

**O‘. E. XO‘JANAZAROV
D.MUXAMEDJANOVA**

EKOLOGIYA VA TABIATNI MUHOFAZA QILISH



**O' . E. XO'JANAZAROV
D.MUXAMEDJANOVA**

**EKOLOGIYA VA TABIATNI
MUHOFAZA QILISH**

TOSHKENT – 2016

Ushbu darslik Davlat Ta'lim Standarti va dasturlari talabi asosida yozildi. Uning bo'limlarida umumiy ekologiyaning asosiy qonuniyatlari, biosfera haqidagi ta'limot, atrof-muhitni muhofaza qilish muammolari kabilar aks ettirilgan.

Umuman olganda, darslik talabalarda yangicha ekologik dunyoqarashni shakllantiradi. Darslik oliy o'quv yurti talabalari uchun tavsiya etiladi.

Данной учебник написан в соответствии с требованиями действующего государственного образовательного стандарта и программой. В его разделах рассмотрены основные положения общей экологии, учения о биосфере, проблемы экологической защиты и охраны окружающей природной среды.

В целом, учебник формирует у студентов новое экологическое мировоззрение. Учебник рекомендуется для студентов высших учебных заведений.

The text-book was written in accordance to requirements on acting of state educational standard and program. The main positions to general ecology, teachings about biosphere and problems of ecological protection and guard of environment are considered in its sections.

As a whole, text-book forms the new ecological world outlook for students. The text-book is recommended for the students of the higher educational institutions.

O'zbekiston Respublikasi Oliy va o'rta maxsus ta'lim vazirligining 2016-yil 22-yanvardagi 26-sonli buyrug'iga asosan nashrga tavsiya etilgan.

SO‘Z BOSHI

Prezidentimiz Islom Abdug‘aniyevich Karimov o‘z ma‘ruzalarida «Tabiat va inson o‘zaro muayyan qonuniyatlarni asosida munosabatda bo‘ladi. Bu qonuniyatlarni buzish, anglab bo‘lmas ekologik falokatlariga olib keladi», degan edilar. Haqiqatdan ham shunday.

Quyosh, oy, yulduzlar, suv, havo, toshlar, o‘simliklar, hayvonlar, odamlar – bular hammasi tabiat.

Tabiat – bu butun jonli mavjudotlarning rivojlanishiga imkon yaratib beradigan asos va inson uchun hayot kechirish, uning moddiy, ma‘naviy ehtiyojlarini qondiruvchi birlamchi manbadir. Inson tabiatning ajralmas bir qismi hisoblanadi, lekin u tabiatning boshqa elementlaridan o‘zining aql-zakovati, ongliligi bilan ajralib turadi. Hayot jarayonlarini, insonning atrof-muhit muammolarini o‘ziga xos uslublarda tadqiq qiladigan mustaqil fan ekologiya hisoblanadi. Ekologiya so‘zini qisqacha qanday tushunsak bo‘ladi? Ekologiya – bu uy, joy, Vatan, makon, degan ma‘nolarni beradi.

Yer, suv, havo, o‘simlik va hayvonlarni, hayot manbalarini va yashash vositalarini ehtiyotkorona saqlash, e‘zozlash *ma‘naviyat mezon*i hisoblanadi. Bunday ezgu maqsadlarga esa, faqat yuksak ma‘naviyat, uzluksiz ma‘naviy tarbiya orqaligina erishish mumkin.

Yurtboshimiz I.A.Karimov ta‘biri bilan aytganda, «Ma‘naviyat – insonni ruhan poklanish, baquvvat, iymon-e‘tiqodini butun qiladigan, vijdonini uyg‘otadigan beqiyos kuch, uning barcha qarashlarining mezonidir».

Ayniqsa, tabiatga, odamlarga yaqinlik, doimo yaxshilikni o‘ylab yashash, halol mehnat qilish, dunyoning tengsiz ne‘mat va go‘zalliklaridan bahramand bo‘lish ma‘naviyatga oziq beradi.

Tabiat qonunlarini yaxshi bilish, amalda tatbiq etish, yoshlarni ekologik madaniyat ruhida tarbiyalash, atrof-muhit tozaligini, sog‘likni mustahkamligini, turmush farovonligini ta‘minlaydi. Hozirgi zamon fanining mazkur muvaffaqiyatlari uzoq tarixga ega bo‘lib, hozirgi yutuqlari uning evolyutsion rivojlanishi natijasidir.

Yuqoridagilardan xulosa qilib aytish mumkinki, ekologik xavfsizlikni ta‘minlashning huquqiy asoslarini to‘g‘ri belgilash lozim bo‘ladi. Organizmlarning hayotiy ehtiyojlariga javob bera olishi yoki insonlar uchun sog‘lom, toza va qulay tabiiy sharoitga ega atrof-muhitni barpo etish Respublikamizda yashayotgan har bir insonning burchi hisoblanadi. Bunga rioya qilish ota-bobolarimizdan qolgan madaniy,

ilmiy, tabiiy meros hamda tabiat in'omlarini asrash hissini o'zida mujassamlashtirgan *yuksak ma'naviyatli shaxsning ongli harakati* hisoblanadi. Chunki, biz atrof-muhit holati va insonlarning hayot faoliyatiga bevosita yoki bilvosita zarar yetkazadigan tabiiy va texnogen xarakterdagi hodisalarni ekologik tahdid sifatida tushunamiz. Shuning uchun ham o'zligini, insoniy qadr-qimmatini anglab yetgan har qanday odam bu haqda o'ylamasdan yashashini tasavvur etish qiyin. Biz tabiatni asrash, avaylash, uni kelajak avlod uchun ham qoldirishimiz, respublikamiz foydali konlaridan oqilona foydalanib, o'simlik va hayvon turlarini kamayib ketishini oldini olishga, yerlarning meliorativ holatini yaxshilashga yuksak ma'naviyat orqaligina erishishimiz mumkin.

I BOB. “EKOLOGIYA” FANI HAQIDA UMUMIY MA’LUMOTLAR

1-§. “Ekologiya” fani va uning vazifalari

Keyingi paytlarda “ekologiya” soʻzi kundalik turmushimizda koʻp ishlatilmoqda. Ekologiya – bu tirik organizmlar va hamjamoalarning yashash sharoiti yoki tashqi muhit oʻrtasidagi oʻzaro aloqa munosabatlarini oʻrganadigan fan. Bu tushunchani fanga birinchi boʻlib, 1866-yilda nemis biologi **Ernest Gekkel** kiritdi. “Ekologiya” – yunoncha soʻz boʻlib, “oykos” – uy, Vatan, makon va “logos” – taʼlimot, - degan maʼnolarni bildiradi. “Ekologiya” alohida fan sifatida XX asrning boshlariga kelib shakllandi. Dastlab “Oʻsimlik va hayvonlar ekologiyasi”, keyinchalik “Inson ekologiyasi” va “Ijtimoiy ekologiya” fanlari paydo boʻlgan.

“*Ekologiya fani*” insonlar va har xil omillar taʼsirida tabiatdagi bogʻlanishlarning buzilishi toʻgʻrisida maʼlumot beradi. Tirik organizmlar (oʻsimliklar, hayvonlar) va ularning atrof tabiiy muhiti ekologiyaning obyekti sanaladi. Tirik tabiat qanday tuzilgan, qaysi qonunlar asosida mavjud va rivojlanadi, inson taʼsiriga qanday javob beradi – bularning barchasi “**Ekologiya**” fanining predmeti hisoblanadi.

“Ekologiya fani” toʻrt boʻlimga boʻlib oʻrganiladi: *autekologiya, populyatsiyalar ekologiyasi, sinekologiya va biosfera*.

1. *Autekologiya* (“autos” – yunoncha soʻz boʻlib, “oʻzi” degan maʼnoni bildiradi) ayrim turlarning ular yashab turgan muhit bilan oʻzaro munosabatini, turlarning qanday muhitga koʻproq va uzviy moslashganligini oʻrganadi.

2. *Populyatsiyalar ekologiyasi* (“populus” – lotincha soʻz boʻlib, “aholi” degan maʼnoni bildiradi, yaʼni populyatsiya deganda, bir turga mansub boʻlgan individlar yigʻindisidan iborat boʻlib, ularning bir-biri bilan oson chatishishi va maʼlum sharoitda oʻz hayotlarini boshqarib turishini tushunamiz) populyatsiyalar tuzilmasi va dinamikasi, maʼlum sharoitda turli organizmlar sonining oʻzgarishi (biomassa dinamikasi) sabablarini tekshiradi.

3. *Sinekologiya* (“sin” – yunoncha soʻz boʻlib, “birgalikda” demakdir) biogeotsenozning tuzilishi (biogeotsenoz – muayyan tuproq sharoitida oʻsimliklar, hayvonlar va zamburugʻlar hamda sodda hayvonlardan tashkil topgan mikroorganizmlarning birgalikda yashashi)

va xossalarini, ayrim o‘simlik va hayvon turlarining o‘zaro aloqasini hamda ularning tashqi muhit bilan munosabatini o‘rganadi.

4. *Biosfera ekologiyasi* (“bios” – hayot, “sfera” - qobiq). Ushbu ta’limotning asoschisi, rus olimi akademik V.I.Vernadskiy (1863-1945 y.y) hisoblanadi. Sayyoramizda tarqalgan organizmlar, ya’ni Yer qobig‘idagi mavjudotlar tizimi *biosfera* deb ataladi. Bugungi kunga kelib, biosfera o‘z o‘rnini noosfera (aql-zakovat) bosqichiga bo‘shatib berdi. *Noosfera* deganda, inson mehnati va ilmiy faoliyati ta’sirida o‘zgargan va uning yashashi uchun qulay bo‘lgan biosfera sharoitlari tushuniladi.

Atrof-muhitga zamonaviy fan va texnika taraqqiyotining ta’siri natijasida ekologiya tushunchasi o‘ta kengayib ketdi. Fanga “*inson ekologiyasi*” degan atama ham kirib keldi. Insonning tashqi muhitga munosabati boshqa tirik organizmlardan tubdan farq qiladi.

Inson ekologiyasi yangi fan sifatida 1921-yilda amerikalik olimlar Park va Borjeslar tomonidan kiritildi. Dastlab, *inson ekologiyasi* tibbiy sohaning bo‘limi sifatida qaralib, keyinchalik uning ijtimoiy, texnik, me’moriy, iqtisodiy va huquqiy tomonlari ham o‘rganildi. *Inson ekologiyasi* insonning atrof-muhitga va, aksincha, muhitning insonga ta’sirini o‘rganadi. *Inson ekologiyasini* o‘rganish natijasida *ijtimoiy ekologiya* vujudga keldi. Unga birinchi bo‘lib, ingliz olimi Raderik Mak Kenzil ta’rif bergan. *Ijtimoiy ekologiya* ijtimoiy fanlardan biri hisoblanib, uning predmeti inson bilan uning atrof-muhit o‘rtasidagi xususiy bog‘lanishlarini o‘rganishdan iborat.

“*Ekologiya*” fanini o‘rganishning quyidagi usullari bor:

1. Tizimli yondoshish – ekologik munosabatlarni muayyan ekologik obyektlarda uzviy bog‘langanligini inobatga olgan tarzda turli guruhdagi tadqiqot usullarini ma’lum bir ketma-ketlikda olib borish tartibi.

2. Kuzatish usuli – joyida yoki masofadan turib ekologik monitoringni olib borish orqali amalga oshiriladi.

3. Tajriba usuli – laboratoriya, tabiiy hudud yoki tajriba uchastkasida muhitning o‘zgarishini organizmlarga ta’sir etishini tajriba qilishni bildiradi.

4. Ekologik modellashtirish. Model – organizmlar va atrof - tabiiy muhit o‘zgarishlarini matematik tarzda ifoda eta olishi, kuzatish, tajriba o‘tkazish va modellashtirish.

Ushbu usullar orqali ekologik izlanishlardan olingan natijalar ekologik xavfsizligimiz uchun mezon hisoblanadi.

“*Ekologiya*” fani ko‘proq kimyo, geobotanika, tuproqshunoslik, geografiya, gidrologiya, matematika, iqtisod, huquq, kompyuter texnologiyalari, umumbiologik fanlar, demak, dunyoviy bilimlarning barchasi bilan uzviy bog‘liqdir.

“**Ekologiya**” fanining maqsadi – hozirgi va kelajak avlodlar uchun ekologik xavfsiz muhitni ta’minlashdir. *Ekologik xavfsiz muhit* - organizmlarning normal (barqaror) holatda ko‘payishi, o‘sishi va rivojlanishi uchun toza, sog‘lom va qulay atrof tabiiy muhit holati demakdir. Ushbu maqsaddan kelib chiqib, quyidagi **ekologik vazifalarni** bajarish talab etiladi:

1. Planetamiz resurslari va atrof tabiiy muhit holatini diagnostika qilish, ya’ni hisobga olish va baholash.

2. Sun’iy yaylovlar hosil qilish.

3. Qumlarning ko‘chishini to‘xtatish, tuproq eroziyasiga qarshi kurash.

4. Cho‘llanishning oldini olish.

5. Sho‘rlanishni yo‘qotish.

6. O‘simlik va hayvonlarni iqlimlashtirish.

7. Ekologik xavfni aniqlash va uning oldini olish.

8. Havo va suv tozaligini ta’minlash.

9. Biologik xilma-xillikni asrash.

10. Ekologik turizm orqali atrof tabiiy muhit holatini saqlab qolish.

11. Tabiat va jamiyat orasidagi muvozanatning buzilishiga yo‘l qo‘ymaslik.

12. Istiqbolga yo‘naltirilgan ekologik reja va dasturlarni ishlab chiqish va ijrosini ta’minlash.

Xulosa qilib aytganda, *ekologiya* organizmlar va ularning atrof-muhiti o‘rtasidagi o‘zaro munosabat qoidalari va qonuniyatlarini tadqiq qiluvchi fan hisoblanadi va shubhasiz, tabiatni muhofaza qilishning ilmiy asosini tashkil etadi.



Savol va topshiriqlar

1. Ekologiya fani nimani o‘rgatadi?
2. Ekologiya fanining qanday bo‘limlari bor?
3. Ekologiya fanining maqsadi va vazifalarini tushuntiring.
4. Ekologiya fani ilmiy-tadqiqot ishlarida foydalanadigan usullar qaysilar?

2 -§. Ekologiya fanining rivojlanish tarixi

Ekologiya fanining rivojlanishida ko'pchilik olimlar ilmiy izlanishlar olib borishgan. Hayvon va o'simliklar hayotining tashqi muhit bilan bog'liqligi va tarqalishi to'g'risidagi ma'lumotlarni umumlashtirishni birinchi bo'lib, eramizgacha yashagan *Aristotelning* (e.av. 384-322 yy.) ishlarida uchramiz. U o'zining "Hayvonlar tarixi" asarida suvda va quruqlikda yashovchi hayvonlar, shuningdek, suzuvchi, havoda uchuvchi va o'rmalovchi hayvonlar kabi hayotiy shakllarga ajratgan. Hayvonlarning 500 turini o'rganib, ularning xulq-atvori, ko'chib yurishi, qishda uyquga ketishi va qushlar to'g'risida ma'lumot qoldirgan. *Teofrast* (e.av. 380-271 yy.) o'simliklarning yashash joylarini hisobga olib, ularni o't, chala buta, buta va daraxt kabi hayotiy shakllarga bo'ladi.

