirit
Legumes	0.5	0.1	0.2-0.3	0.02-0.03	10	50
Sugar and candy	1.0	0.1	0.5	0.02-0.03	10-20	50
Milk and dairy products	0.1	0.03	0.05	0.005	1.0	5
Vegetable oil and products made from it	0.1	0.05	0.1	0.05	1.0	5-10
Fresh and frozen vegetables, berries and fruits	0.04-0.5	0.03	0.2	0.02	5.0	10.0
Vegetables, fruits and products made from them, packed in tin cans	1.0	0.05	0.2	0.02	5.0	10.0
Fresh beef and poultry	0.5	0.05	0.1	0.03	5.0	20
Canned beef and poultry in a bulk tin	1.0	0.1	0.1	0.03	5.0	70
Fresh and frozen fish	1.0	0.2	1.0-5.0	0.3-0.6	10	40
Canned fish in a tin can	1.0	0.2	1.0-5.0	0.3-0.7	10	40
Drinks	0.1-0.3	0.01-0.03	0.1-0.2	0.005	1.0-5.0	5.0-10

Meat products . Chemical composition of the main types of meat raw materials . Raw meat is a ready - made product The following aspects are related to production : identification of raw materials , cleaning , processing , etc. t ayor m a sul o tn sa ql a shd a n sentence

Beef , mutton and pork account for 9/10 of the meat raw materials . Meat from other animals is only available in certain regions . It feels good .

The composition of raw meat is different , including the breed , age , It depends on the sex , the type of treatment .

O qsill a r. Meat products are the main source of vital nutrients . The amount of protein in meat can be 11-21 % . You can feel the amount of protein in the meat of SH - type food by 18 % .

Proteins of living products are used in different parts of living tissues and perform different functions . Fractional compounds with different chemical composition di.

The main fraction of muscle tissue is the oral fluid - sarcoplasm (6 % tissue or 33 % total protein) Muscle fibrils (10 % tissue or 56 % of total protein) Protein binding with tubular membranes producing tissue (2 % of muscle tissue or 11 % of total protein) l a n g a n. Muscle tissue is 3.5 % nitrogenous forms for the protein part (tin - 0.55 % , phosphate - 0.3 % , di- 0.07 % of triphosphate pyridinucleo - tidl , free amino acids - 0.35 % , carnosine and anserine – 0.3 %).

Meat proteins are rich in amino acid , flour A lm a shinm a ydig a n a min o kisl o t al a l a rt a rt a t a rt a no.

The quality of meat depends on the amount of connective tissue in it (up to 15 %) . The more of them there are , the higher the biological and the food value will be so low . A distinctive feature of connective tissue is the high amount of oxyproline - 12.8 % , the low amount of cystine , and the general absence of amino acids such as tryptophan . That 's why the quality that shows the amount of oxyproline connecting tissues is useful .« Tript of f a n : The ratio of oxyproline is considered an indicator of meat quality . For beef muscle tissue , this indicator is 4.7 g / kg , for mutton 4.0 g/ kg , and for pork 5.5 g / kg .

Different scientists estimate the value of meat o qsild a nf o yd a l a nish k o effici e ntid a nf o yd a l a n a dil a r . OFK - indicates the ratio of the desired quantity to the standard quality of the protein itself . M a s a l a n O FK lean pork 90 % for fresh white meat , 75% for beef , 70% for lamb e ng. B o shq a Scientists use the efficiency coefficient of the molecule to calculate the energy of the molecule . Use the animal 's energy to calculate the energy of the molecule .1 kgThe ratio is determined by the exact amount . OSK is 5 g for lean pork , and 1 g for lean mutton .

Fat (lipid) . Meat products are the most important source of fats .

The total amount of fat in meat can be from 1 to 50 % . As the amount of lipids increases , the amount of protein and water decreases . Fatty acid composition , physical properties of animal fats , digestibility , heat tolerance , etc. b o shq a He made a difference with his qualities .

M o lv a mutton is saturated with fatty acid p a lmitin and st ea rin , h a m d a m o n o toyinm a g a n o There is a large amount of acid in it . The amount of fatty acids - linoleic acid - linolenic acid is relatively high .

Pork The ratio of saturated fatty acids to polyunsaturated fatty acids is 3 : 4 : 1 , which is close to the optimal ratio (3 : 6 : 1) . That 's why lard is so valuable .

The ratio of cholesterol to muscle tissue to fat tissue is 1.5 ml . Eating lean meat is recommended to reduce the amount of dietary cholesterol .

Vit a minl a r. Meat B_1 , B_2 , PP v a x usus a n B_{12} vit a minl a nb a i his o bl a n a . With this , they ate together The amount of A and C vit a minl a m a m .

Min e r a lm o dd a l a r. Meat contains important minerals . Meat contains important nutrients such as phosphorus , iron , and zinc . m a jud The amount of protein in meat is three times higher than that in plants .

Ugl e v o dl a r . Eat a lot of meat and vegetables . Glycogen – 0.1-1 % , lactic acid 0.5-0.9 % , glucose - 6 - phosphate 0.17 % , glucose 0 .01 % га ча .

Cut the meat . The technology of processing raw meat has shown several advantages of using it . 1) indirect work in slaughtering . It is a high - quality product line . 2) cold meat - 0 ...- 1 o ^{S} for a few days , for example 10-20 daysa sh; 3) Frozen

meat . Bund a meat -12...-25 º S v a und a np a st h a r o r a td a s a ql a sh. This meat can be stored in the refrigerator for 5-18 months .

2.6. THE EFFECT OF VEHICLES ON THE HUMAN ORGANISM

wrote down the solutions to many issues related to the science of hygiene in his book "The Canons of Medicine" . In particular, he says that "If there were no dust and other particles in the air, man would live a thousand years", and he advocates keeping the atmosphere free from pollution. The scholar pays particular attention to air temperature and humidity. He emphasizes the need for people to take precautions to maintain their health at different times of the year. He states that many diseases are aggravated when humidity increases or when the temperature is too high. His words "It is known that different climatic conditions of the season can cause a disease, so it is necessary to intelligently recommend different daily routines to people depending on the climate" prove our point.

Due to the interconnectedness of the elements of the biological shell, polluted atmospheric air has a negative impact on other components of nature. As a result, negative changes occur in the natural state of water and soil, in the human body, in the flora and fauna. The cardiovascular system is damaged, blood pressure increases, and cancer, bronchitis, and lung diseases increase.

On average, a person breathes 25 kg of air per day. As a result, harmful dust, soot and gases contained in the air accumulate in the body. This gradually leads to a weakening of the human body, and as a result, the body loses its ability to adequately resist various infections . We will consider all this in separate examples.

Nitric oxide poisons the human body.