XVII-XVIII asrlardagi ekologik ma'lumotlar tirik organizmlarning ayrim guruhlarini o'rganishga qaratilgan edi. *J.Byuffon* ishlarida hayvonlarning tuzilishiga tashqi muhitning ta'siri; *J.B.Lamark* o'simlik va hayvonlarning evolyutsion o'zgarishlarida eng muhimi tashqi muhit ta'siri ekanligi; ekologik g'oyalarning rivojlanishida ingliz tabiatshunos olimi (1809-yilda Angliyada tug'ilgan) *Ch.Darvinning* organik olam evolyusiyasi haqidagi ta'limotida ilgari surilgan. Nemis biolog *Ernest Gekkel* 1866-yilda fanga "ekologiya" tushunchasini birinchi bo'lib kiritdi va unga ta'rif berdi.

Ekologiya mustaqil fan sifatida XX asrning boshlarida vujudga keldi. Uning rivojlanishiga G.F.Morozov, V.N.Sukachev, V.G.Ramenskiy, K.Raunkiye, Ch.Elton, M.S.Gilyarov, N.S.Serebryakov, A.Tensli, G.Odum, Y.Odum kabi dunyo olimlari katta hissa qo'shdilar. Yirik rus olimi *V.I.Vernadskiy* biosfera haqidagi ta'limotni yaratdi va biosferaning holati inson faoliyati bilan bog'liqligi haqida xulosaga keldi.

O'zbek xalqining betakror tarixi va madaniy-ma'naviy merosining naqadar chuqur ildizga ega ekanligi haqida Yurtboshimiz Islom Abdug'aniyevich "Turkiston" gazetasi muxbiriga intervyusida: "Biz jahon maydonida kuni kecha paydo bo'lgan xalq emasmiz. Bizning millatimiz, xalqimiz ko'hna Xorazm zaminida "Avesto" paydo bo'lgan zamonlardan buyon o'z hayoti, o'z madaniyati, o'z tarixi bilan yashab keladi", degani e'tiborli. Zero, insonlarning tabiat va atrof-muhit bilan bog'liqligi, ular o'rtasidagi munosabatlar bir necha ming yillar qadimgi davrlarga borib taqalishini qadimgi va eng nodir qo'lyozmamiz

bo'lgan "Avesto" asarining "Vandidod" qismidan bilib olishimiz mumkin. Ushbu manbaning 3-, 9-, 10-, 16-17- boblarida insonlarning ruhan pok bo'lish bilan bir qatorda tana ozodaligiga e'tibor berishlari, ayniqsa, yuz-qo'llarni va boshini kunda bir necha marta yuvib turishlari, sochni tarash va tishni toza tutish, tirnoqlarni tez-tez olib turishlari, mudom badan tarbiyasi bilan shug'ullanishlarining amaliy mohiyatiga dahldor mulohazalar yuritilgan va foydali maslahatlar berilgan. Unda ekin yerlarini ko'paytirish, shudgor qilingan joylarni asrab-avaylash, uni muqaddas hisoblash, uy-joy qurish va uni olov bilan, uy hayvonlari, xotin, bola-chaqa bilan to'ldirish, o'simlik va daraxt ko'kartirish, katta-kichik hayvonlarni ko'paytirish, yerni parvarish qilish Zardushtiylikning asosini tashkil qilishi, Zardushtiylik ta'limotiga e'tiqod qo'ygan odam esa, tozalik va poklikka rioya qilishi shartligi e'tirof etiladi. Mazkur falsafiy yo'nalishning pirovard-natijasi insonparvarlik g'oyasiga borib taqaladiki, bu g'oya oradan uch ming yillar o'tgan bo'lishiga qaramasdan, hamon o'zining axloqiy-ma'naviy ahamiyatini yo'qotmasdan kelmoqda. Zero, maqsad - yer, suv, daraxt, kiyim, yotoq, joy, inson va hokazolarning poklanishi orqali barcha yaratilgan moddiy va ma'naviy dunyoda odamzodning tinch va ezgu hayot kechirishiga qaratilgan bo'lib, buning uchun Zardushtiylikning asosiy axloqiy-falsafiy tamoyili – ezgu fikr, ezgu so'z va ezgu amal birligiga amal qilmoq lozim. Shunday qilib, "Avesto"dagi: "Yosh avlodga inson butun umri davomida yer, olov, suv va havoni, umuman, dunyodagi jamiyki narsalarni pok va bus-butun asrashga burchlidir, inson o'zi o'sib-ulg'aygan zaminni sevsa, ardoqlasa, atrof-muhitni toza saqlashni o'zining vatanparvalik burchi deb tushunmog'i kerak", degan g'oyalar bugungi yoshlarimizga ham mos kelishini, ular ma'naviyati tarbiyasidagi o'rni hozirgi kunda ham juda ahamiyatli ekanligini e'tirof etish joiz.

Markaziy Osiyolik Muhammad ibn Muso al-Xorazmiy (783-850 yy.), Muhammad ibn Ismoil al-Buxoriy (810-870 yy.), Abu Nasr Forobiy (870-950 yy.), Abu Rayhon Beruniy (973-1048 yy.), Abu Ali ibn Sino (980-1037 yy.), Hoja Ahmad Yassaviy (1041-1167 yy.), Yusuf Xos Hojib (1019 y.), Umar Xayyom (1048-1123 yy.), Mirzo Ulug'bek (1394-1449 yy.), Alisher Navoiy (1441-1501 yy.), Zahiriddin Muhammad Bobur (1483-1530 yy.) kabi va boshqa allomalimiz hali *ekologiya fani* dunyoga kelmagan davrlarda tabiat va undagi muvozanat, o'simlik va hayvonot dunyosi, tabiatni e'zozlash haqida qimmatli fikrlar aytganlar.

Islom Sharqining Fanlar Akademiyasi “Baytul-hikma” (“Donolar uyi” – bugungi Urganchdagi Maʼmun akademiyasi) da Xalifa Maʼmun rahnamoligida ijod qilgan, algebra, arifmetika, matematika, geometriya, tarix, tabiat, geografiyaga oid “Al-jabr val-muqobala”, “Astronomik jadvallar”, “Quyosh toʻgʻrisidagi risola” asarlari muallifi *Muhammad ibn Muso al-Xorazmiy*: “Bilginki, daryoning koʻzlari yoshlansa, uning boshiga gʻam, kulfat tushgan boʻladi”, deb taʼkidlagan edi. U oʻzining “Kitob surat al-arz” (“Yer surati”) asarida 637 ta noyob (muhim) tabiiy joylar, 209 ta togʻlarning geografik tafsilotlarini bergan hamda dengizlar, daryolar va okeanlar havzalarining shakllari, ularda joylashgan orollarning muhim koordinatlarini bayon etgan. Ushbu asarda Orol dengizining tasviri ham berilgan boʻlib, Orol dengizining Markaziy Osiyo xalqlari hayoti, oʻsimliklari va hayvonot dunyosi uchun naqadar muhimligi ham bashorat qilingan. Hozirgi kunda esa, Orol va Orolboʻyi mintaqasi tabiati va insonlari muammolari sayyoramiz hamjamiyati oldida koʻndalang turgan fojiali muammolar sirasiga aylanib ulgurganidan barchamiz boxabarmiz.

Hayotligidayoq “Muallimi soniy” (“Ikkinchi muallim”), “Sharq Aristoteli” nomlari bilan ulugʻlangan *Abu Nasr Forobiy* ilmning turli sohalari boʻyicha 160 dan ziyod risolalar yaratdi, jumladan, odam aʼzosining tuzilishi va unda kelib chiqadigan oʻzgarishlar, yaʼni kasalliklar, ovqatlanish tartibining buzilishi, kasallikning oldini olish chora-tadbirlari haqida ham maʼlumotlar qoldirgan. Uning tabiatshunoslikka doir “Inson aʼzolari haqida risola”, “Hayvon aʼzolari haqida soʻz” kabi asarlari alohida ahamiyatga ega. Ushbu buyuk olimning taʼbiricha, tabiat va jamiyat bir-biri bilan chambarchas bogʻliq, yaʼni tabiatning oʻzgarishi jamiyatning rivojlanishiga albatta taʼsir koʻrsatadi.

Falsafa, tabiat, astronomiya, zoologiya, botanika, geologiya, musiqa, psixologiya, axloq, mantiq, tilshunoslik, adabiyot kabi fanlarga bagʻishlab 450 dan ziyod asarlar qoldirgan (ularning 242 tasi bizgacha yetib kelgan) *Abu Ali ibn Sino* oʻzining “Kitob at shifo (“Davolash kitobi”), “Donishnoma”, “Najot”, “Kitob al-qonun fit tib” (“Tib qonunlari kitobi”) kabi asarlarida tabiat, iqlim, dorivor oʻsimliklar, inson organizmining tuzilishi, kasalliklar va ularning oldini olish masalalari, sogʻliqni saqlashda badan tarbiya, toʻgʻri-oqilona ovqatlanish (parhez), turmushda gigiyenaning oʻmi, jumladan, asab kasalliklarini davolashda jismoniy usullar yaxshi natija berishi kabi maʼlumotlari qayd etilgan. U dorivor oʻsimliklarning morfologiyasi, nomlarining

kelib chiqishi, tarkibi va geografiyasini o'rganib, ular to'g'risida ma'lumot qoldirgan. Jumladan, Ibn Sino o'simlik va hayvonlardan olinadigan 811 ta sodda dorining nomlarini, ularning har birining qay bir vaqtning o'zida qaysi kasallikka davo ekanligini yozib qoldirgan. Inson tanasiga tashqi omillarning ta'siri masalalariga katta ahamiyat berib, ba'zi kasalliklarning suv yoki havo orqali tarqalishini ta'kidlaydi va atrof-muhitni ifloslantirilishidan, quduqlarni, ariqlarni, umuman, suv inshootlarini toza saqlashlikka, ya'ni ekologik omillarga insonlarni to'g'ri yondoshishga undaydi.

Bir vaqtning o'zida geograf, astronom, geolog, biolog, ma'dansunos, o'lkashunos, tarixchi, dinshunos, faylasuf olim bo'lgan *Abu Rayhon Beruniy* 17 yoshidayoq astronomiya ilmi bilan shug'ullangan, 21 yoshida matematika, geografiyaga oid kashfiyotlar qilgan, xususan, Ekliptika tekisligining ekvatorga nisbatan qiyaligini aniqlagan, 22 yoshida diametri 5 metr bo'lgan globus yasagan. U 150 dan ortiq asarlar yozgan bo'lib, bizgacha 27 tasi ("Osori boqiya", "Kartografiya", "Geodeziya", "Hindiston", "Minerologiya", "Qadimgi xalqlardan qolgan yodgorliklar", "Xaritalar va yer yuzasini bilish", "Saydana" va boshqalar) yetib kelgan. "Saydana" asaridan o'simlik va hayvonlarning biologik xususiyatlari, ularning tarqalishi, tashqi muhit bilan o'zaro aloqasi va xo'jalik ahamiyati haqida ma'lumotlar topish mumkin. Unda olim 1116 turdagi dorivorlarga (shundan 750 tasi o'simliklar va 101 tasi hayvonlardan olingan) batafsil ta'rif beradi.

Buyuk bobokalonimiz *Amir Temurning* tabiatga munosabati, avvalo, uning obodonchilikka qaratgan e'tibori bilan izohlanadi. Ayniqsa, "Temur tuzuklari" da qarovsiz yerlarni obod qilish, ularni hosildor yerlarga aylantirish haqida ko'rsatmalar berilgani e'tiborga molik.

Temuriylar sulolasidan, nomi Sharq va G'arb dunyosida ham bugungi kungacha teng e'zozlanib kelinayotgan buyuk olim *Mirzo Ulug'bek* hukmronligi davrida Samarqand juda obod bo'lganligi tarixdan ma'lum. Uni dunyoga tanitgan va shon-shuhrat keltirgan "Ziji jadidi Ko'ragoniy" asari barcha musulmon va Yevropa mamlakatlarida o'rganilgan. Bugun u lotin, fransuz, ingliz tillariga o'girilgan. Muhammad Tarag'ay nomi bilan ham dunyoga tanilgan Mirzo Ulug'bek astronomiya va boshqa fanlar sohasidagi kashfiyotlari va ilmiy ta'limotlari bilan insoniyatning keyingi ilmiy tafakkuri rivojiga muhim zamin tayyorlab bergan olim edi.

Qarangki, asrlar mobaynida ajdodlarimiz inson aql-idroki va tafakkurining tabiat kuchlarini o'ziga xizmat qildirishga, uning butun sirlarini bilib olishga intilishlarining chegarasi yo'qligi, shuningdek, insonning aql-zakovati tabiatda juda ko'p ajoyib-g'aroyib narsalarni kashf etgani va hali yana ko'p narsalarni kashf etishi, insonning butun vujudi bilan tabiatga bog'liqligi, tabiat va jamiyat taraqqiyoti uchun qilgan barcha izlanishlari faqat uning kelajagi uchun xizmat qilishini ko'rsatib o'tganlar.

O'zbekistonda ekologik yo'nalishdagi ishlarning asoschilari D.N.Kashkarov va Ye.P.Korovinlar hisoblanishadi. Ular ekologik ilmiy tadqiqotlarni rejalashtirish va ekolog mutaxassislarni tayyorlash zarurligi g'oyasini o'rtaga tashlashgan. 1930-yilda ular tomonidan "*Muhit va hamjamoalar*", "*Cho'ldagi hayot*" kabi ilmiy asarlar chop etilgan. Ushbu asarlarda "Ekologiya" fani va uning vazifalari, uslublari o'z aksini topgan.

Ekologik yo'nalishdagi ishlar natijasida, keyinchalik O'zbekiston Respublikasi Fanlar Akademiyasining olimlari V.A.Burigin, O.X.Hasanov va boshqalar tomonidan o'simliklarning qurg'oqchil issiq (cho'l) sharoitiga moslashishi, o'simliklar hamjamoasining tuzilmasi, mahsuldorligi, yem-xashakbop o'simliklarning orasidan qurg'oqchil issiq sharoitga chidamli turlarini tanlash va ularning ekologo-biologik xususiyatlarini o'rganib, sun'iy yaylovlar barpo etishning ilmiy asoslari ishlab chiqildi. Akademiyaning zoologiya va parazitologiya yo'nalishida hayvonot olamini muhofaza qilish va undan oqilona foydalanish tadbirlari, qishloq xo'jaligi hayvonlarida uchraydigan yuqumli kasalliklarning oldini olish, qimmatli hayvon turlarining kadastri va nazorat ishlari olib borildi. Ushbu ilmiy ishlarga T.Z.Zohidov, A.M.Muxammadiyev, V.V.Yaxontov, M.A.Sultonov, G.O.Olimjonov, A.A.Rafiqov va boshqalar rahbarlik qildilar.

XX asrning ikkinchi yarmida hozirgi davr fanlarini "*ekologiyalashtirish*" boshlandi. Bu esa, ekologik bilimlarning katta ahamiyatga ega ekanligini bildiradi. Demak, bugun "Ekologiya" fanining kelajagi porloq, chunki insoniyatni sayyoramizda yashab qolishi, ko'p jihatdan, ushbu fan rivojlanishi darajasi bilan bog'liq bo'lib qoladi.

TEST TOPSHIRIQLARI

1. Ekologiya fanining asoschisi kim?

1. E.Gekkel 2. Ch.Darvin. 3. V.Vernadskiy. 4. J.Lanark.

2. Ekologiya fani nimani o'rganadi?

1. Tirik organizmlar bilan tashqi muhit o'rtasidagi aloqani o'rganadi.

2. Hayot haqidagi fan. 3. Muhitni ifloslanishini o'rganadigan fan.

4. Insonning tabiatga ta'sirini o'rganadigan fan.

3. Biologik va ekologik hodisalarni aniq sharhlash va kelajak tadqiqotlar rejasini tuzishda qudratli omil sifatida ahamiyatga ega bo'lgan ekologik uslub qaysi?

1. Tasviriy usul. 2. Taqqoslash usuli. 3. Tajriba usuli. 4. Matematik modellash usuli.

4. Ekologiya fanining ilmiy-tadqiqot uslublari qaysilar?

1. Tasviriy, tajriba, modellash, matematik. 2. Tasviriy, taqqoslash, tajriba, modellash

3. Individ, populyatsiya, biogotsenoz. 4. Modellash, tasviriy, tajriba, fizikaviy.

5. Ekologiya faniga hissa qo'shgan O'rta Osiyo allomalari?

1. Muhammad Muso al-Xorazmiy, Jayhoni. 2. Abu Rayhon Beruniy, Abu Ali ibn Sino.

3. Alisher Navoiy, Abu Nasr Farobiy. 4. Sulton Balhiy, Mahmud ibn Vali.

6. "Bilingki, daryoning ko'zlari yoshlansa uning boshiga g'am, kulfat tushgan bo'ladi. Odamlar, daryodan mehringizni darig' tutmanglar". Ushbu satrlar qaysi allomaga tegishli?

1. Muhammad Muso al-Xorazmiy. 2. Abu Nasr Forobiy. 3. Abu Rayhon Beruniy.

4. Abu Ali ibn Sino.

7. Abu Rayhon Beruniyning "Saydana" degan asarida qancha dori-darmonlar qayd etilgan?

1. 700 ta. 2. 750 ta. 3. 1116 ta. 4. 1200 ta.

8. O'zbekistonda "Hayvonlar ekologiyasi asoslari" nomi bilan birinchi yozilgan darslik kimning qalamiga mansub?

1. M.S.Gilyarov. 2. V.N.Sukachev. 3. D.N.Kashkarov. 4. G.Odum.

9. D.N.Kashkarov va Ye.P.Korovinlar tomonidan yaratilgan ekologiya fani va uning vazifalari, uslublari o'z aksini topgan ilmiy asarlar qaysilar?

1. "Muhit va jamoa", "Cho'ldagi hayot". 2. "Hashoratlar ekologiyasi", "Qizilqum cho'lining biotsenozlari".

3. "Hayvonot olamini qo'riqlash va undan ratsional foydalanish", "Qarshi cho'lning umurtqali hayvonlari ekologiyasi".

4. "Farg'ona vodiysining umurtqali hayvonlari", "Payg'ambar oroli sut emizuvchilari".

Savol va topshiriqlar



1. Ekologiya mustaqil fan sifatida qachon vujudga keldi?

2. O'rta Osiyo allomalarining ekologiya faniga qo'shgan hissasini so'zlab bering?

3. O'zbekistonda ekologiya yo'nalishidagi ilmiy ishlarning asoschilari kimlar?

4. Ekologiya fanining rivojlanishida O'zbekiston olimlari tomonidan olib borgan ilmiy-tadqiqot ishlar haqida to'xtaling?

II BOB. TABIAT VA JAMIYAT ORASIDAGI MUNOSABATLAR

3-§. Ekologik muammolar

XXI asrga kelib, insoniyatni tashvishga solayotgan dolzarb masalalardan biri – ekologik muammodir. Hozirgi davrda jamiyatdagi ishlab chiqarish kuchlarining tezlik bilan o‘sishi, tabiatdan pala-partish foydalanish va intensiv o‘zlashtirish natijasida ekologik muvozanat buzilib, ekologik tanglik yuzaga keldi.

Ekologik tangliklar o‘z navbatida avj olib, sayyoramizning ba’zi mintaqalarida ekologik halokatlarni keltirib chiqaradi. Ekologik tanglikning tinmay kuchayib borishi esa, ekologik muammolarni kelib chiqishiga sabab bo‘lmoqda. Ekologik muammolar o‘z vaqtida hal qilinmasa, u muayyan hududga ekologik halokat xavfini olib keladi.

Ekologik muammo - insonning tabiatga ta’siri bilan bog‘liq holda tabiatning ham insoniyatga aks ta’siri tushuniladi (1-jadval).

1-jadval

Yer yuzi va Markaziy Osiyoda mavjud ekologik muammolar

<i>T/r</i>	<i>Global (umumbashariy)</i>	<i>Regional (mintaqaviy)</i>	<i>Lokal (mahalliy)</i>
1	Chuchuk suv muammosi	Orol va Orolbo‘yi muammosi	Har qanday hududda yuzaga
2	Ozon qatlamining siyraklashishi	Chuchuk suv muammosi	kelgan muammolar:
3	Atmosferaning “dimiqish” hodisasi	Cho‘llanish jarayoni	-avtotransportdan chiqadigan zaharli
4	O‘simlik va hayvon turlari sonining qisqarishi	O‘simlik va hayvon turlari sonining qisqarishi	gazlar; -chiqindilarning to‘planishi;
5	Aholi sonining ortishi	Radioaktiv ifloslanish	-qurg‘oqchilik; -atmosfera
6	Iqlim o‘zgarishi		havosining ifloslanishi;
7	Cho‘llanish jarayoni		-oqova suvlarni ifloslanishi va
8	Chiqindilarning ko‘payishi		hokazolar

4-§. Ilmiy-texnika inqilobining atrof-muhitga ta'siri

Insoniyat tarixining eng katta g'alabasi - ilmiy texnika jarayoni, taraqqiyoti va uning ilmiy natijalarini xalq xo'jaligining turli tarmoqlariga joriy etishdir. Ilmiy texnika jarayoni natijasida insoniyat o'zining ehtiyojini qondirish maqsadida, tabiatning yangi o'rganilmagan sirlarini o'rganishga, uning qonuniyatlarini ochib berishga, tabiiy boyliklardan foydalanishga bir muncha imkoniyat yaratdi.

Okean va dengizlarni, kosmik fazoni, odam organizmining turli murakkab funksiyalarini hujayra va yadro darajasida o'rganib, bilimlarni rivojlantirib, turli kasallik sirlarini ochib, ko'p kasalliklarning oldini olishga va davolashga imkon topdi. Shu bilan bir qatorda, sanoat korxonalaridagi texnologik jarayonlarning to'la - to'kis takomillashgani, xalq xo'jaligining turli soxalarida kimyoviy moddalarning ishlatilishi, avtomobil transportining tez rivoji ko'p miqdorda zaharli chiqindilarning paydo bo'lishiga olib keldi, ularning atmosfera havosiga, suv havzalariga, yer yuzasiga tashlanishi hamda juda ko'p miqdorda xo'jalik va sanoat axlatlarining paydo bo'lishi tabiatning jonli va jonsiz omillari o'zaro munosabatlarining buzilishiga, qolaversa, pirovardida inson salomatligiga salbiy ta'sir etib, uni turli kasallaklarga giriftor qilayotganining guvohi bo'lib turibmiz.

1940 - yillarda atom yadrosi elektrga bo'lgan ehtiyojni qondira boshladi. Insoniyat atom energiyasini o'zlashtirdi. Kibernetikaning o'sishi muhim ahamiyatga ega bo'ldi. Atom bombalari va atom reaktorlari o'rasidagi tadqiqotlar fan uchun muhim sanalsada, mamlakatlar o'rtasida kelishmovchilika olib kelindi.

Elektronik kompyuterlar ilmiy va texnologik inqilobning simvoli sifatida paydo bo'ldi va 1950 - yillarda fan va sanoatda keng ishlatila boshlandi. Shunday qilib, insoniyat 1940 va 1950 - yillarda ilmiy va texnologik inqilobning davriga kirdi. Texnologik inqilob yangi yo'nalishdagi innovatsion o'zgarishlar natijasi edi. Kranzbergning texnologiya qonunida shunday deyiladi: "Texnologiya bu tugundan paydo bo'ladigan katta va kichik holdagi ixtiro natijasidir".

J.Uatning bug' mashinasining ixtirosi Buyuk Britaniya va jahonda sanoat inqilobiga olib keldi. 1988 - yilda IBM shaxsiv kompvutrlari ixtiro qilindi. Yangi texnologik inqilob mehnat mahsuldorligi va samaradolgini oshirdi. Bir necha universal texnologik inqiloblarni quyida ko'rib o'tamiz:

1.(1600–1740). Moliyaviy-qishloq xo'jalik inqilobi.

- 2.(1780–1840). Sanoat inqilobi.
- 3.(1880–1920). Texnika inqilobi yoki ikkinchi sanoat inqilobi.
- 4.(1940–1970). Ilmiy-texnika inqilobi.
- 5.(1985–2000). Informatсион va telekommunikatsion inqilob.

Texnologik inqilob iqtisodiy o'sishga olib keldi. Jumladan:

- Yuqori paleolitik inqilob: “yuksak madaniyat” ning paydo bo'lishi va yangi texnologiya davrining boshlanishi (50,000 - 40,000 yillar oldin).
- Neolitik inqilob (ehtimol 13000 yillar oldin), insoniyat sivilizatsiyasining rivojlanishi davri.
- Renayssans texnologik inqilobi: ixtirolar davrining boshlanishi, 14 va 16 - asrlar.
- Savdo-sotiq inqilobi: 16 - asrdan 18 - asr boshlarigacha bo'lgan davr.
- Narx-navo inqilobi: 15 - asrdan 17 - asrning birinchi yarmigacha bo'lgan davrni o'z ichiga oladi va iqtisodiy inflyatsiya jarayoni bo'lib o'tgan davr.
- Ilmiy inqilob: Ilmiy g'oyalar hayotga tadbiiq etilish davri, ya'ni 16 - asrni o'z ichiga oladi.
- Britaniya qishloq xo'jalik inqilobi: 18 - asr urbanizatsiya kuchaygan va qishloq xo'jalik ekinlarini ekish keng tarqalgan davr.
- Sanoat inqilobi: 18 - asr oxiri va 19 - asr boshlarida Britaniya va butun jahonda texnologik, ijtimoiy iqtisodiy va madaniy sharoitlarning rivojlangan davri.
- Bozor inqilobi: AQSH ning janubida mehnat tizimidagi o'zgarishlar va buni keyinroq butun dunyoda tarqalishi (taxminan 1800–1900 yillar).
- Ikkinchi sanoat inqilobi: (1871–1914).
- Yashil inqilob: O'g'itlarning sanoatlashgan holda ishlab chiqarilishi va dunyo qishloq xo'jaligida hosildorlikning oshishi (1945-1975).
- Raqamli inqilob: Elektronik kompyuterlarning yaratilishi davri (1950).
- Axborotlar inqilobi: Raqamli inqiloblardan keyin (1960 - yillardan keyin) iqtisodiy, ijtimoiy va texnologik o'zgarishlarning kuchygan davri.

Global muammolar

- Qarish muammosi.
- Qashshoqlik va ochlik muammosi;

- Yadro texnologiyasi va atrof - muhitni radioaktiv ifloslanishi;
- Bioxilmaxillikni qisqarishi.
- Tabiiy resurslardan foydalanish muammosi;
- Global isish muammosi;
- Ozon tuynugi muammosi;
- Yurak qon - tomir, onkologik kasalliklar va SPID.
- Demografik rivojlanish (ochlik).
- Terrorizm;
- Asteroid xavfi.



Savol va topshiriqlar

1. Siz yana qanday global, mintaqaviy, mahalliy ekologik muammolarni bilasiz?
2. Siz yashaydigan joydagi ekologik muammolarni aytib bering!
3. Rivojlangan mamlakatlarda qanday ekologik muammolar mavjud?
4. Mahalliy ekologik muammolarni oldini olishda qanday takliflaringiz bor?
5. ITI ni atrof-muhitga ta'sirini izohlang?

Nizomiy nomli
T D P U
kutubxonasi

4-8026/2

III BOB. TABIATNI MUHOFAZA QILISHNING ILMIY-NAZARIY ASOSLARI

5-§. Muhit va ekologik omillar

Ekologiyada muhit deb, tirik organizmni o‘rab turgan fizik qurshov e‘tiborga olinadi. Aniqroq qilib aytganda, *muhit* - tevarak-atrofdagi o‘zaro bog‘lanishlardagi shart-sharoitlar va ta‘sirilar majmuidir.

Odatda, tabiiy va sun‘iy muhitlar ajratiladi. Tabiiy muhitni suv, quyosh, shamol, havo, yer, o‘simlik va hayvonot dunyosi kabi tabiiy omillar majmui tashkil etadi. Sun‘iy muhit esa inson tomonidan yaratilgan bo‘lib, bunda insonning mehnat mahsuli yotadi. Tabiiy va sun‘iy muhitlar bir-biri bilan chambarchas bog‘liq. Ularning bog‘liqligini *ekologik muhit* tushunchasi ifodalaydi.

Organizmlarning muhitga moslashuvi *adaptatsiya* deyiladi (lotincha “adaptatsio” - moslashuv). Adaptatsiya tushunchasini moslashish bilan ifodalaymiz. *Moslashishning* morfologik, fiziologik va xulqiy turlari ajratiladi.

Morfologik moslashishlarga misol qilib, suv muhitida baliqlarning suvning qarshiligini kesib yurishga mos tana tuzilishi, shuningdek, plankton organizmlarning suvda osilgan holda yashashi kabilar hisoblansa, o‘simliklar dunyosida cho‘l sharoitida minimum suv sarflashga moslashish sifatida barglarning reduksiyalanishi yoki butunlay bo‘lmasligi kabilarni ko‘rsatish mumkin.

Fiziologik moslashishlarga hayvonlarda ozuqa tarkibiga ko‘ra, ovqat hazm qilish sistemasida fermentlarning ma‘lum turlarining uchrashi yoki cho‘lda yashovchi hayvonlarning suvga bo‘lgan talabini qondirish uchun yog‘larning biokimyoviy oksidlanishdan foydalanishi kabilar kiradi (tuya o‘rkachida yog‘ qatlamining mavjudligi).

Xulqiy yoki etologik moslashishlar hayvonlar uchun xos bo‘lib, turli shakllarda namoyon bo‘ladi. Masalan, tashqi muhit bilan hayvon tanasi o‘rtasida qulay issiq almashinuvi uchun uya qurish (boshpana topish), qulay haroratli joyni izlab topish, shuningdek, qushlar va sut emizuvchilarda sutkalik va mavsumiy ko‘chib yurishlari ma‘lum. Hayvonlar faqat harorat omiliga xulqiy tomondan moslashib qolmay, balki namlik, yorug‘lik va boshqa ko‘pchilik ekologik omillarga ham moslashadi. Xulqiy moslanishlar yirtqichlarning o‘ljani izidan yurish, kuzatish kabilarda hamda o‘ljaning javob reaksiyalarida ko‘rinadi.