Nitric oxide II inflames the mucous membranes of the eyes and lungs, and causes irreversible damage to the cardiovascular system.

the air contains more than 0.01 % CO, the body is significantly poisoned. When inhaled, it binds to hemoglobin in the blood and displaces oxygen from it, resulting in oxygen deficiency and affecting the central nervous system. Chronic poisoning is manifested by headaches , tinnitus, difficulty breathing, and general weakness.

Lead compounds in the human body cause tissue damage, nervous system, gastrointestinal dysfunction, metabolic disorders, and cancer. Lead compounds, like carcinogens, do not leave the body and accumulate in dangerous concentrations.

Routes of lead entry into the body.

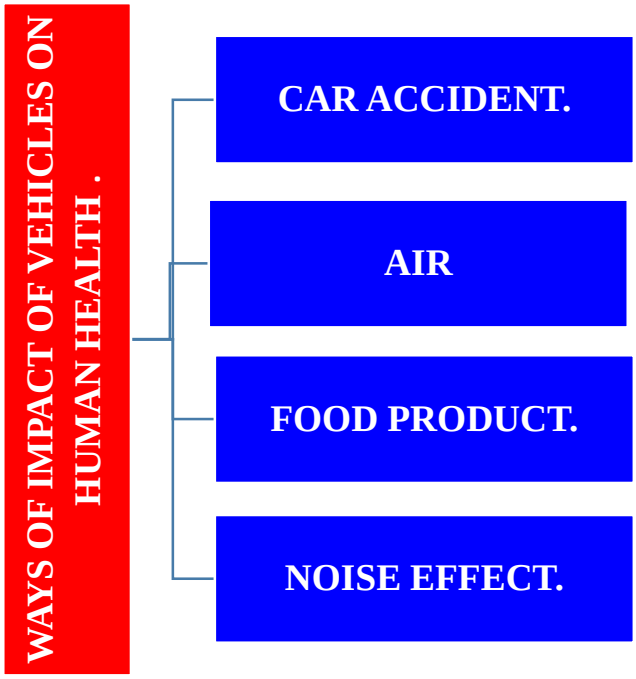
- Through the skin
- By mouth
- Through the mucous membranes of the respiratory tract

The effects of lead on the body.

- To the nervous system
- Digestive system
- To the circulatory system
- Endocrine and excretory system
- To the genitals
- To the musculoskeletal system

(Table 12)

The following diagram shows the ways in which vehicles affect human health .



The impact of exhaust gases from motor vehicles on human health through the air.

Table 13

Substance name	Diseases caused by
Sulfur oxide SO_2	chronic asthma, bronchitis, pneumonia liver and blood pressure to increase and eye diseases. Because SO2 in the air $_{reacts}$ with water to form weak sulfuric acid, which burns the mucous membranes in the eyes. As a result, the eyes become red.
Carbon monoxide	The hemoglobin in the body decreases, the cardiovascular system is damaged, multiple sclerosis increases, dizziness occurs, the heart rate increases, sleep is disturbed, and the person becomes a nervous person (nervous disease).
Nitric oxide N_xO_x (NO, NO_2, N_2O_5, N_2O_3, N_2O_4)	It is a colorless and odorless toxic gas that has a strong effect on the respiratory tract. It reacts with exhaust gases to form photochemical smog. Smog is usually a dense fog consisting of various harmful gases and dust. The effect of nitrogen oxides on the human body begins with the appearance of a mild cough. High concentrations of nitrogen oxides cause severe coughing, headache and vomiting. Nitrogen oxides, when combined with moisture on the mucous membranes of surfaces, cause the formation of nitric acids (HNO_3 and HNO_2) . They have a strong effect on the lungs
Hydrocarbons (gasoline vapors, pentane, hexane, etc.).	They have a strong effect on the human body. Their extremely small concentrations cause diseases such as headaches and dizziness. If a person breathes this air for 8 hours, he will cough and suffer from headaches.
Hydrogen sulfide H_2S	dizziness, nausea, vomiting, and decreased sense of smell

Fluorine compounds	nosebleeds, teeth and bones in general may be eroded, gout occurs, gastrointestinal diseases increase
Lead compounds.	nervous system, urinary tract, and respiratory tract. It reduces the amount of hemoglobin in the body. Lead compounds enter the body through the respiratory tract, where about 50% of its compounds accumulate.
Atmospheric dust.	Black cumin has the ability to adsorb heavy hydrocarbons and benzo(a)pyrene, which is extremely dangerous for humans. the respiratory tract and causes tumors and various diseases.

According to our survey, at least 20-25 people die and hundreds of others are injured in car accidents every year in urban areas. In rural areas, this figure is 3-5 deaths and more than 50 injuries .

Due to the noise of vehicles, many people become nervous or suffer from diabetes. Our experience has shown that at least 80% of people with diabetes are women. The main reason for this is that many young drivers who drive these vehicles suddenly use a slightly louder signal when passing women. This causes women to be afraid and suffer from diabetes. If these signals were emitted according to state standards, there would be no harm. However, some entrepreneurs, craftsmen and drivers deliberately install such loud sound generators, and as a result, ordinary people suffer again.

Figure 7

When we contacted the statistics department of the Fergana regional health organization to investigate this interesting situation, they provided the following disease statistics (table).

(Table 14)

According to the statistical report of the Ministry of Health

Fergana city and Fergana district

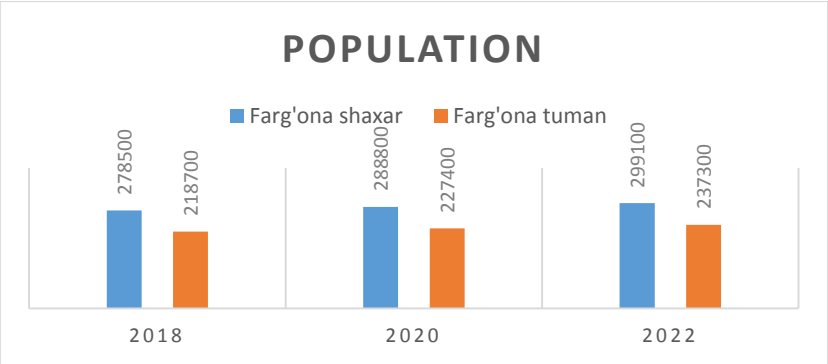
	Far. city. 2018	Ph.D. 2018	Far. sh. 20 20	Far. T. 20 20	Far. sh. 20 22	Far. T. 20 22
Total persons	217295	177167	217306	182461	226844	157108
Diseases from them	241439	196852	228743	191461	250429	168451
Some infectious and parasitic diseases.	1975	9915	7319	4217	2295	4282
new growths	1683	181	1925	975	1752	60
Endocrine system diseases	15725	20263	36150	25113	19803	19885
Diabetes mellitus total (diabetes mellitus)	3652	6628			3588	5560
Diseases of the blood and blood-forming organs	40840	33161	13909	18120	38907	32598
of which : anemia	40796	32355	13909	18120	38871	32598
Mental nausea	9313	9440	8543	2952	7144	2511
Nervous system diseases	13702	8892	9793	14918	12703	8900
of which : children with cerebral palsy	194	506	11	0	189	493
the tut kanaok and the tut kanaok	164	813	230	600	175	685
Peripheral vascular diseases	1725	379	1274	0	1646	46
Alzheimer's disease	0	0	97	56	0	18
Diseases of the eye and its appendages	6568	6782	5300	14925	5940	5850
Circulatory system diseases	27873	17897	30528	24462	24539	16193
Respiratory organ.disease.	56619	38588	58444	29507	70348	27961
Acute bronchitis	743	2293	1466	882	1026	1102
including: chronic pharyngitis, nasopharyngitis, sinusitis, rhinitis	2440	1685	1440	2911	3594	451
Tonsil and adenoid diseases	1379	1475	359	40	3382	421
Allergic rhinitis	328	423	3071	1206	285	254
Inflammation of the lungs (pneumonia)	530	150	663	224	574	143
Chronic and unspecified bronchitis, emphysema	2116	1701	1208	2016	1938	1116
Asthma, asthmatic condition	705	826	658	1414	710	778
Hunting is a disease.	17519	12148	15772	11877	19122	11125
oral cavity, salivary glands	0	540	16	23	0	1262