Moslashish jarayoni organizmlarni ular hayotidagi o'rni va tashqi tuzilishini ifodalaydi. Buni biz **ekologik nisha (joy)** bilan ham izohlashimiz mumkin. Ya'ni, qancha ekologik tur mavjud bo'lsa, shuncha ular uchun yashash muhiti mavjud bo'ladi. "*Nisha*" termini fransuzcha "*niche*" – chuqurlashuv, degan ma'noni ham anglatib, bu nafaqat yashash joyi, balki tabiatda turning o'rni, biologik jamoadagi funksional roli, tashqi muhit omillariga bardoshliligi ham hisoblanadi.

Ekologik nisha (grekcha "oikos" – uy, vatan, fransuzcha "*niche*" – devordagi o'yi) atamasini fanga ilk bor 1917 - yilda, amerikalik ekolog Djozef Grinell *turning maqomini egallash tavsifi* sifatida taklif etgan. Ch.Elton bo'yicha, bu turning "professiyasi", ya'ni jamoadagi nima bilan shug'ullanishi demakdir.

Turning muhit sharoitlari o'zgarishiga moslasha olish darajasi *ekologik valentlik* (grekcha "oikos" – uy, Vatan; lotincha "valents" – kuch) deyiladi. *Ekologik valentlik* turning muhitidagi ko'pchilik omillar yoki alohida bir omilning o'zgarishiga chiday olishiga qarab belgilanadi. Muhit omilining kuchli o'zgarishiga chidaydigan turlarning ekologik guruhi ifodalanganda uning oldiga "evri" qo'shimchasi, muhit omilining o'zgarishiga chidamaydigan turlarning ekologik guruhi ifodalanganda esa uning oldiga "steno" qo'shimchasi qo'yiladi. Masalan: haroratga chidamli turlar *evritermlar* deyiladi (yantoq, saksovul). Baliqlar orasida xon baliq stenoterm, okun esa evriterm organizm hisoblanadi. Agar daryo bo'yidagi daraxtlar yo'qolib ketib, suv harorati ko'tarilsa, xon baliq nobud bo'ladi, okun esa yashayveradi.

Tirik organizmlarning hayotiga va geografik tarqalishiga ta'sir etuvchi (ijobiy yoki salbiy) shart-sharoitlar *ekologik omil* deb ataladi. Ekologik omillar quyidagi guruhlarga ajratiladi:

1. *Abiotik omillar*. Bunga yorug'lik, harorat, namlik, tuproq va relyef sharoitlari kiradi.
2. *Biotik omillar*.
3. *Antropogen omillar*.

Abiotik omillar

1. Yorug'lik ekologik omili

Barcha organizmlar uchun yorug'likning ahamiyati katta, chunki ekosistemada kechadigan jarayonlarda sarflanadigan energiya bu asosan quyosh energiyasidir. O'simliklarda fotosintez jadalligi yorug'likning optimal darajasiga (yorug'lik to'yinishiga) bog'liq. Yorug'likka

munosabatiga qarab o'simliklarni *yorug'sevar*, *soyasevar* va *soyaga chidamlilarga* bo'lamiz. Yorug'sevar o'simliklar yaxshi yorug' tushadigan ochiq joylardagina rivojlanadi. Ularda fotosintez jarayoni jadal kechadi. Cho'llarda va chala cho'llarda o'sadigan izenlar, shuvoqlar, saksovullar, chogonlar, qizilchalar, qandimlar, qo'ng'irboshlar va shu kabilar yorug'sevar o'simliklarga kiradi. Soyasevar o'simliklar esa, aksincha kuchli yorug'likni yoqtirmaydi va ular doimiy soya joylarda o'sadi. Bunday o'simliklarga o'rmonlarda o'sadigan paporotniklar, moxlar, yong'oqzorlar ostida o'suvchi yovvoyi xina, tog' gunafsha kabilar kiradi. Soyaga chidamli o'simliklar soya joyda ham, yaxshi yoritilgan joylarda ham bemalol o'saveradi. Bularga qayin, qarag'ay, eman daraxtlari, o'rmon yer tuti, g'ozpanja, binafsha kabi o'simliklar kiradi.

Yorug'likning hayvonlar uchun asosan informativ ahamiyati mavjud. Sodda hayvonlarda yorug'lik sezuvchi organlari bo'lib, ular orqali fototaksis (yoritilgan tomonga harakatlanish) amalga oshadi. Kovakichaklilardan tortib deyarlik hamma hayvonlarda yorug'lik sezuvchi a'zolar mavjud.

Ayrim hayvonlar (ukki, ko'rshapalak) faqat kechasi faol hayot kechiradi, ayrimlari esa doimo qorong'i sharoitda yashashga moslashgan (askarida, ko'rsichqonlar).

Ko'pchilik hayvonlar uchun yorug'lik fazoda mo'ljal olishda yordam beradi. Masalan, asalarilar asal shira ko'p bo'lgan joylarni bildirish uchun iniga qaytgach uzoq muddat davomida gir aylanib quyosh bilan oziqa joylashishiga nisbatan ma'lum burchak hosil qilgan xolda to'xtaydi. Qushlar esa uzoq joylarga uchib ketayotganda quyoshga qarab mo'ljal oladi. Dengiz va okean suvlari tagida yashaydigan jonivorlar va quruqlikda yashaydigan ba'zi qo'ng'izlar o'z tanasidan nur chiqarish xususiyatiga ega. Bu hodisa *biolyuminestsentsiya* deb ataladi. Biolyuminestsentsiya hayvonlar uchun signal vazifasini o'taydi. Ular jinsiy marosim, dushmandan himoyalaniish, o'ljaga tashlanish kabi jarayonlarni amalga oshiradi.

Yorug'lik hayvonlarning rivojlanishiga ham ta'sir ko'rsatadi. Masalan, uzoq muddatda yorug'lik ta'sir ettirilganda hasharotlar va sut emizuvchi hayvonlarda jinsiy balog'atga yetish tezlashadi. Ba'zi hasharotlar kun qisqarishi natijasida ko'payish jarayonini to'xtatadi, kun uzayishi bilan esa ko'payish qayta tiklanadi. Buning sababi shuki, uzun kun bosh miyadagi gepofiz beziga ta'sir etib, ichki sekretsia bezlari ishini kuchaytiradi va jinsiy bezlarga ham signal beradi.

2. Harorat ekologik omili

Er yuzidagi organizmlarning yashashi, rivojlanishi va tarqalishiga katta ta'sir ko'rsatuvchi eng muhim abiotik omillardan biri *haroratdir*.

O'simliklar va ko'pchilik xayvonlar tana haroratini birday saqlay olmaydi. O'simliklarning sovuqqa chidamliligi hujayralarda qand miqdorining ko'p bo'lishi natijasida hujayra shirasi kontsentratsiyasining ortishiga va suvning kamayishiga bog'liqdir. Harorat 0 °C dan past bo'lsa, urug' unib chiqmaydi. Binobarin har bir o'simlik urug'i unib chiqishi uchun *minimal*, *optimal* va *maksimal* harorat talab qiladi.

Sibirida o'sadigan tilog'och, qarag'ay, pixta va shu kabi daraxtlar – 70 °C gacha sovuqqa bardosh bera oladi. Bunday o'simliklar *psixrofil* o'simliklar deyiladi. O'rta Osiyoning jazirama issiq cho'llarida o'sadigan yantoq, qovul, saksavul, shuvoq, izen o'simliklari +60 +70 °C haroratga ham bardosh bera oladi. Ular *termofil* o'simliklar hisobanadi. O'simliklar uchun ularning butun vegetatsiya davrida oladigan foydali harorat yig'indisi ham jiddiy ahamiyatga ega. Agar harorat yig'indisi yetarli bo'lmasa o'simlik gullamaydi va hosilga kirmaydi. Masalan, o'rta tolali g'o'za navlarining to'la yetilib hosil berishi uchun harorat yig'indisi 1750-2000 °C bo'lishi kerak, ingichka tolali g'o'za navlari uchun esa bu ko'rsatkich 2000-3000 °C ni tashkil etadi.

Tana haroratini saqlay olish xususiyatlariga ko'ra hayvonlar *issiqqonlilar* va *sovuqqonlilar*, *oraliq guruhga kiruvchilarga* bo'linadi. Sovuqqonlilarga (poykiloterm) umurtqasizlar, baliqlar, suvda va quruqlikda yashovchilar, sudralib yuruvchilar kiradi. Ular o'zlari tana haroratini birday saqlay olmaydilar.

Evolyutsiya jarayonida issiqqonli organizmlar (gomoyoterm) tashqi muhit haroratining juda keng o'zgarishidan qat'iy nazar o'z tana haroratini doimiy holatda saqlashga moslashgandir. Issiqqonlilarga qushlar va sut emizuvchi hayvonlar kiradi.

Qushlarning tana harorati +40 °C dan yuqoriroq. Sut emizuvchilarniki esa +37 - +40 °C atrofida saqlanadi. Tana haroratining bir xil saqlashda to'rt kamerali yurakning paydo bo'lishi, nafas olish sistemasining takomillashishi ham katta ahamiyatga ega bo'lgan. Ularda harorat o'zgarmay saqlanishiga olib keladigan mexanizmlar bu qalin jun, patlar, teri osti yog' klechatkasi, ter bezlarining paydo bo'lishi, qon aylanishining nerv sistemasi orqali idora qilinishi va hokazolardir.

Oraliq guruhga kiruvchilar geteroterm organizmlar deb atalib, ular tanasi faol harakatda bo'lganda gomoyoterm hisoblanadi, uyquga

ketganda esa tana harorati pasayib, tanani termik idora qilish qobiliyati yo'qoladi. Bunday hayvonlarga yumronqoziq, ko'rshapalak, tipratikan, olmaxonlar kiradi.

3. Namlik ekologik omili

O'simlik va hayvonlar uchun suv muhim ahamiyatga ega. O'simliklarning tuproq va havo namligiga bo'lgan talabiga ko'ra ular kserofitlar, mezofitlar, gigrofitlar va gidrofitlarga bo'linadi.

Kserofitlar. Dasht va cho'llarda o'sadigan, qurg'oqchilikka chidamli o'simliklarga kserofitlar deyiladi. Kserofitlarda hujayralar kichik bo'ladi, hujayra po'sti qalinlashgan, barg mezofilida palisad parenxima yaxshi rivojlangan, barg tomirlari zich joylashgan, bargdagi og'izchalar soni ham ko'p bo'ladi. Kserofitlarga shuvoq, erman-shuvoq, izen, oq saksovol, qora saksovol, juzg'un, pista, teresken, kamforosma va shu kabilar kiradi.

Kserofitlarga oid maxsus bir guruh o'simliklar *sukkulentlar* deyiladi. Bu o'simlik organlarida maxsus suv g'amlovchi to'qimalari yaxshi rivojlangan bo'lib, ularda suv zahirasi saqlanadi. Bunday o'simliklarga kaktuslar, agavalar kiradi.

Kserofitlarning yana bir guruhi *sklerofitlar* hisoblanadi. Sklerofitlar qurg'oqchilikka chidamli, ko'p yillik, dag'al, ko'pincha barglari reduksiyalangan va tikanlarga aylangan, yaxshi rivojlangan mexanik to'qimaga ega bo'ladi. Ularga saksovol, yantoq, shuvoq, betaga va boshqalar kiradi.

Cho'l zonasidagi sho'rxok yerlarda esa danasho'r, seta, sarsazan va qizil sho'ra o'sib, ular *galofitlar* deb ataladi.

Mezofitlar. Nami yetarli bo'lgan tuproq va iqlim sharoitida o'sadigan o'simliklar mezofitlar deyiladi. Bu xil o'simliklar hujayralaridagi osmotik bosim kserofitlarga qaraganda pastroq, ya'ni 11-15 atmosfera orasida bo'ladi. Mezofitlarga ko'pchilik daraxt va aksari ekinlarning o'simliklari: g'oz, beda, makkajo'xori, qovun, tarvuz, pomidor, boyimjon hamda deyarli hamma mevali o'simliklar kiradi. Bu xil o'simliklarning ildizi uncha chuqur ketmaydi, lekin u kuchli tarqoqlanib, tuproq orasida katta hajmi egallab oladi.

Gigrofitlar. Namlik ko'p bo'lgan sharoitda, ya'ni daryo bo'ylari, o'tloqlar, hamda o'rmonlar orasida o'sadigan o'simliklar bo'lib, ularning barglari odatda yirik, kutikulasiz va tuksiz bo'ladi. Barg yuzasidagi og'izchalar doimo ochiq bo'lib, ular bargning ham ostki, ham ustki

qismida joylashadi. Ildizlari yerga chuqur kirmaydi, chunki ildizlar yoyilgan joy doimo nam bo'ladi. Ulardagi osmotik bosim 8-12 atmosferani tashkil etadi. Daryo va ko'l bo'ylarida o'sadigan savagich, qamish, qiyoq, ba'zi bir begona o'simlik turlari va madaniy ekinlardan, sholi gigrofitlarga misol bo'ladi.

Gidrofitlar. Suvga botib o'sadigan o'simliklar bo'lib, ularning organlarida mexanik to'qima deyarli rivojlanmaydi. Bu o'simliklarning suv yuzasida qolgan barglarning faqatgina ustki epidermisida og'izchalar joylashadi. Ostki suvga tegib turgan tomonida og'izchalar bo'lmaydi. Barglarda kutikula qavati deyarli rivojlanmaydi. O'simlik butun organlari yuzasi bilan suvni shimib olishi mumkin. Shu sababli bu xil o'simliklarda o'tkazuvchi to'qimalar ildiz tuklari ham yaxshi o'smagan, ildizning suv va mineral tuzlarni shimish qobiliyati ham past. Gidrofitlarga barcha suv o'tlari, gulli o'simliklardan chilim yoki suv yonog'i (Trapa natans), suv grechixasi (Polygonum amphiliium), vallesneriya (Vallesneria), elodea (Elodeae) va shu kabilar misol bo'la oladi.

Cho'l va dashtda yashovchi hayvonlarda ham suvsizlikka moslanish mavjud.

Kemiruvchilar, sudralib yuruvchilar, hasharotlar va boshqa mayda cho'l hayvonlari oksidlanish reaksiyalari natijasida hosil bo'ladigan suvlarni g'amlash hisobiga tanadagi suv muvozanatini saqlaydi, ayniqsa, yog'ning oksidlanishi natijasida ko'p miqdorda suv hosil bo'ladi. Shu tufayli cho'l da yashovchi hayvonlarda qalin yog' qatlamlari bo'ladi (tuyaning o'rkachi). Ko'pgina cho'l hayvonlarining qoplovchi qalin to'qimasi mavjudligi tufayli, ular teri orqali suvni bug'lantirmaydi, ularning ko'pchiligi kechasi hayot kechiradi, kunduz kunlari esa uylariga yashirib oladi.

Hayvonlar hayotida ham namlik yoki suv muhim ahamiyatga ega. Hayvonlarning suvga bo'lgan talabi uch xil yo'l bilan qondiriladi: 1) Bevosita suv ichish orqali; 2) O'simliklar bilan oziqlanish orqali; 3) Metobalizm, ya'ni tanadagi moylar, oqsillar va karbon suvlarning parchalanishi orqali.

Antilopalar, yo'lbarslar, jayronlar, fillar, sherlar, gienalar har kuni suv izlab uzoq masofalarga yo'l bosadilar. Ular uchun ovqat tarkibidagi suv yetarli bo'lmaydi. Ba'zi hayvonlar esa oziqa tarkibidagi suv bilan qanoatlanishga moslashgan. Bunday moslanishlar ham odatda uch xil bo'ladi: *yurish-turish* harakati orqali, *morfologik* va *fiziologik* moslanish.

Yurish-turish orqali moslanishda hayvonlar albatta, suvni izlab topish, yashaydigan joyini tanlash, in qazib unda yashash orqali moslashadilar.

Morfologik moslanish tanasining ustida chag'anoqlar, sovutlar, kalqon va tangachalar hamda kutikularlar hosil qilish orqali amalga oshiriladi. Masalan, shilliqqurt, toshbaqa, kaltakesak, qo'ng'izlar ana shunday moslashadilar.

Fiziologik moslanish esa, metabolitik suv hosil qilish orqali amalga oshadi. Masalan, odamlar tanasidan vazniga nisbatan 10 % gacha suv yuqotishi mumkin. Undan ortiq suv yuqotilsa organizm halok bo'ladi.

Hayvonlarning qurg'oqchil sharoitda moslanishlari ham juda xilma-xildir. Galapagos orollaridagi toshbaqalar suvni siydik qopida jamg'arilgan holda saqlaydi. Avstraliya cho'llaridagi qurbaqalarda ham shunday holat kuzatiladi. Tuyalar esa, to'plagan yog' miqdorini (o'rkachida) metabolik parchalash yo'li bilan organizmning suvga bo'lgan talabini qondiradi.

Biotik omillar

Biotik omillar – organizmlarning o'zaro ta'sirlari hisoblanadi. Jumladan, tirik organizmlarning o'zaro ta'sir etishining barcha ko'rinishlari (masalan: o'simliklarning hasharotlar yordamida changlanishi, raqobat, bir organizm tomonidan ikkinchisining iste'mol qilinishi, simbioz, parazitlik) va ularning tashqi muhitga ta'siridan iborat. Biotik omillar quyidagilarga bo'linadi:

a) fitogen – jamoadagi o'simliklarning bir-biriga ta'siri. Bunga o'simliklarning parazitlik, simbiozlik, mexanik ta'siri kiradi;

b) zoogen – hayvonlarning oziqlanishi, payhon qilishi va boshqa mexanik ta'sirlar kiradi;

c) mikrobiogen va mikogen – mikroorganizmlar va zamburug'larning ta'siri.

V.N.Beklemishev tasnifi bo'yicha, turlarning bir-birlari bilan aloqasi to'rt toifaga bo'linadi: *trofik, topik, forik va fabrik*.

Trofik aloqada bir tur ikkinchi tur bilan oziqlanadi.

Topik aloqa esa bir tur ikkinchi turning yashash sharoitini o'zgartirishda namoyon bo'ladi. Daraxtlar tanasida lishayniklarning yashashi, o'rmondagi daraxtlar tomonidan shu yerlarda o'suvchi o'simliklar hayotiga ko'rsatiladigan ta'sirlarda yaqqol ko'rinadi.

Forik aloqa bir turning tarqalishiga ikkinchi turning ta'sir etishi natijasida ro'yobga chiqadi. Ko'pchilik hayvonlar tomonidan o'simlik urug' va mevalarining tarqalishi bunga misol bo'la oladi. Bunday tarqalish aktiv yoki passiv holda o'tishi mumkin.

Bir turning o'ziga in qurishi uchun boshqa turning qoldiqlaridan foydalanishiga *fabrik* aloqa deyiladi. Chunonchi, qushlar in qurishi uchun daraxt barglari va shoxchalaridan yoki hayvonlarning jun va patlaridan ham foydalanadilar.

Antropogen omillar

Antropogen omillar – inson faoliyati ta'siridir.

Antropogen omil deganda, insonning xo'jalik faoliyati bilan bog'liq bo'lgan ta'sirlar tushuniladi.

Tirik organizmlarga juda ko'p omillar ta'sir ko'rsatadi. Ana shu omillarning ayrim organizmlarga ko'rsatgan ta'siri natijasi esa xilma-xildir. Omilning organizm hayoti uchun eng qulay darajasi - **optimum daraja deyiladi**. Har qanday ekologik omillarning eng yuqori darajasi maksimum va eng qo'yi darajasi minimum bo'ladi. Tabiiyki, har bir tirik organizm uchun u yoki bu ekologik omilning o'z maksimumi, minimumi va optimumi bo'ladi. Chunonchi, uy pashshasi +7°C dan +50°C gacha yashashi mumkin. Ular uchun yashashning optimum darajasi 36 - 40°C ni tashkil etadi.

Antropogen omilning salbiy tomoni: o'rmonlarning kesilishi, yaylovlarda nazoratsiz mol boqilishi, tuproq, suv, havoning ifloslanishi, sanoat chiqindilari bilan zaharlanish kabilar yuzaga keladi.

Tabiatdagi mavsumiy o'zgarishlar

Yil davomida harorat, namlik va boshqa xil ekologik omillar davriy o'zgaruvchanlikka egadir. Abiotik, ekologik omillarning mavsumiy o'zgarishlari o'z navbatida tirik organizmlar hayot faoliyatiga katta ta'sir ko'rsatadi. O'simlik va hayvonlarning o'sishi va rivojlanishi kun uzunligiga bog'liqdir. Bu hodisa *fotoperiodizm* deyiladi. Fotoperiodizm - tirik organizmlardagi fiziologik jarayonlar faolligining yorug' kun uzunligiga bog'liqligidir. Fotoperiodizm o'simliklardagi fotosintez jarayoniga ham bog'liq. Kun uzunligiga javob

reaktsiyasiga qarab, o‘simliklar *uzun kun*, *qisqa kun* va *neytral* o‘simliklarga bo‘linadi.

Qisqa kun o‘simliklari (kanop, tamaki, arpa va boshqalar) gullash fazasiga o‘tish uchun 12 soat yoki undan kamroq yorug‘likning davriyligini talab etadi.

Uzun kun o‘simliklari (kartoshka, bug‘doy, suli, javdar, zig‘ir) gullashi uchun 12 soat va undan ortiq vaqt davomida yorug‘lik zarur.

Neytral usimliklar. Bular uchun yorug‘lik davomiyligining ahamiyati yo‘q. Masalan, pomidor, qoqi o‘t kabi o‘simliklar.

Kun uzunligi hayvonlarning o‘sishi va rivojlanishiga ham katta ta‘sir ko‘rsatadi. Masalan, bizda ko‘p boqiladigan ipak qurti qisqa kunda yaxshi rivojlanadi. Fotoperiodizm qushlarning, sut emzuvchilarning va boshqa hayvonlarning urchish davriga, ularning embrional rivojlanishiga, tullashiga, migratsiyasiga, qishki uyquga ketishiga katta ta‘sir ko‘rsatadi.

Biomaromlar

Fotoperiodizm asosida o‘simlik va hayvonlarda evolyutsiya davomida maxsus davriy takrorlanib turuvchi biologik maromlar paydo bo‘lgan. Biologik maromlar - biologik jarayonlar jadalligining davriy takrorlanuvchi o‘zgarishidir. Biologik maromlar sutkali va yillik bo‘lishi mumkin. Sutkali biomaromlar yirik va ochiq rangli gullarda yaxshi ifodalangan. Ularning gullari bir kecha-kunduz davomida davriy ravishda ochilib-yopiladi. Bunday o‘simliklarga qarab vaqtni aniqlash mumkin. Shuning uchun ham ular “biologik soatlar”, deyiladi. Masalan, ertalab qoqio‘t, bo‘ztian kabilar ochilsa, ulardan keyin sachratqi, na‘matak gullari ochiladi. Kechga tomon xushbo‘y nomozshomgul ochilib, changlatuvchi hashoratlarni o‘ziga tortadi. Kecha-kunduz biomaromlariga o‘simliklarda sutka davrida fotosintezning o‘zgarishini, hayvonlarda harakatning, garmonlar sekretsiyasining, hujayra bo‘linishi tezligining o‘zgarishlarini misol qilib olish mumkin. Odamda ham nafas olish tezligi, arterial bosim va shunga o‘xshash jarayonlar kecha-kunduz davomida ritmik o‘zgarib turadi.

Yillik maromlarga o‘simliklarda xazonrezgilik boshlanib, qushlarni uzoqlarga uchib ketishi, qushlar va sut emizuvchilarni qish mavsumiga mosashishini misol qilish mumkin. Yillik maromlar ko‘pchilik turlarda endogen xarakterga ega (nafas olish, yurakning urishi, tana harakati) va ular tsirkan maromlar deyiladi.

Bilib qo‘ygan yaxshi!

Hayot shakli termini birinchi marta 1884 - yilda daniyalik botanik Ye.Varming tomonidan qo‘llanilgan. Uningcha, *hayot shakli* deganda o‘simlik vegetativ tanasining butun hayoti davomida tashqi muhit bilan garmoniyada ekanligini, urug‘dan toki halok bo‘lguncha bog‘liq shakl tushuniladi.

O‘simliklarning hayot shakliga doir turli tasniflar va sxemalar mavjud bo‘lib, bunday tasniflash Teofrast davridan boshlanadi. Teofrast barcha o‘simliklarni daraxt, buta, chala buta va o‘t o‘simliklar kabi shakllarga ajratgan.

D.N.Kashkarov (1945-y.) organizmlarning hayot shakliga ko‘ra, hayvonlarning harakatlanishi bo‘yicha quyidagi tasnifni bergan:

1. Suzib yuruvchilar.
2. Yerni qoplovchilar. Masalan: yer qazuvchilar.
3. Yer usti shakllari. Bular - in quradigan va in qurmaydiganlar, qoya hayvonlari.
4. Daraxtlarda o‘rmalovchilar.
5. Havo shakllari.

Bilib qo‘ygan yaxshi!

Agar barcha shart-sharoitlar qulay bo‘lib, ulardan biri yetarli miqdorda bo‘lmasa, uni *cheklovchi omil* deb yuritiladi. Masalan: gulli o‘simlik turlarini biror joyga iqlimlashtirishda ularni changlatuvchi hasharotlar *cheklovchi omil* bo‘ladi.

Estda tuting!

Amerikalik olim V.Shelford ortiqcha yoki yetishmaydigan omillarni chegaralovchi omillar hisoblab, buni *tolerantlik qonuni* deb ataydi. *Tolerantlik* (toleransiya – yunoncha soʻz boʻlib, chidamlilik degani) deganda, yashash sharoitining oʻzgarishiga organizmning chidamliligi tushuniladi. Gʻoʻza oʻsimligi hujayralari yozning jazirama issiq kunlarida ham 38°C dan yuqori haroratga chidab, yangi sharoitga maʼlum bir vaqtdan soʻng moslashadi.

Estda tuting!

Nemis kimyogari Yu.Libix 1840-yilda *oʻsimliklarning mineral oziqlanish nazariyasini* ilgari surib: “Asosiy ozuqa elementlaridan birortasining oʻsimlikka yetishmasligi uning hosildorligini pasaytirishi mumkin”, deydi. Bu - *Libixning minimum qonuni* deyiladi. Masalan: ortiqcha suv yoki azot tuproqda mikro miqdorda uchraydigan *bor* yoki *temir* elementlari yetishmasligining oʻrnini bosa olmaydi.

TEST TOPSHIRIQLARI

1. Ekologiyada muhit tushunchasi qanday ta'riflanadi?

1. O'simlik va hayvonlardan iborat bo'lgan muayyan maydon birligi. 2. Ijtimoiy-iqtisodiy tizim.

3. Tirik organizmlarni o'rab turgan fizik qurshov. 4. Yorug'lik, harorat, namlik.

2. Tirik organizmlar tarqalgan asosiy hayot muhitlarini ko'rsating?

1. Suv, tuproq, havo, tirik organizm. 2. Yer yuzasi, Quyosh sistemasi. 3. Tirik organizmlar, suv.

4. Havo, tuproq, koinot.

3. Ekologik omil deganda nimani tushunasiz?

1. Muhitning tirik organizm hayotiga ta'sir etuvchi elementlari.

2. Suv va uning barcha fizik va kimyoviy xususiyatlari.

3. Havo va uning kimyoviy tarkibi. 4. Tirik organizmlar: o'simlik, hayvon va bakteriyalar.

4. Abiotik omillar majmuini ko'rsating?

1. Edafik, fitogen, biotik. 2. Mikrobiogen, zoogen, relef. 3. Fiogen, zoogen, mikrobiogen.

4. Iqlim, tuproq, relef.

5. Hayvonlar hayotida yorug'likning ahamiyati nimada?

1. Fazoda mo'ljal olish, harakatlanish, oziqlanish. 2. Tana haroratini boshqarish. 3. Ko'payish.

4. Populyatsiya sonini boshqarish.

6. Biotik omillar majmuini ko'rsating?

1. Fitogen, zoogen, mikrobiogen, mikogen. 2. Orografik, fitogen, zoogen, mikrobiogen.

3. Mikrobiogen, kimyoviy, edafik. 4. Tarixiy, mikogen, yong'in, zoogen.

7. O'simliklarning hayotiy shakllari

1. Bir, ikki va ko'p yillik o'tlar. 2. Daraxt, buta, chala buta, butacha, o't.

3. Chala buta, daraxt, buta, o't. 4. Buta, bir va ikki yillik o'tlar.

8. Hayvonlarning hayotiy shakllari

1. Suvda va quruqda yashovchilar.

2. Sakrovchi, yuguruvchi, o'rmalovchi xususiyatga ega bo'lganlar.

3. Suzuvchi, kovlovchi, quruqlikda, havoda, daraxtda yashovchilar.

4. O'tlar, butalar orasida yashovchilar.



Savol va topshiriqlar

1. Tirik organizmlar qanday muhitlarda tarqalishini tushuntiring?

2. *Moslashish* tushunchasini izohlab bering?

3. *Ekologik omillarni* sanab bering?

4. *Ekologik omillar* orasida *antropogen omilning* o'rni qanday kechmoqda?

5. O'simliklarning qanday hayotiy shakllarini bilasiz?

6. D.N.Kashkarov hayvonlarni harakatlanish bo'yicha qanday guruhlariga ajratgan?

7. Ekologik nisha nima?

IV BOB. POPULYATSIYA VA EKOTIZIMLAR EKOLOGIYASI

6-§. Populyatsiya haqida tushuncha

Populyatsiya deganda, ma'lum hududni egallagan bir tur doirasidagi organizmlarning guruhini tushunamiz.