Stomach and duodenal ulcer disease	744	850	680	195	1005	617
Gastritis, duodenitis	2173	963	2781	662	3057	868
Chronic hepatitis	784	303	657	517	681	271
Liver cirrhosis	180	115	178	154	158	55
Gallstone disease	341	177	253	89	305	283
Digestive tract diseases	2790	217	3271	426	3621	90
Diseases of the pancreas	549	36	386	28	545	12
Genitourinary system	20641	13490	2138	6001	20840	14314
Skin and subcutaneous tissue diseases	3504	4026	16951	15165	3210	5186
The bones, muscular system, and connective tissue are diseased.	7356	6957	1547	1615	6470	6612
Congenital anomaly	632	1321	4835	1364	592	944
Some conditions that occur in the perinatal period	4427	2053	542	926	4227	1386
Symptoms and unspecified signs	0	80	0	110	0	590
Injury and poisoning	6884	4832	5441	5006	6884	2731
T ransport accidents	0	0	230	200	500	256
External causes of illness	0	0	0	0	0	49
poisoning	0	0	0	2	0	0

From this then our interest population number , birth and death to the number when we look Fergana of the province statistics from the department following the results we got it .

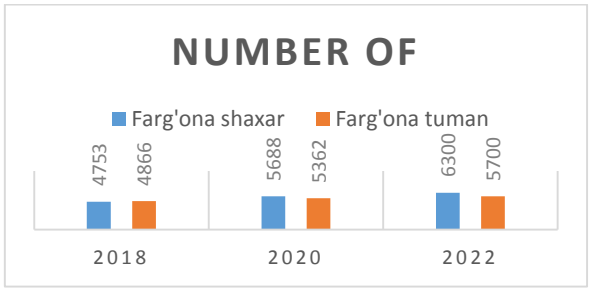
Fergana province statistics department gave to the message according to Fergana city and Fergana in the district in 2018, 2020, 2022 population number following in the diagram illustrated .

Diagram 3



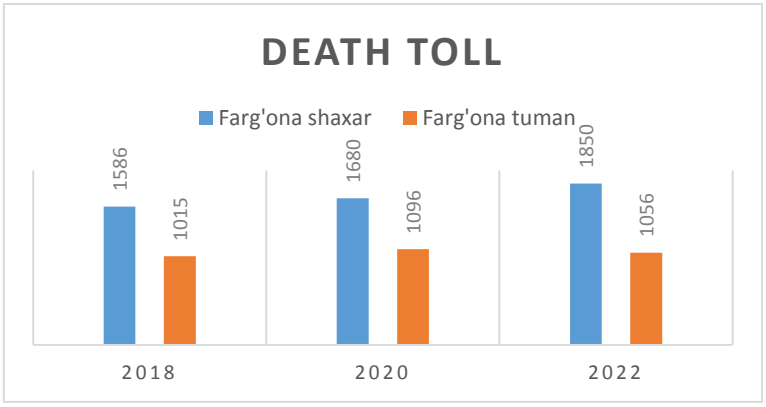
According to the Fergana Regional Department of Statistics, the number of births in Fergana city and Fergana district in 2018, 2020, and 2022 is presented in the diagram below.

Diagram 4



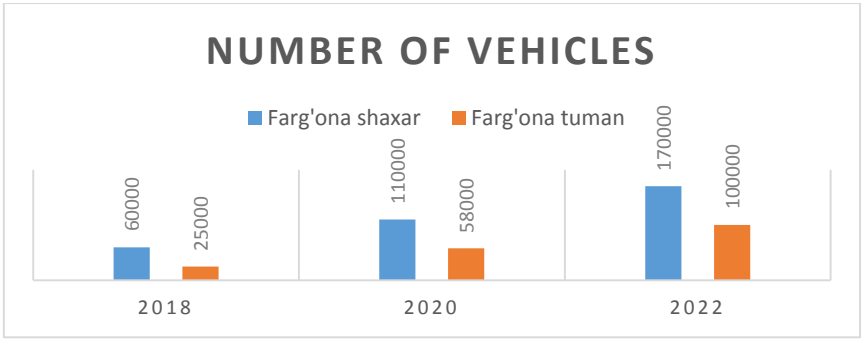
According to the Fergana Regional Department of Statistics, the number of births in Fergana city and Fergana district in 2018, 2020, and 2022 is shown in the diagram below.

Diagram 5



According to the Fergana Regional Department of Statistics, the number of births in Fergana city and Fergana district in 2018, 2020, and 2022 is shown in the diagram below.