Populyatsiyalar ekologiyasining asoschisi ingliz olimi Ch.Elton bo'lib, *populyatsiyalar ekologiyasi fani* 1930-yilda vujudga keldi. Kam uchraydigan va yo'qolib ketayotgan turlarni qo'riqlashning ilmiy asoslarini *populyatsiyalar ekologiyasi* ishlab chiqadi. Populyatsiyaning muhim xususiyatlaridan biri - o'zini son jihatdan idora etishdir.

Populyatsiyalar ekologiyasining predmeti populyatsiyaning tuzilishi, dinamikasini, yoshi va jinsini o'rganishdan iborat. Chunki, ular hosildorlik va ko'payish xarakterini ko'rsatadi, bu esa yashash sharoitiga moslashish o'lchamini yuzaga keltiradi. Populyatsiyalar ichida organizmning o'sishi, rivojlanishi tashqi muhitga qarab o'zgarib boradi.

Populyatsiyaning soni va zichligi

Populyatsiya quyidagi belgilar bilan xarakterlanadi:

- Populyatsiyaning soni. Har bir maydondagi populyatsiyaning soni, avvalo uning shu hududdagi miqorini kamayib yoki ko'payib ketishini o'rganish uchun zarur bo'ladi.

- Zichlik (ma'lum maydon birligiga to'g'ri keluvchi organizmlar soni tushuniladi). Populyatsiyada absolyut va nisbiy zichliklar ajratilib, absolyut zichlik ma'lum maydon birligiga to'g'ri keluvchi populyatsiyaning miqdori bo'lsa, nisbiy zichlik ma'lum maydon birligidagi individlar sonini bildiradi. Nisbiy zichlik orqali populyatsiyaning ko'payishi yoki kamayishi haqidagi ma'lumotlar o'rganiladi. Populyatsiyaning zichligi vaqt davomida o'zgarib turadi. Har qanday o'zgarishning quyi va yuqori chegaralari, shuningdek o'rtacha o'lchamlari bo'ladi. Populyatsiya zichliining yuqori chegarasi individlar sonining ortib ketishi va o'z-o'zini cheklashi bilan bog'langan, quyi chegarasi esa populyatsiyaning kelajakda yashay olishi yoki o'limga yuz tutishi, yani minimal o'lchamga tushib qolishi bilan belgilanadi. Har bir populyatsiya ma'lum sharoitda o'rtacha zichlikka ega bo'ladi, bunda barcha hayotiy jarayonlar samarali borib, uning natijasi populyatsiyaning yuqori mahsuldorligi, hayotchanligi va

boshqalarda ko'rinadi. Ushbu qonuniyat ekologiyada Olli qoidasi deb nom olgan (A.To'xtaev, 1998).

Turning populyatsion tuzilmasi

• **Jins tuzilmasi.** Populyatsiyaning jins tuzilmasi turli yoshdagi guruhlardagi erkak va urg'ochi individlarning son jihatdan nisbatidir. Populyatsiyadagi jinslar nisbati, birinchidan, jinsiy xromosomalarning qo'shilishi bilan, ya'ni genetik qonuniyatlarga bog'liq bo'lsa, ikkinchidan, ma'lum darajada tashqi muhit ham ta'sir etishi mumkin. Masalan, ўрмон чумолилари ҳарорат -20°C дан паст бўлганда фақат эркек чумолилар, юқори ҳароратда эса деярли ургочи чумолилар ривожланади.

• **Yosh tuzilmasi.** Populyatsiyaning yosh tuzilmasi qayta tiklanishning jadalligi, nobud bo'lish darajasi va nasllar gallanishining tezligi kabi muhim jarayonlarni ifodalaydi. Fitotsenozdagi muayyan turlarning, har xil holatlardagi individlarning yig'indisi *isenopopulyatsiya* deb ataladi. Uni agar gulli o'simliklar misolida ko'radigan bo'lsak, unga tuproqda (yoki uning yuzasida) o'z hayotchanligini yo'qotmagan urug'lar, nihollar va har xil yoshdagi individlar kiradi. Populyatsiyaning yosh tuzilmasi o'simlik va hayvonlarda ham bir necha omillarga bog'liq. Birinchi navbatda balog'atga, voyaga etish vaqti, umr ko'rish muddati, ko'payish davri muddati, avlodlar davomiyligi, ota-onasidan bir vaqtda tug'iladigan individlarning bunyodga kelish muddati, har xil jins va yoshdagi individlarning nobud bo'lish xarakteri, populyatsiyaning son jihatdan o'zgarib turish dinamikasi kabilarga bog'liq.

T.A.Rabotnov o'simliklar jamoasidagi o'simliklarning hayotini quyidagi asosiy yosh davrlariga ajratadi:

A) Latent davri. Bunda o'simlik spora, urug' yoki mevalar holida tinim davrida uchraydi. Tinim davri har xil o'simliklarda turlicha davom etadi. Masalan, terakning urug'i hayotchanligini 3-4 kundan to 3 haftagacha saqlay oladi, ba'zi bir begona o't o'simliklar esa urug'ining hayotchanligini bir necha o'n yillab saqlay oladi. Tuproqda turli o'simliklarning ko'p sonidagi urug'larini topish mumkin. Ular qulay sharoit vujudga kelganda unib chiqish xususiyatiga ega. Shu bilan birga har yili yangi urug'lar tuproqqa tushib turadi.

B) Virgil davri. Bu davr o'simlikning nihollik, yosh o'simlik va voyaga etgan holatidir. Nihollar yosh o'simliklardan urug'palla barglarining bo'lishi bilan farqlanadi.

V) Generativ davr. O'simlik hayotida sporalar yoki urug'lar bilan ko'payishning boshlanishi bilan tavsiflanadi.

G) Senil (qarilik) davri. O'simlikning yoshi ortishi bilan generativ ko'payish xususiyati yo'qoladi, ana shunga senil davri boshlanadi.

T.A.Rabotnov bo'yicha, quyidagi populyatsiya turlari mavjud:

1. Invazion turdagi populyatsiya. O'simlik jamoasiga endigina kirib kelayotgan populyatsiya tushuniladi.

2. Regressiv turdagi populyatsiya. Bu populyatsiya generativ ko'payish xususiyatini yo'qotgan turlarni o'z ichiga oladi.

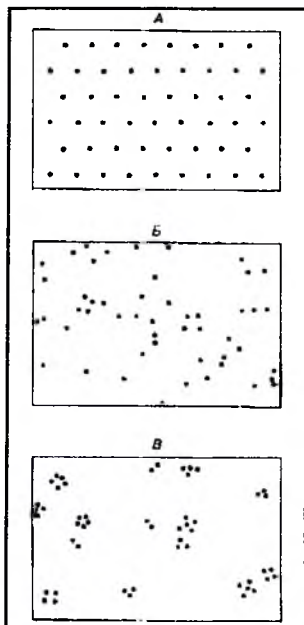
3. Normal turdagi o'simliklar populyatsiyasi. Bu populyatsiyadagi o'simliklar barcha vegetatsion davrlarni o'z ichiga oladi va ular jamoaning asosiy populyatsiyasi hisoblanadi.

Populyatsiya genetik xarakterga ham ega bo'ladi. Bular quyidagilar:

1. Moslashuvchanlik.
2. Reprodukativ moslashganlik.
3. Uzluksizlik.

• **Populyatsiyaning fazoviy tuzilmasi** populyatsiya maydonidagi ayrim individlar va guruhchalarning tarqalish xarakterini ifodalaydi. Individlarning uch turdagi tarqalishi ma'lum: bir tekis, tasodifiy va guruhli (to'da-to'da). Individlar bir tekis tarqalganda xuddi mevali daraxtlar bog'da o'tkazilganidek, bir-biriga nisbatan bir xil masofada joylashadi. Tasodifiy tarqalishda individlar bir-biridan har xil masofada joylashadi. Bunday joylashish populyatsiyaning zichligi kam bo'lgan bir xil muhitda uchraliladi (1-чизма).

1-чизма



Hayvonlar populyatsiyasining xulqiy hatti-harakat tuzilmasi

Hayvonlarning ancha yirik birlashmalari podalar, galalar va kolonivalar hisoblanib, ularning shakllanishida populyatsiyalardagi xulqiy munosabatlar yanada murakkablashadi.

• Kolonivalar o'troq hayot kechiruvchi hayvonlarning birgalikdagi yashashidir. Ular uzoq vaqt yoki ko'payish oldidan birga yashashi mumkin.

• Galalar bir turga kiruvchi ba'zi guruh hayvonlarning biron-bir biologik jihatdan foydali harakatni amalga oshirish uchun vaqtinchalik birlashishi hisoblanadi.

• Podalar galalarga nisbatan hayvonlardagi ancha uzoq muddat davomida doimiy birlashish shaklidir. Podalar odatda tur uchun xos bo'lgan barcha funksiyalarni, ya'ni ozuqa topish, yirtqichdan saqlanish, migratsiya, ko'payish va bolalarni tarbiyalash kabilarni amalga oshiradi. Podalardagi hayvonlarning guruhli xulqiy xatti-harakatlari "hukmdor" va "itoatkor" asosidagi o'zaro munosabatlardan tashkil topadi.

Populyatsiyalar dinamikasi

Hozirgi vaqtda *antropogen omillar* ta'sirida, meyorsiz foydalanish natijasida, dorivor o'simliklar populyatsiyalaridagi organizmlar yo'qolib ketmoqda. Bunday holatlarning oldini olish uchun populyatsiyalarni monitoring yo'li bilan kuzatish va tiklash chora-tadbirlarini ishlab chiqish zarur bo'ladi.

Populyatsiyaning dinamik tavsifi quyidagilarni o'z ichiga oladi:

1. Tug'ilish va mahsuldorlik.
2. Nobud bo'lish.
3. Hayotchanlik. Populyatsiyadagi individlarning tug'ilishi bilan nobud bo'lish o'rtasidagi farq hayotchanlik deb qaraladi.
4. Ko'payishning sof tezligi. Bunda urg'ochi jinsning butun umri davomida qoldirgan avlodlarining o'rtacha soni tushuniladi.
5. O'sish tezligi va populyatsiyalar sonining ortishi. Populyatsiyalarning o'sishini ikki omil boshqaradi. Birinchi omil-organizmning tug'ma qobiliyati, ya'ni maksimal tezlik bilan ko'payish (biotik potentsiyal ham deb ataladi). Ikkinchi omil-muhitning tazyiqi, ya'ni u biotik potentsial bilan amaldagi o'sish tezligi o'rtasidagi farqda ko'rinadi. Muhitning tazyiqi o'z ichiga suv, yorug'lik, ozuqa, fazo, uya qurish uchun joy kabi resurslarni oladi.

Populyatsiya gomeostazi (yunoncha “gomeo” – o‘xshash, statis - holat) – organizmning o‘z ichki muhiti tarkibi va xossalari doim bir me‘yorda, nisbiy dinamik turg‘unlikda saqlay olish xususiyatidir. Gomeostaz asosida teskari aloqa printsipli yotadi. Gomeostaz kontseptsiyasi F. Kliments tomonidan (1979) ishlab chiqilgan va keyinchalik u ekotizimda qo‘llanilgan. Populyatsiyaning zichligini boshqarish o‘simliklarda hududni hisobga olgan holda o‘z-o‘zini siyraklantirish, vegetativ quvvatini oshirishda namoyon bo‘lsa, hayvonlarda esa ozuqa zahiralari cheklangan holatda ro‘y beradi. Ko‘pchilik turlar populyatsiyasining o‘shishini sekinlashtiruvchi mexanizmlardan biri individlarning o‘zaro kimyoviy ta‘sir etishidir.

Organizmlarning populyatsiya nuqtai nazaridan, ma‘lum maydonda **tirik qolishning ekologik strategiyasi** farqlanib, bu organizmlarning yashab qolishi uchun harakati hisoblanadi. XX asrning 30-yillarida A.G.Ramenskiy (1938) o‘simliklarni o‘shishi uchun 3 etapni keltirib o‘tadi:

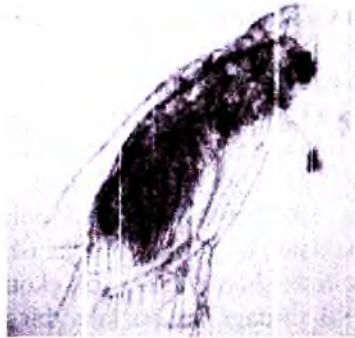
1. Violentlar (lot. *violentia* – **zo‘rlik, zo‘ravonlik**) yoki konkurentlar (raqiblar) – o‘rmonzor hosil qiluvchi turlar (1-rasm).

2. Patientlar (lot. *patientia* – **chidamli, bardoshli yoki stress-tolerantlar**) – noqulay sharoitlarda yashab qolishga moslashgan turlar (soyasevarlar, sho‘rga chidamli o‘simliklar) (2-rasm).

3. Eksplrentlar (lot. *explere* – **to‘ldirmoq yoki ruderal**) (to‘ldiruvchilar) – buzilgan yerlarda tez paydo bo‘luvchi turlar (3-rasm).



1-rasm. Violent. Daphnia pulex (Romanovskiy Yu.E. (1989 y.))



2-rasm. Patient. *Diaphanosoma brachiurum*



3-rasm. Eksplerent. *Moina sp.*



Savol va topshiriqlar

1. Populyatsiya tushunchasini izohlab bering?
2. Populyatsiyaning xarakterli belgilarini tushuntiring?
3. Populyatsiyaning genetik xarakterini izohlang?
4. Populyatsiyalar ekologiyasining qanday ahamiyati bor?

7-§. Ekotizim va biogeotsenozlar haqida tushuncha

Ekotizim deb, birga yashovchi har xil organizmlar va ularning yashash muhiti orasidagi qonuniyatli bog‘lanishga aytiladi. Ekotizimlarga cho‘l, o‘rmon, o‘tloqzor yoki hovuzlar misol bo‘la oladi. “*Ekotizim*” tushunchasi ilk bor ingliz ekologi A.Tensli (1935-yil.) tomonidan qo‘llanilgan. Ekotizim tabiiy yoki butunlay sun‘iy hodisa bo‘lishi mumkin. Funktsional birlik bo‘lganish uchun qo‘shni ekotizimlardan ajralib turishi shart emas. Yirik ekotizimlar odatda odam ta‘sirida bo‘ladi. Har xil turdagi organizmlar bir-birlariga va tevarak atrofdagi jonsiz tabiatga har tomonlama moslashgan va bunday uzviy bog‘lanishlar biotsenozlarni tashkil etadi.

Boshqacha aytganda, quruqlikdagi yoki suv havzalaridagi muayyan maydonlarda tarqalgan o‘simlik, hayvon, zamburug‘ va mikroorganizmlarning o‘zaro birgalikdagi yig‘indisi *biotsenoz*ni anglatadi. *Biotsenoz* – biogeotsenozning bir qismidir. Biotsenoz uchun konsortsiyaar xarakterlidir.

Konsortsiya tushunchasi fanga V.N.Beklemishev va L.G.Ramenskiylar tomonidan kiritilgan. L.G.Ramenskiy moddalar almashinuvi nuqtai nazaridan o‘simliklar hamjamoasidagi hayoti va taqdiri bir-biri bilan chambarchas bog‘langan hamda umumiy bo‘gan har xil organizmlarning majmuini konsortsiyalar deb qaraydi. Masalan, yong‘oq o‘simligi tuproqdagi hamkorlikda yashaydigan zamburug‘lar bilan birga tana va shoxlaridagi epifit hodda yashayotgan moxlar va lishayniklar, to‘qimalaridagi parazit zamburug‘lar hamda juda ko‘p bo‘g‘imoyoqlilar bilan murakkab konsortsiyani tashkil etadi.

Biogeotsenoz (“*bios*” – hayot, “*geo*” – yer, “*senoz*” – jamoa) tushunchasini rus botanik olimi, akademik V.N.Sukachev 1940-yilda taklif etgan. Muayyan tuproq sharoitida o‘simliklar, hayvonlar va zamburug‘lar hamda ayrim soddahayvonlardan tashkil topgan mikroorganizmlarning birgalikda yashashi *biogeotsenoz*ni bildiradi. Biogeotsenoz tabiiy hodisa hisoblanib, ma‘lum tabiiy chegaraga ega bo‘lgan fazoviy birlik; u qo‘shni biogeotsenozlardan fitotsenoz bilan ajralib turadi. Biogeotsenoz tarkibiga odam kirmaydi. Uning asosiy komponentlari atmosfera, tog‘ jinslari, suv, o‘simlik va hayvonot dunyosi sanaladi. Darhaqiqat, uning organik dunyosi (o‘simliklar, hayvonlar, zamburug‘lar, mikroorganizmlar) *biotsenoz* deb atalib, muhit esa *ekotop* deyiladi.

Biotsenoz komponentlari o'rtasida o'zaro munosabatlar turli xil shaklda bo'ladi. Ana shunday munosabatlarning bir necha xillari bo'lib ular quyidagilardan iborat.

1. Neytralizm – (0:0) bunda ikki populyatsiyadagi asotsiatsiyalarda o'zaro ta'sir sezilmaydi, ikki populyatsiya individlari ham deyarlik bir xilday yashaydi. Masalan, sherlar o'tlar bilan oziqlanmasalar ham, savannalardagi yaylovlarning holati ular uchun befarq emas. Chunki ularning ovqati bo'lmish antilopalar hosildor yaylovlarda ko'p bo'ladi.

2. Konkurentsia (raqobatlilik) (-,-) - bunda ikki populyatsiyalar bir-birlariga to'sqinlik qiladilar. Ya'ni bir populyatsiya ikkinchi populyatsiya bilan defitsit resurslarni o'zlashtirishda kurashadilar.

3. Amensalizm (-,0) - bunda bir populyatsiya o'ziga zarar keltirmasdan ikkinchi populyatsiyaning yashashiga to'sqinlik qiladi yoki uni o'sishga qo'ymaydi. Amensalizmga tipik misol qilib antibiotik zamburuqlar - aktinomitsetlar yoki o'simlik fitontsidlarining parazit mikroorganizmlarga ko'rsatgan ta'sirini olish mumkin. Amensalizm hodisasini suvning gullashida ham ko'rish mumkin, ya'ni ko'payib chiriyotgan ko'k – yashil suvo'tlardan ajralib chiqqan toksinlar (zaharli moddalar) ko'pchilik zooplanktonlarning o'limiga sabab bo'ladi yoki ularni siqib chiqaradi.

4. Parazitizm va yirtqichlik - bunda bir populyatsiya ikkinchi populyatsiyaga hujum qilib, uning yashashiga zarar keltiradi, biroq o'zining kelgusidagi hayoti ham o'ljasiga bevosita boqliqdir. Agar jamoadagi bir populyatsiya yirtqich (birlamchi konsument)- odatda hayvonlar o'ljasi yoki "xo'jayini" - birlamchi produtsent (o'simlik) bo'lsa, ular o'simlikxo'rlar deyiladi. Agar bir populyatsiya ikkinchi populyatsiya uchun zararli bo'lgan moddalarni ishlab chiqsa, bunda allelopatiya yoki antibioz mikroorganizmlar deyiladi.

5. Kommensalizm - bunda bir populyatsiya ikkinchi populyatsiya bilan birlashganda foyda ko'radi, bu birlashish ikkinchi populyatsiya uchun esa ahamiyatsiz yoki uning uchun befarq bo'ladi. Bu birlashish simbiozning shunday bir shakli, bundagi partnyorlarning bittasi ikkinchisiga (xo'jayiniga) tashqi muhitga bo'lgan munosabatlarini bajarishni yuklaydi, o'zi esa tashqi muhit bilan to'g'ridan-to'g'ri bog'lanmaydi. Ular orasida antoganizm ham bo'lmaydi. Umumiy maydon, substrat, oziqa, harakatlanish-kommensial munosabatlarning asosini tashkil etadi. Masalan, daraxtlarda in qurib yashovchi qushlar, akulalarda yopishib yashovchi lotsman baliqlari, axlatlar bilan

oziqlanadigan sinantrop yumronqoziq populyatsiyalari va qushlar ham kommensalizmga misol bo'la oladi.

7. Kooperatsiya - ikki organizm bir-birlari bilan kooperatsiya hosil qiladilar. Bunday kooperatsiya ikki organizm uchun ham ustunliklarga ega. Masalan, krablar bilan kovakichlilar bunga misol bo'la oladi. Kovakichlilar krablarning orqasiga yopishib olib (ba'zan ularni krablarning o'zlari o'tqazib oladilar) ularni dushmanlardan, himoya qiladilar. Kovakichlilar esa o'z navbatida krablardan transport vazifasida foydalanadilar hamda ulardan qolgan ovqat qoldiqlari bilan ovqatlanadilar.

8. Mutualizm. Birlashgan ikki populyatsiya ham faqat foyda ko'radi, bu birlashish ular uchun foydalidir, bunday birlashgan organizmlar tabiiy sharoitda biri ikkinchisiz hayot kechira olmaydi. Masalan, termitlar va ularning ichaklarida yashovchi xivchinlilar bunga yaqqol misoldir. Bunda xivchinlilar termitlar qabul qilgan kletchatkani hazm qilishga yordam beradilar, chunki termitlar kletchatkani mustaqil o'zlashtira olmaydilar. Xivchinlilar ham termitlarsiz yashay olmaydilar. Chunki ular uchun yashash sharoiti termitlar ichaklaridir.

9. Turlar o'rtasidagi munosabatlarning ikki va undan ko'p tur uchun qulaylik tug'diradigan xilini o'zaro yordam deyiladi. Masalan, hasharotlar yordamida changlanadigan o'simliklar changni bir o'simlikdan ikkinchi o'simlikka olib o'tadigan va shu bilan o'simliklarning chetdan changlanishini ta'minlaydigan hasharotlarga muhtojdir.

Ekotizimlar biogeotsenozga nisbatan kengroq tushuncha hisoblanadi. Ekotizimda moddalar aylanishini ta'minlash uchun ma'lum miqdorda kerak bo'ladigan anorganik moddalar zahirasi va bajarayotgan ishi jihatidan uch xil ekologik guruhni tashkil etuvchi organizmlar bo'lishi zarur.

Birinchi guruhga o'simliklar kirib, ular *produtsentlar* deyiladi. *Produtsentlar* assimilyatsiya jarayonida to'plangan energiyasini boshqa organizmlarga beradi.

Ikkinchi guruhga hayvonlar kiradi. Ular o'simliklar tomonidan to'plangan organik moddani iste'mol qiluvchilar hisoblanadi va *konsumentlar*, deb ataladi. Konsumentlarni birinchi, ikkinchi, va uchinchi tartiblardagi konsumentlarga ajratamiz.

1-tartibdagi konsumentlarga produtsentlar bilan oziqlanuvchi o'txo'r hayvonlar kiradi.

2-tartibdagi konsumentlarga hashoratlarning ko'pchilik vakillari, sudralib yuruvchilar, qushlar va sut emizuvchilar kiradi.

3-tartibdagi konsumentlarga sut emizuvchilarning o'txo'r guruhlari, kemiruvchilar va tuyoqlilar kiradi.

Uchinchi guruhga mikroorganizmlar kiradi. Nobud bo'lgan o'simlik va hayvonlardagi organik moddalar mikroorganizmlar, ya'ni saprofit holda yashovchi bakteriyalar va zamburug'lar ta'sirida parchalanadi. Bunday organizmlar *redutsentlar*, deb ataladi.

Bilib qo'ygan yaxshi!

Olimlar hisobiga ko'ra, tabiatda o'simlik, hayvon va mikroorganizmlarning 10 millionga yaqin turlari mavjud. Ammo, ularning atigi 1,4 million turigagina nom berilgan bo'lib, qolganlari hali o'rganib chiqilmagan.

Ekotizim va *biogeotsenoz* tushunchalari bir-birining sinonimi sifatida qo'llaniladi, biroq ba'zi farqlar mavjud. Ya'ni *biogeotsenoz* tarkibiga odam kirmaydi. *Yirik ekotizimlar*, odatda, odam ta'sirida bo'ladi. *Biogeotsenoz* tabiiy hodisa hisoblansa, *ekotizim* tabiiy yoki sun'iy hodisa bo'lishi mumkin.



Savol va topshiriqlar

1. *Ekotizim* tushunchasini izohlab bering?
2. Biotsenoz, biogeotsenoz tarkibiy qismlariga nimalar kiradi?
3. *Biogeotsenoz* va *ekotizim* tushunchalari orasidagi farqni tushuntiring?
4. *O'zbekiston ekotizimlari* haqida to'xtaling?

8-§. Ekotizimda energiya oqimi va biologik mahsuldorlik. Ekotizimlarning o'zgarishi (Oziqa zanjiri, ekologik piramida va suksessiya)

Ma'lumki, yashil o'simliklar hayot uchun zarur bo'lgan kimyoviy moddalarni olib, fotosintez jarayonida organik birikmalar to'playdi va quyosh energiyasi kimyoviy energiyaga aylanadi. Ular hayvonlarga ozuqa beradigan tirik moddaning asosiy qismini tashkil etadi. Havo tarkibidagi kislorod va karbonat anhidrid gazlarining miqdorini tiklaydi va suvning aylanish jarayonida qatnashadi. Bunday organizmlar avtotrof organizmlar deyiladi. O'simliklar va boshqa jonivorlar bilan oziqlanib yashovchi geterotroflar esa oziqlanish jarayonida organik moddalarni karbonat anhidrid, suv va mineral tuzalarga aylantiradi. SHunday qilib, ekotizimdagi energiya oqimi avtotrof va getrerotrof organizmlar o'rtasida boradi. Geterotrof organizmlar safiga kiruvchi redutsentlar murakkab organik moddalarni mineral birikmalarga aylantiradi.

Demak, avtotrof organizmlar o'plagan mahsulot va undagi energiya boshqa organizmlar o'rtasida ozuqa zanjiri orqali taqsimlanadi.

Oziqa zanjiri deb, har bir organizm o'zidan keyinda turgan organizm uchun ozuqa bo'lib xizmat qilishi tushuniladi. U organizmlarning trofik darajasiga ko'ra uch-besh halqadan iborat:

1. *Produktentlar* (o'simliklar).
2. *Birinchi darajali kontsumentlar* (o'txo'r hayvonlar).
3. *Ikkinchi darajali kontsumentlar* (o'txo'r hayvonlar biomassasi bilan oziqlanuvchi etxo'r hayvonlar).
4. *Uchinchi darajali kontsumentlar* (etxo'r hayvonlar biomassasi bilan oziqlanuvchi etxo'r hayvonlar).
5. *Produktentlar va 1, 2, 3-darajali kontsumentlar biomassasi bilan oziqlanuvchi to'rtinchi darajali kontsumentlar.* Organizm tomonidan oziqa bilan qabul qilingan energiya oziqa zanjiri bo'ylab organizmdan – organizmga o'tishda zanjirning har bir halqasida birin-ketin kamayadi va oxirida yo'qolib ketadi.

Masalan: tariq – hashorat – qurbaqa – ilon - kalxat.

Demak, ozuqa zanjiridagi har bir bo'g'inning o'rni *trofik darajani* tashkil etadi. Trofik zanjirlar fotosintez hosil qiluvchi organizmdan boshlansa, sarflanish zanjiri deyiladi. Masalan, o'simlik – kiyik – bo'ri – tariq – hashorat – qurbaqa – ilon – kalxat. Agar ozuqa zanjiri o'simlik qoldiqlari, hayvon jasadida yoki chiqindilardan boshlansa, parchalanish

(detrit) zanjiri deyiladi. Masalan, to'kilgan barg – yomg'ir chuvalchangi – qorayaloq – qirg'iy. Trofik darajalar o'rtasidagi *energiya oqimi* turli ekotizimda turlicha boradi.

Ekotizimlarning biologik mahsuldorligi

Ekologik piramida (grekcha, piramidos – ko'p qirrali + oikos - uy, vatan) – *biomassa piramidasining o'zi* deyish mumkin, ammo undan farqi shundaki, *ekologik piramida* quyidagi 4 ta qoidaga asoslanib quriladi:

1) ikkilamchi biomahsulotning vazni birlamchi biomahsulot vaznidan doimo kam bo'ladi;

2) iste'mol qilinadigan organizmlarning vazni iste'mol qiluvchilar vaznidan doimo ko'p bo'ladi;

3) biomahsulot hosil qilish tezligi ikkilamchi biomahsulot hosil qiluvchilarning qisqa yashaydiganlarida ularning uzun umr ko'radiganlariga nisbatan tez kechadi (serpushtlik, tez ko'payish va vazn o'rtirish tezligi hisobiga);

4) ekologik piramidaning yuqori pog'onalariga ko'tarila borgan sari organizmlar soni kamayadi. Dastlab, *ekologik piramida* Ch.Elton tomonidan tuzilib, u *sonlar piramidasi*, deb atalgan.



Shunisi e'tiborliki, *ozuqa zanjirlarining* keyingi bo'g'inlarida biomassa tobora kamayib boradi. Bu haqda ingliz biolog olimi Lamott (1969 y.) o'zining *ekologik piramida qurilishi tamoyilini* rasmdagi shaklda taklif etdi.

Ekotizimlarning o'zgarishi

Suksessiya (lot. "succession" – vorislik, meros olish) - inson faoliyati yoki tabiiy omillar ta'sirida yer yuzining muayyan joyida biotsenozlarning ma'lum tartibda, birin-ketin almashishi. *Ekologik suksessiya* ("sukseido" – ketma-ketlik, degan ma'noni bildiradi) deb atalib, *ekotizimlarda* kuzatiladigan qonuniyat hisoblanadi.

Birlamchi va ikkilamchi *suksessiyalar* farqlanadi.

Birlamchi suksessiya – hali tuproq hosil bo'lmagan substratda (tog' toshlari, yangi allyuvial cho'kindilarda) biotsenozlarning endigina o'zgarishga boshlagan jarayoni bo'lib, bu jarayon natijasida nafaqat o'simliklar paydo bo'ladi, balki tuproq ham hosil bo'ladi.