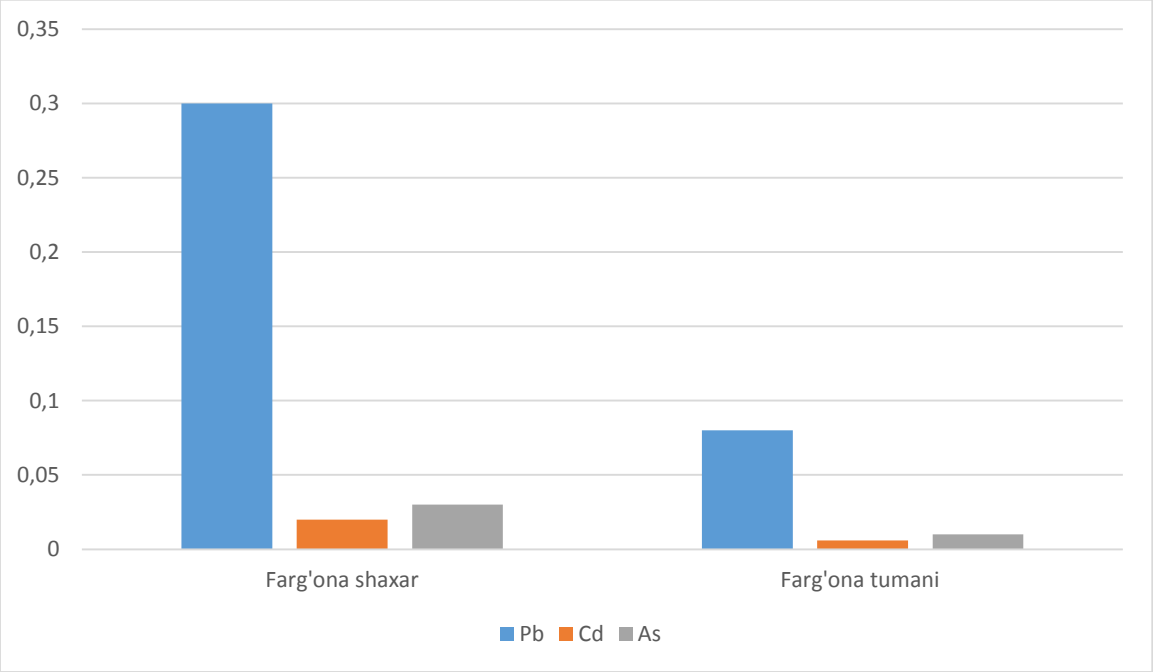
Diagram 6


NUMBER OF VEHICLES
Farg'ona shaxar
Farg'ona tuman
60000
25000
110000
58000
170000
100000
2018
2020
2022

CHAPTER III. RESULTS OF PERSONALLY COLLECTED MATERIALS

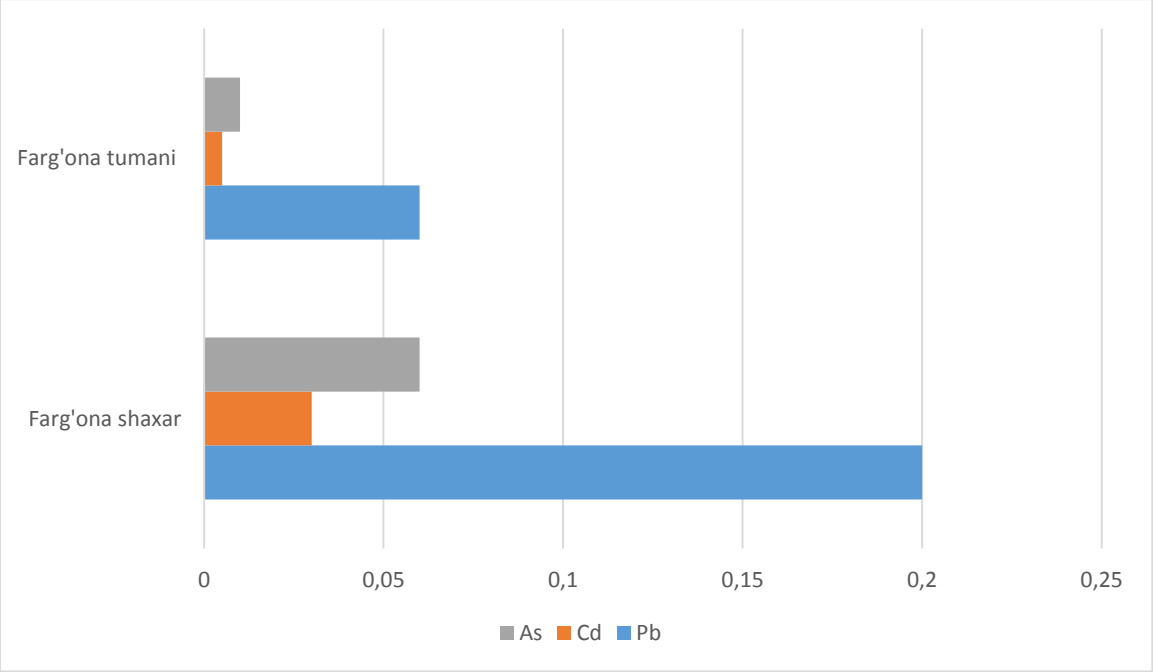
When we tested carrot salad from Fergana city and Fergana district, we found the following heavy metals (mcg) in their content:

Diagram 7



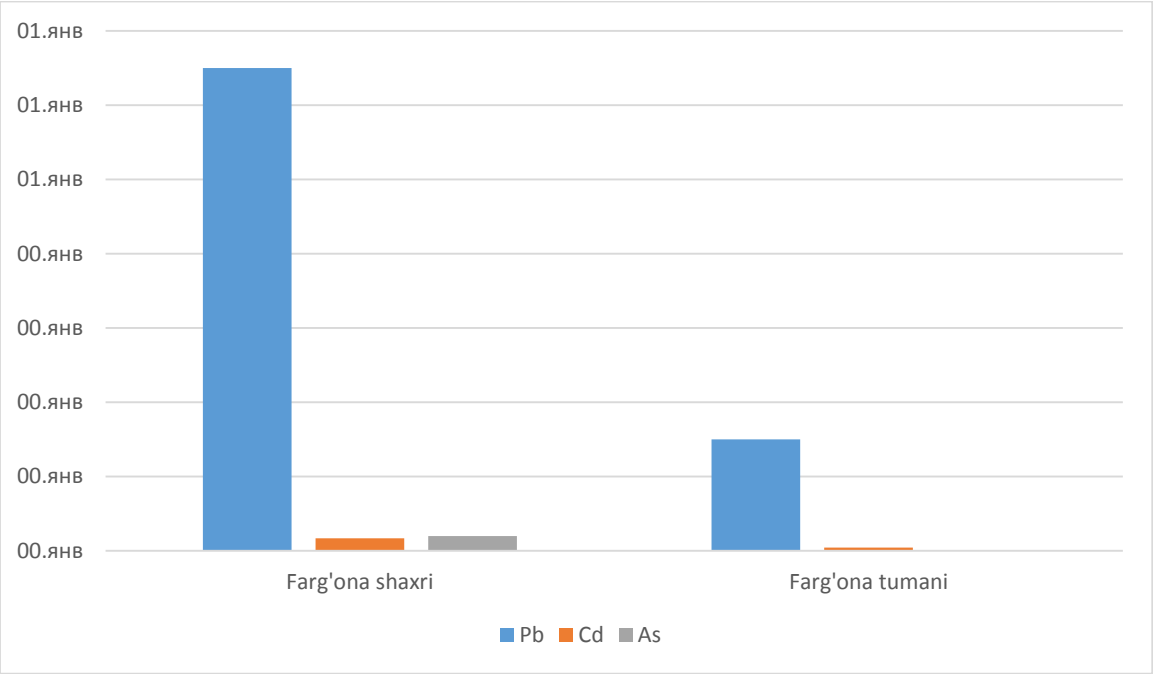
Fergana city and Fergana district, we found the substances listed in the table below in micrograms.

Diagram 8



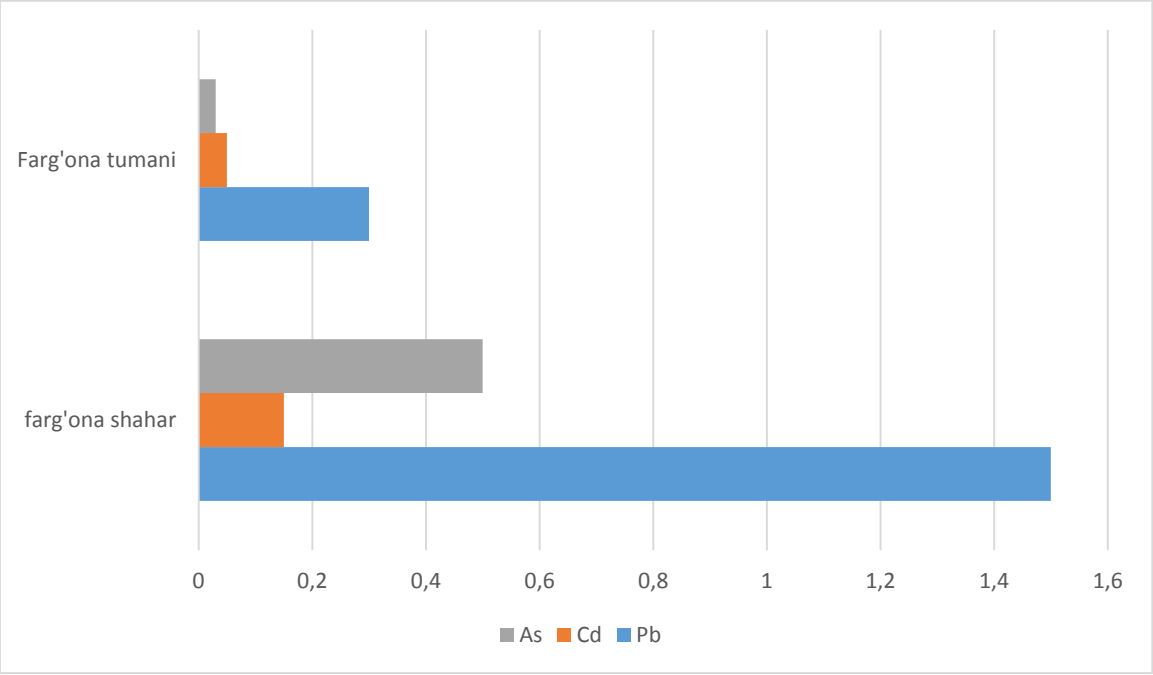
When we examined meat from Fergana city and Fergana district, we found that it contained the substances listed in the table below in micrograms.

Diagram 9



Fergana city and Fergana district, we found that they contained the substances listed in the table below in micrograms.

Diagram 10



Food products (especially dried ones) absorb moisture from the environment , that is, from the moisture in the air. Dry and relatively dry products (dried milk, dried

fruits, tea, coffee), products rich in proteins, starches, fructose and invert sugar can absorb moisture, while products rich in fats and oils or with a very high moisture content cannot. However, they absorb dust and other toxic gases in the air onto their surface.

often see meat on market stalls that are not refrigerated but are kept in the open air . When we checked these products, we found that they contained lead and dust particles, which were 3 times higher than the standard.

Figure 8

In addition, our various food items, salads, fried fish, boiled hooves (halodes, hasb), chickpea soup, and the four products we love to eat during the New Year, are sold under the open sky at our market stalls, but no one pays attention to this or thinks about the harm it causes.

Figure 9

When we examined such wet products, it was found that they were unfit for consumption and toxic to the human body. It was found that the above products contained lead compounds, nitro compounds, and sulfur compounds. When I checked it with the one in the barrel, it was found that it was present in large quantities in the products.

After that, when we started to study fruits on the roadside and in the fields, it turned out that fruits and vegetables on the roadside also contain toxic substances.

Figure 10

In rural areas, due to the lack of special places for washing vehicles, it can cause great damage to wastewater. In addition, exhaust gases from vehicles combine with water droplets (rain, snow, fog, dew, hail) and, falling into groundwater and surface water, such as ditches, artesian wells, streams and other open water bodies, change their composition and lose their toxicity. I myself conducted an interesting experiment, that is, when I released leeches into rainwater, they died within 1 day. When I checked it, it was found that the water contained sulfite, nitrate and PbO. It is clear that vehicles are now causing great problems for humanity.

Our investigations showed that the permissible limit of PM2.5 particles in Fergana city increased by 23 times, and in Fergana district by 5 times. Science has proven that PM2.5 causes cancer and asthma.

3.1. RESULTS OF INSPECTION IN FERGANA CITY AND FERGANA DISTRICT.

, when we examined 100 people from Fergana city and Fergana district, the number of people with respiratory diseases in the city was 30 and in the district 10. Nervous system disorders are found in 25 cases in the city and 5 cases in the village. In addition, it causes children to be born with anomalies or with cerebral palsy. Out of 100 babies, 80 cases in the city are born with cerebral palsy, and 40 cases in the village.

According to our survey, at least 20-25 people die and hundreds of others are injured in car accidents every year in urban areas. In rural areas, this figure is 3-5 deaths and more than 50 injuries .

Due to the noise of vehicles, many people become nervous or suffer from diabetes. Our experience has shown that at least 80% of people with diabetes are women. The main reason for this is that many young drivers who drive these vehicles suddenly use a slightly louder signal when passing women. This causes women to be afraid and suffer from diabetes. If these signals were emitted according to state standards, there would be no harm. However, some entrepreneurs, craftsmen and drivers deliberately install such loud sound generators, and as a result, ordinary people suffer again.

According to our survey, at least 20-25 people die in urban areas every year due to car accidents, and hundreds of people suffer various injuries. In rural areas, this figure is 3-5 deaths and more than 50 injuries. In addition, it causes various types of tumors and anemia in people.

CONCLUSION.

"Uzbekistan on the Threshold of the 21st Century : Threats to Security, Conditions for Stability and Guarantees of Development" by the President of the Republic of Uzbekistan, Islam Karimov, all of humanity, the population of our country, is facing a major environmental threat. Not noticing this, sitting idly by, is tantamount to condemning oneself to death.

The Resolution of our President dated December 14, 2006 “On measures to further develop production at the Samarkand Automobile Plant and renew the republican motor transport fleet” is of great importance. According to the data received for the city of Samarkand , the number of passenger cars is 42,000, trucks are 2,800, buses are 1,000, and microbuses are 2,000. How does the movement of these cars affect the city's population ? The composition of gases emitted by cars that are in traffic day and night is being studied, and measures are being taken to eliminate the impact on human health and the negative consequences that arise. According to the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated February 10, 2007 "On measures to develop gas filling compressor stations and gas filling stations for vehicles and gradually switch vehicles to liquefied and compressed gas", in 2007-2012 it is planned to complete the construction of a total of 138 gas filling compressor stations for vehicles and 952 gas distribution stations for vehicles, and to switch 119 thousand vehicles to liquefied gas and 69 thousand to compressed gas. According to data, there are currently more than 900 million cars in the world. Experts say that if the development of road transport continues at this rate, their number may reach 1.8 billion by 2017. The increase in the number of cars that bring people closer together will lead to an improvement in the quality of service, but their negative impact on the environment and ecology cannot be denied. It is known that when the temperature of the engine cylinder exceeds 2000 degrees, extremely harmful nitrogen gases are formed . Also, 15 kilograms of air are required for 1 liter of car fuel consumption. According to experts , if 10 thousand cars in cities consume an average of 10 liters of

fuel per day, about 117 thousand tons of oxygen will be required to burn 36 million 500 thousand liters of fuel per year. This is 10-20 percent of the oxygen in the air. It is worth noting that in recent years, the main source of pollutants in the atmosphere has been motor vehicles . The harmful fumes emitted by vehicles contain more than 200 harmful compounds (extremely harmful benzaprine , lead, etc.). These compounds cause lung cancer, heart disease and other serious diseases. Therefore, measures are being taken to reduce the amount of such harmful substances . This is especially true for motor vehicles running on gasoline. Therefore, the harmful effect of such vehicles on the environment is greater and more harmful than that of other motor vehicles. For example, when burning 1 ton of leaded gasoline, 788.3 kilograms of harmful substances are released into the air, 585.0 kilograms of liquefied petroleum gas, 274.0 kilograms of compressed natural gas and 208.5 kilograms of diesel fuel. One of the measures aimed at reducing atmospheric air pollution is the state control over the toxicity of exhaust gases and the amount of smoke from automobile engines. In this area, from March 1, the Republic of Uzbekistan will prohibit the import and use of used vehicles of categories "M2", "M3" and "N2" and new vehicles equipped with gasoline and diesel engines whose emission levels do not meet the requirements of the "Euro-2" environmental standard. A number of scientific centers around the world are conducting research to solve the environmental problem associated with vehicle emissions. As a result of the research , it became clear that switching to alternative fuel will lead to a reduction in the amount of harmful gases, a lower consumption of oxygen that gives life to living things, and a decrease in substances that create the "greenhouse effect" and deplete the ozone layer. To be more precise , alternative fuel refers to a type of fuel that burns completely and produces fewer gases that are released into the atmosphere.

In conclusion, it is worth noting that by finding an optimal solution for coordinating the use of road transport, it is possible to preserve the gene pool of flora and fauna, biodiversity, protect and rationally use natural resources, improve population health, and ensure that current and future generations live in favorable environmental conditions.

REFERENCES USED R READER .

1. http://geografiya.uz/ekologiya/718-ekologiya-va-biz.html
2. https://kadet-mvd.ru/uz/alexander-svia/osobennosti-vozdeistviya-transportnyh-sredstv-na-okruzhayushchuyu-sredu.html
3. Bárbara PinhoNov. Whatever Happened to the Hole in the Ozone Layer? The discovery of the ozone hole shocked the world and propelled nations into action. Decades later , where does the problem stand? By (https://www.discovermagazine.com/author/barbara-pinho) 11, 2020 3:15 AM
4. Harry E. Preble Professor of Atmospheric Sciences, Department of Atmospheric Sciences, University of Illinois, Urbana, Illinois (https://www.britannica.com/contributor/Donald-Wuebbles/77949 The Editors of Encyclopaedia Britannica
5. Britannica's editors oversee subject areas in which they have extensive knowledge, whether from years of experience gained by working on that content or via studying for an advanced degree. They write new content and verify and edit content received from contributors (https://www.britannica.com/editor/The-Editors-ofEncyclopaedia-Britannica/4419). The Editors of Encyclopaedia Britannica Last Updated: Feb 24, 2023 • Article History (https://www.britannica.com/science/ozonelayer/additional-info#history
6. Salimjon Buriev, Dildora Makhkamova, Vafabay Sherimbetov ("Ecology and Environmental Protection",
7. Salokhiddinov A. T., Valiev X.I., Kholmirzaeva M., "Ecology", Tashkent, 2014.
8. Encyclopedia "Avanta +", Chemistry 17, D. Zhilin "What is under us", Ed. Center "Avanta +" 2001
9. Ecology: textbook / LV Peredelsky, VI Korobkin, OE, Prihodenko, Ed. "Prospect", 2008
10. State report "On the state of sanitary and epidemiological well-being of the population in the Russian Federation in 2014".
11. Ilyin VB "Heavy metals in the soil-plant system " - Novosibirsk: Science, 1991.
12. Ismailov NM Oil pollution and biological activity of soils. -Moscow: Nauka, 1991.

13. Korobkin VI, Peredelsky LV Ecology. - Rostov n / a: "Fenix" publishing house, 2003.
14. Abdurakhmanovich , KO , & Ugli, GSO (2022). Ultrasonic Diagnosis Methods for Choledocholithiasis. CENTRAL ASIAN JOURNAL OF MEDICAL AND NATURAL SCIENCES, 3 (2), 43-47. Retrieved from
15. https://cajmns.centralasianstudies.org/index.php/CAJMNS/article/view/619
16. Abdurakhmanovich, KO, & Ugli , GSO (2022). Ultrasound Diagnosis of the Normal and Diseases of the Cervix. CENTRAL ASIAN JOURNAL OF MEDICAL AND NATURAL SCIENCES, 3(2), 58-63. Retrieved from
17. https://cajmns.centralasianstudies.org/index.php/CAJMNS/article/view/622
18. QMSidiknazarov , EAAsatov , MZMusajonov, Technical operation of vehicles. Textbook for higher educational institutions. Edited by Professor Sidiknazarov QM of the TAYI . – T.: Voris-nashriyot, 2008. 560p.
19. Khidirov , M. Q. The impact of harmful substances in exhaust gases in the automotive transport system on the environment.// Educational research in universal sciences, (2023).p. 543–548.
20. Law of the Republic of Uzbekistan "On Protection of Atmospheric Air" 1996.
21. Ziyonet.com
22. Red Book of the Republic of Uzbekistan. Volume I. Plants, “Chinor ENK”, 1998.
23. Abdullayev XA . Fundamentals of biogeochemistry and soil protection. Tashkent. "Teacher", 1989, 127 p.
24. Alimov T. A. , Rafikov AA " Lessons of ecological mistakes ", Tashkent, "Uzbekistan", 1991, 70 p.
25. Baratov P. Nature protection. T.: "Teacher", 1991, 254 p.
26. Akimova T.A., Kuzmin A.P., Haskin V.V. Ecology-M.: YUNITI, 2001.
27. Valukonis G.Yu , Muradov Sh.O. Basic ecology . Volume I Obshchaya ecology, Tashkent, "Mekhnat", 2001.
28. Boron Alikhanov , Oliy Assembly Legislation chamber Speaker's Deputy Prime Minister . On the 26th anniversary of the Constitution : Environment protection legal guarantee . People's word . November 26, 2018.

29. Aksavli Tumishova, Aliya Yunusova, deputies of the Legislative Chamber of the Oliy Majlis, members of the UzHDP faction. “ Requirements for the release of pollutants into the atmosphere will be tightened.” www.norma.uz 04.10.2017.
30. 3. Alimov T. A. , Rafikov AA " Lessons from ecological mistakes ", Tashkent, "U`zbekiston", 2019, 70 p.
31. S. Gazinazarova . I. Akhmedov . B. Mukhamedgaliyev . A. Khojiyev “Ecological safety” Ecological problems of the atmosphere. Tashkent 2010 31-p.
32. Valukonis G.Yu, Muradov Sh.O. Basic ecology . Volume I Obshchaya ecology, Tashkent, "Mekhnat", 2001.
33. www.norma.uz
34. www.aim.uz
35. www.arxiv.uz
36. www.cyberleninka.uz
37. Masodikov , Q . XOGL , Khujamkulov , S., & Masodikov, JXOGL (2022). METHOD OF CONDUCTING EXPERIMENTS ON THE PRODUCTION OF CAR TIRES AND THE DISPOSAL OF USED CAR TIRES. Academic research in educational sciences, 3(4), 254 -259.
38. Meliboyev , A. , Khujamkulov, S., & Masodikov, J. (2021) . Univer calculation experimental method of researching the indicators of its toxicity in its management by changing the working capacity of the engine using the characteristics. Economics and society, (4-1), 207-210.
39. Khodjaev, SM (2022). The main problems of organization and management of car maintenance and repair stations in the Ferghana region. Innovative Technologica: Methodical Research Journal, 3(9), 1-10
40. Khujamkulov , S. UOGL , & Masodiqov, QXOGL (2022). FORMATION OF TASKS FOR MONITORING THE OPERATIONAL PROPERTIES OF AUTOMOTIVE TRANSPORT VEHICLES . Academic research in educational sciences, 3(4), 503-508.

41. Khujamkulov , S. U. , Masodikov , KX , & Abdunazarov, R. Kh. (2022, March). Prospects for the development of the automotive industry in Uzbekistan. In E Conference Zone (pp. 98-100).
42. Qabulov , M. , Jaloldinov, G., & Masodikov, Q. (2021) . Existing systems of exploitation of motor vehicles. Economics and society, (4-1), 303-308.
43. Ergashev, MI, Abdullaakhatov, EA, & Khametov, ZM (2022). APPLICATION OF GAS CYLINDER EQUIPMENT TO THE SYSTEM OF INTERNAL COMBUSTION ENGINES IN UZBEKISTAN. Academic research in educational sciences, 3(5), 1112-1119.
44. Red Book of the Republic of Uzbekistan. Volume I. Plants, “Chinor ENK”, 1998.
45. Abdullayev XA . Fundamentals of biogeochemistry and soil protection. Tashkent "Teacher", 1989, 127 p.
46. Alimov T. A. , Rafikov AA " Lessons of ecological mistakes ", Tashkent, "Uzbekistan", 1991, 70 p.
47. Baratov P. Nature protection. T.: "Teacher", 1991, 254 p.
48. Akimova T.A., Kuzmin A.P., Haskin V.V. Ecology-M.: YUNITI, 2001.
49. Valukonis G.Yu , Muradov Sh.O. Basic ecology . Volume I Obshchaya ecology, Tashkent, "Mekhnat", 2001
50. Uzbekistan Republic The President's " Road " of February 14 , 2017 farm management system further improvement measures about " decree ;
51. February 14 , 2017 day Uzbekistan Republic The President's "2017-2018 " regional car the ways develop program done increase measures about " decision ;
52. Uzbekistan Republic of first President I. A. Karimov 's March 6 , 2015 " In 2015-2019 engineering - communication and road transport infrastructure develop and modernization to do program " Resolution on " ;
53. Uzbekistan Republic The President's "2017-2021 " village in places updated exemplary projects according to cheap home - places build program " in the right " decision .

54. Mirziyoyev Sh . M. “ Great our future brave and noble our people with together " We will build ." - Tashkent: "Uzbekistan" 2017.
55. Mirziyoyev Sh.M. “We will continue our path of national development with determination and move to a new stage . Volume 1. – Tashkent: “Uzbekistan” 2017.
56. Resolution of the President of the Republic of Uzbekistan "On the Investment Program of the Republic of Uzbekistan for 2017" dated December 23, 2016;
57. The Law of the Republic of Uzbekistan "On Motorways", adopted in October 2007;
58. Decree of the First President of the Republic of Uzbekistan No. PF3292 dated August 19, 2003 “On improving the system of management of the construction and operation of public roads”;
59. Resolution No. 1446 of the First President of the Republic of Uzbekistan dated December 21, 2010 “On Acceleration of the Development of Infrastructure, Transport and Communications Construction in 2011-2015”;
60. Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 277 dated October 22, 2009 “On measures to develop road infrastructure and services along Uzbek national highways”; Textbooks and study guides:
61. SHNQ 2.05.02-07 “Automobile roads” State Committee for Construction of the Republic of Uzbekistan. Tashkent. 2008
62. SHNQ 2.07.01-03* Planning of development and construction of urban and rural settlements. State Committee for Architecture and Construction of the Republic of Uzbekistan. Tashkent 2009.
63. QMQ 2.05.11-95 “Domestic economic highways” g. T.: 1996. 56 p.
64. QXAzizov. “Fundamentals of safe driving on the roads”, Tashkent: TAYI 2005.
65. ATXotamov , QT . Usmonov « Complex improvement of urban areas ». Textbook. Ministry of Higher and Secondary Specialized Education of the Republic of Uzbekistan, Tashkent, TAQI, 2014
66. Babkov V.F., Andreev O.V. Design of automobile roads. Part 1. Translation into Uzbek by A.R. Kadirova. TAII. 2004.
67. www.mygov.uz

68. www.lex.uz
69. www.kun.uz
70. www.daryo.uz
71. www.google.ru
72. www.umail.uz
73. www.1001plans.ru
74. www.archiv.uz
75. www.ref.u
76. Albegova J.K., Gagloeva E.M., Moldovan T.V., Albegova N.R. Comparative analysis of the influence of intragastric introduction of salt tsvetnykh metallov na moche obrazovatelnuyu funktsiyu pochek// XXII sezd Fiziologicheskogo obshchestva imena I.P. Pavlova. Volgograd, -2013- C.14
77. Novikova M.A. , Pushkarev B.G., Sudakov N.P., Nikiforov S.B., Goldberg O.A. Javerbaum
78. P.M. Vliyanie khronicheskoy svintsovoy intoksikatsii na organizm cheloveka // Siberian medical magazine (Irkutsk). 2013-№2.-S.13-16.
79. Miransari M. Abiotic and biotic stresses in soybean production. Soybean production and heavy metal stress // J. Elsevier Ltd. USA.V:1; -2016, P.197-216
80. Lukash S.I. Problemy diagnostics nekotorykh zabolevaniy po vydykhaemomu vozdukhu //Computer equipment, network system. 2010, No. 9 p. 62-71.
81. Markov H.M. Oxide of nitrogen and oxide of carbon - a new class signal molecule // Uspekhi physiologischeskikh nauk. -1996. - No. 4. - S. 30-43.
82. Determination of alcohol and vydykhaemom vozdukhe. http://www.lawru.info /legal2/se18/ pravo18946/ index.htm
83. Drugov Yu.S., Berezkin V.G. Gazochromaticheskii analiz zagryaznennogo vozdukha. - M.: Khimiya, 1981. - 256 p.
84. Labori A. Regulation obmennyx protsesov. - M.: Medicine, 1970. - 249 p.
85. http://www.rusmedserver.ru/med/narodn/legkie/3.html]:
86. Fawcett TA, Moon RE, Fracizza PJ, Mebane GY, Theil DR, Piantadosi CA
87. Warehouse workers' headache. Carbon monoxide poisoning from propane-fueled forklifts // J. Occup Med. - 1992. - 3 . – N 1. –50 s.

88. Dolgopolov N.V. , Yablokov M.Yu. Nanosensor neuropodobnaya system "electronic nose". – ELECTRONICS : Science, Technology, Business. -2008. - No. 1. - S. 60-65.

89. Voytovich I.D., Korsunsky V.M. Intellectual sensory. - Kyiv: Izd-vo IK NAN Ukrainy, 2007. - 513 p.

90. Konov V.I., Osiko V.V., shcherbakov I.A. Fundamental achievements in optics and laser physics for medicine // Vestnik RAN. – 2004. – 74. – No. 2. – S. 3 – 21.

91. Lukash S.I. , Kolesnitsky O.K., Voytovich I.D. Technique and technology analysis of objects for environmental and medical diagnostics // Computer equipment, network system. – 2006. – No. 5. – S. 141-148

92. Clinical immunology: uchebnik / pod ed. AM Zemskova. - 2008. - 432 p.

93. Ispolzovanie method "plastic relief" s selyu prognozirovaniya odnosti vodnogo puti peredachi infection i nitraten y x atravlenii. Chapter 5. Epidemiological and laboratory studies of viral and hepatitis viruses and HIV in rural areas of Uzbekistan. Zapiski epidemiologo Izrail-2010 PM Lerner SITNOMINEDIGNA

94. Lobzin Yu.V, Belozerov ES, Belyaeva TV , Bulankov Yu.I. Ocherki Obshiy Infectologii L. 2007.

95. Mayer KP Hepatitis i posledstvya hepatitis: Praktich. ruk.: Per. s wet. — M.: GEOTAR Medicine, 2004. — 717 p.

96. Yushuk ND Vengerov YU.YA. Infectious diseases . Natsionalnoe rukovodstvo M. GEOTAR-media. 2009 str. 601-664

97. Therapy of viral hepatitis C. N. Zharov , Doctor of Medical Sciences, Professor B. I. Sanin, Candidate of Medical Sciences, Associate Professor RGMU, Moscow 2014

98. Vozianov JI . . Infectious and parasitic diseases Kiev. Zdorovya 2000 str 601-676

99. Lobzin YV , Finogeev FP Lechenie infectious disease . LLC "Izdatelstva FOLIANT" 2003 str-25-30.

100. Chronic viral hepatitis Podred V.V. Serova, ZGAprosinoy. M. Medicine. 2004 pp. 273-274

101. LobzinY.V. , , ZhdanovK.V. Voljanin V.M., Gusev D.A. Viral hepatitis. clinic, diagnostics, lechenie. OOO "Izdatelstva FOLIANT" 2003 str 116

102. Health of the Republic of Uzbekistan. Protocol for the treatment of chronic viral hepatitis. 2014.187

103. of Health of the Republic of Uzbekistan . SanPiN No. 0254-08 "Hygienic standards for the content of nitrates in plant products consumed as food products" October 14, 2008

104. Law of the Republic of Uzbekistan "Ob okhrane prirody" December 9, 1992. #754 -XII.

105. Law of the Republic of Uzbekistan "Ob osobo okhranyaemyx prirodnyx territoriyax" May 7, 1993. No. 871- XII.

106. National Document on the Status of Environmental Environment (2001) T: Gosudarstvennyy komitet Respubliki Uzbekistan po okhrane prirody. 2001

107. Karimov IA Uzb e kiston to the great k e lajak. Toshk e nt, "Uzb e Kiston", 1998. 503-521 p.

108. Karimov IA Uzbekistan on the path of deepening economic reforms. Tashkent , "Uzbekistan " , 1998. pp. 98-99.

109. Abdullaev O., Toshmatov Z. Ecology of Uzbekistan : today and tomorrow. Tashkent , " Science", 1992.

110. Alib ekov LA, Nishonov SA Development of science and technology , nature and man. Tashkent , "Uzbekistan " , 1984.

111. Burgin VA, Martsinkovskaya MI Selsko economy and ecology . Toshk e nt, "M e xnat", 1990.

112. Zokirov XX Agrochemistry. Tashkent , "University " , 1998 .

113. Zakirov XX Handbook of Agricultural Chemistry. Tashkent , " University " , 1998.

114. Otaboev Sh., Nabiev M. Man and the biosphere . Tashkent , "O`qituv", 1995.

115. Tretyakov Yu.D. and others. Chemistry and the present time. Tashkent , "Teacher", 1990.

116. UN. Millennium Report. Tashkent , 2003.

117. Uzbek Soviet Encyclopedia . Tashkent , 1978. Volumes 9,12,13,14 .

118. Ecology Bulletins. 2002. 4.6; 2003. 3.4; 2004. 1.3; 2006. 3.5; 2007. 1.2.3; 2008. 2.4, issues.

119. Isakov Sobirjon Rakhmatjon oglu EURASIAN JOURNAL OF NATURAL SCIENCES Vol. 1, No.1, June-July 2018 "FOOD PRODUCTS INFLUENCING WITH AUTOTRANSPORT EQUIPMENT." 28-32 (-table)