Ikkilamchi suksessiya ma'lum bir joyda shakllangan biotsenozlarning buzilib ketishidan (eroziya, qurg'oqchilik, yong'in, o'rmonni kesib yo'qotish, vulqonlar otilishi, tog'-kon ishlari va hokazolar natijasida) kelib chiqadigan *biotsenozlar almashinishi*. Masalan: botqoqning qurtilishi natijasida botqoqlik biogeotsenozi o'tloq biogeotsenozi yoki agrotsenoz (sun'iy) bilan almashinadi. Yong'indan keyin o'rmon biogeotsenozi o'rniga o'tloq biogeotsenozi hosil bo'ladi.

Suksessiya yakunida juda sekin rivojlanadigan klimaks hamjamoalari hosil bo'ladi. Masalan: *klimaks jamoalar* quyidagicha bo'ladi: Bo'sh yer – lishayniklar – mox – qirqquloqlar – butalar – o't - o'simliklar – daraxtlar.

TEST TOPSHIRIQLARI

1. Populyatsiya tuzilmasini aniqlang.

1. Jins, fazoviy, yosh, xulqiy. 2. Fazoviy, yosh, genetik. 3. Fiziologik, morfologik, biokimyoviy.

4. Xulqiy, biokimyoviy, fazoviy.

2. Populyatsiyaning gomeostazi

1. Urug'larning to'liq hayotchanlikka ega emasligi. 2. Urug' va mevalarning turli yo'llar bilan tarqalishi.

3. Populyatsiyaning son jihatdan bir me'yorda saqlanib turishi.

4. Vegetativ, jinsiy-va jinsiz usulda ko'payishi.

3. Populyatsiyaning yosh tuzilmasi

1. Latent, virgil, generativ, senil davri. 2. Normal, generativ, invazion.

3. Normal, generativ, regressiv. 4. Virgil, generativ, senil davri

4. Populyatsiyaning fazoviy tuzilmasi

1. Bir tekis, tasodifiy, guruhli. 2. Tasodifiy, guruhli, tarqoq.

3. Guruhli, tarqoq, koloniyali. 4. Bir tekis, guruhli, gala.

5. Kim biogeotsenozlar haqidagi tasavvurni asoslab berdi?

1. A.F.Middendorf. 2. K.Myobius. 3. G.F.Morozov. 4. V.N.Sukachev.

6. Ozuqa zanjiri deganda nimani tushunasiz?

1. Har bir organizmni o'zidan keyin turgan organizm uchun ozuqa bo'lib xizmat qilishi tushuniladi.

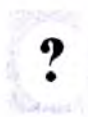
2. Organizmlarning ayrim bo'g'inlarni hosil qilishi.

3. Ozuqa zanjiridagi organizmlarning bir-biriga munosabati.

4. Anorganik moddalarning organik moddalarga aylanishi.

7. Ekologik tizim nima?

1. Yashash sharoiti o'xshash va o'zaro munosabati natijasida bir-biriga ta'sir ko'rsatuvchi har xil turga mansub bo'lgan birgalikda yashovchi organizmlar yig'indisi.
 2. Yashash sharoiti har xil va o'zaro munosabati natijasida bir-biriga ta'sir ko'rsatuvchi har xil turga mansub bo'lgan birgalikda yashovchi organizmlar yig'indisi.
 3. Ma'lum bir maydonni egallagan va bir turga mansub bo'lgan individlar yig'indisi.
 4. Bir necha tur o'simliklarning birgalikda qavm bo'lib yashashi.
- 8. Ekotizim terminini va tushunchasini fanga qaysi olim kiritgan?**
1. A.Tensli. 2. K.Myobius. 3. E.Gekkel. 4. J.Lamark
- 9. Noosfera tushunchasini fanga kim kiritgan?**
1. E.Gekkel. 2. J.Lamark. 3. Ye.Lerua. 4. V.Vemadskiy.
- 10. Ekologik piramida kim tomonidan tuzilgan?**
1. I.A.Severtsov. 2. D.N.Kashkarov. 3. Ye.P.Korovin. 4. Ch.Elton.



Savol va topshiriqlar

1. *Ozuqa zanjiri* deganda nimani tushunasiz?
2. *Ozuqa zanjiri halqalari* nima?
3. *Ekologik piramidani* tushuntiring?
4. *Suksessiya* tushunchasini izohlab bering?

V BOB. BIOSFERA

9-§. Biosfera va noosfera haqida tushuncha

Yer yuzidagi tirik organizmlar tarqalgan, ularning doimiy ta'siri ostida bo'lgan va faoliyati mahsulotlari egallagan qobiq *biosfera* (yunoncha "bios" – hayot, "sfera" – shar) deb ataladi.

Biosfera terminini dastlab, frantsuz olimi J.B.Lamark (1744-1829 yy.) ishlatgan. Ushbu ta'limotning asoschisi rus olimi, akademik V.I.Vernadskiy (1863-1945 yy.) hisoblanadi. *Biosfera* Yer sharidagi eng yirik ekotizim deb qaralib, u ayrim ekotizimlarning yig'indisidan tashkil topgan. Bular: *litosfera* (quruqlik), *gidrosfera* (suv havzalari), atmosferaning quyi qatlamlaridan iborat.

V.I.Vernadskiy sayyoramizdagi barcha tirik organizmlar yig'indisini "*tirik modda*" deb atab, u biosferaning eng muhim tarkibiy qismi ekanligini ta'kidlaydi. V. I. Vernadskiy «Tirik modda» larni 5 funksiyasini asoslagan:

1. Gaz - gazlarni organizmlarga o'zlashtirilishi (fotosintez va boshqa jarayonlar).
2. Kontsentratsion funksiyasi - organizm o'z tanasida ko'p elementlarni to'playdi.
3. Oksidlanish va qaytarilish funksiyasi.
4. Biokimyoviy - tirik organizmlarni o'sishi, rivojlanishi va ko'chishi.
5. Biogeokimyoviy - yer sharidagi moddalarni sanoat, qishloq xo'jaligi, transport va boshqa sohalarda qo'llanilishi.

Biosferaning ikkinchi tarkibiy qismi *o'lik moddalar* (iqlim, atmosfera, tog' jinslari va boshqalar) hisoblanib, V.I.Vernadskiy ta'limoti bo'yicha, ularning hosil bo'lishida tirik organizmlar qatnashmaydigan biosferadagi moddalar yig'indisi kiradi.

Biosferada *oraliq moddalar* ham ajratilib, ular o'lik va tirik moddalarning birgalikdagi faoliyatidan hosil bo'ladi. Tirik organizmlar oraliq moddalar hosil bo'lishida yetakchi o'rinni egallaydi. Oraliq moddalar - Yerdagi tirik moddaning faoliyati bilan bog'liq bo'lgan tuproq, yemirilgan tog' jinslari va barcha tabiiy suvlardir. Bulardan tashqari, *biogen moddalar* ham mavjud. Ular tirik organizmlarning hayoti davomida hosil bo'ladi va o'zgarishlarga uchraydi. Ularga nihoyatda katta potensial energiyaga ega bo'lgan toshko'mir, bitum, neft, ohaktosh va boshqalar kiradi. Shunday qilib, *biosfera* tirik modda

ta'siridagi Yerning qobig'i hisoblanadi. Biosferada katta doirada *moddalar aylanishi* amalga oshadi.

Biosferada moddalar aylanishi

Biosferada kichik va katta doiradagi moddalar aylanishi xarakterlanadi. Kichik doiradagi moddalar aylanma harakati biologik doiradagi aylanish bo'lib, bu organizmlar o'rtasida, quruqlikda tuproq bilan organizm o'rtasida, suvda esa organizm bilan suv o'rtasida kechadi. Katta doiradagi moddalarning aylanishi quruqlikdan moddalarning daryo va havo oqimlari bilan okeanga kelib tushishidan iborat bo'lib, dengiz yotqiziqlarining quruqlikka qayta chiqishi esa okean tubining ko'tarilishi va uning natijasida quruqlik ayrim joylarining cho'kishi bilan sodir bo'ladi.

1. *Suvning aylanishi.* Biosferada suv bir holatdan ikkinchi holatga o'tib, kichik va katta aylanish doiralari hosil qiladi. Suvning bug'lanib, kondensatsiyalanib yog'ingarchilik vositasida yerga qaytib tushishi suvning kichik doirada aylanishini tashkil etadi. Bu aylanishning turi ko'pincha okeanlar yuzasida sodir bo'ladi.

Suv bug'lari havo yo'nalishi bilan quruq mintaqaga borishi va qaytib okeanlarga borib tushishi suvning katta doirada aylanishini tashkil etadi. Suvning juda sekin aylanishi shimoliy muz okeanlarida sodir bo'ladi.

2. *Uglerodning aylanishi.* Uglerodning aylanishi eng tez sodir bo'ladigan biogeokimyoviy jarayon hisoblanadi. Uglerod almashinuvi ko'proq CO₂ orqali bo'ladi. Havoda karbonat angidrid gazi 0,03% bo'ladi. CO₂ o'simlikka o'zlashtirilib, fotosintez mahsuldorligini hosil qiladi. O'simlik va hayvon qoldiqlaridagi organik moddalarning parchalanishi karbonat angidridning manbaidir. Masaan, organik moddalarning parchalanishi natijasida hayvon siydigida ham karbonat angidrid ajralib chiqadi. Okean bilan atmosfera o'rtasida shamol va havoning harakati tufayli karbonat angidridning almashinishi kuzatiladi. Dunyo bo'yicha, jami quruqlikdagi o'simliklar tomonidan bir yilda 600 mln. tonna CO₂ o'zlashtirilib, 400 mln. tonna O₂ chiqariladi va bunda 450 mln. tonna organik moddalar hosil bo'ladi. Yer yuzida barcha CO₂ ning bir marta to'liq aylanishi 300 yilda sodir bo'ladi.

3. *Kislorodning aylanishi.* Kislorodning aylanishi juda ham murakkab jarayon. Kislorod fotosintez jarayonlarida hosil bo'ladi. Bunda karbonat angidrid va suvning quyosh nuri ta'sirida reaksiyaga kirishib, organik modda, kislorod va suv bug'i hosil bo'ladi. Kislorodni

to'la bir marta aylanishiga 2000 yil kerak. Kislorodning asosiy manbai azon (O₃) hisoblanadi.

4. *Azotning aylanishi.* Atmosferaning 78 % ini azot tashkil etadi. Azot inert gazidan iborat bo'lganligi sababli, uni birikma holda havoda uchratish qiyin. Tirik organizmlarda azot aminokislotalar va oqsilning muhim komponenti hisoblanadi. Havodagi erkin azot azotobakteriyalar vositasida o'zlashtiriladi va birikma holda ajratib chiqariladi. Bakteriyalar faoliyati natijasida 1 ga maydonda 2-3 kg dan 5-6 kg gacha azot birikma holga o'tkaziladi. Erkin yashovchi azot o'zlashtiruvchilar vositasida har gektar yerga bir yilda 10 kg azot o'zlashtiriladi, dukkakli ekinlar vositasida esa 400 kg/ga o'zlashtiriladi.

5. *Fosforning aylanishi.* Fosfor - nuklein kislotalari, oqsil, ATF va boshqa hayotiy muhim organik moddalarning muhim tarkibiy qismlaridan hisoblanadi. Fosforning aylanishi trofik zanjir, organik fosfat zanjiri vositasida hamda organik fosfatning ajralishi va tirik organizmlarning ulishi natijasida yerga tushishi yo'li bilan amalga oshadi. Ularni mikroorganizmlar chiritib, yana qaytadan o'simlikka o'zlashtiriladigan holatga o'tkazadi.

Noosfera tushunchasi

Ta'kidlash lozimki, jamiyatning rivojlanish jarayonini to'xtatib bo'lmaydi. Ammo insonning biosferaga ta'sirini boshqarish orqali ularning har ikkisinin ham rivojlanishiga ziyon yetkazmaslik mumkin.

Keyingi yillarda biosferaning asta-sekin noosferaga aylanishi kuzatilmoqda. *Noosfera* tushunchasini frantsuz olimi Ye.Le-Rua (1927-yil) kiritgan. Ushbu ta'limotni akademik V.I.Vernadskiy rivojlantirgan. *Noosferaning* lug'aviy ma'nosi "fikrlovchi qobiq" demakdir. V.I.Vernadskiy fikricha, noosfera biosferaning qonuniy rivojlanishi natijasida kelib chiqadigan bosqich bo'lib, inson bilan tabiat o'rtasidagi o'zaro ongli aloqa munosabatlarini o'z ichiga oladi.

TEST TOPSHIRIQLARI

1. "Biosfera" terminini dastlab kim ishlatgan?

1. J.Lamark. 2. V.Sukachev. 3. V.Vernadskiy. 5. Ye Lerua.

2. Biosferaning yangi sifat holati nima?

1. Noosfera. 2. Litosfera. 3. Troposfera. 4. Ionosfera.

3. Biosferada moddalarning geologik (katta) doirada aylanishi:

1. Quruqlik bilan gidrosfera o'rtasidagi aylanish.
 2. Avtotrof organizmlar o'rtasidagi aylanish.
 3. Geterotrof organizmlar o'rtasidagi aylanish
 4. Okeanda moddalarning aylanishi.
- 4. Biosferaning eng quyi chegarasini aniqlang?**
1. Suv o'tlari o'sadigan qatlam.
 2. Quyosh yorug'ligi tushadigan chuqurlik.
 3. Mariana cho'kmasi.
 4. Gidrosferadagi hayot chegarasi.



Savol va topshiriqlar

1. *Biosfera* deganda nimani tushunasiz?
2. *Biosferaning tarkibiy qismlarini* sanang?
3. *Noosfera* tushunchasini izohlab bering?
4. Bugungi kundagi *hayot qobig'ini* siz qanday ifodalagan bo'lar edingiz?

VI BOB. TABIIY RESURLAR VA ULARDAN OQILONA FOYDALANISH

10-§. Tabiiy resurslar

Resurslar (fransuzcha “ressources” – vositalar, zahiralalar) – insonlar uchun moddiy va ma’naviy oziqa beruvchi va shunday oziqalarni berishga mo’ljallangan barcha manbalardir.

Jamiyatning moddiy, ilmiy va madaniy ehtiyojlarini qondirish uchun ijtimoiy ishlab chiqarishda ishlatiladigan tabiiy obyekt, sharoit va tabiatda bo’ladigan jarayonlarga tabiiy resurslar, deb aytiladi.

Tabiiy resurslarga qazilma boyliklar, iqlim, suv, tuproq, o’simlik, hayvonlar, kosmik resurslar, atom resurslari kiradi.

Tabiiy resurslardan to’g’ri foydalanish, muhofaza qilish uchun ularni bir tizimga solish lozim.

Inson ta’sirining xarakteriga ko’ra tabiiy resurslar, odatda, ikki kategoriyaga: tugaydigan va tugamaydigan resurslarga bo’linadi.

Tugaydigan tabiiy resurslar, o’z navbatida, ikki guruhga bo’linadi: qayta tiklanmaydigan va qayta tiklanadigan resurslar.

Tiklanmaydigan tabiiy resurslarga yer osti boyliklari (temir rudasi, oltin, neft, gaz, ko’mir va boshqalar) kiradi, ulardan muntazam foydalanish sababli zahirasi kamayib, so’ngra tugashi mumkin.

Tiklanadigan tabiiy resurslarga butunlay yo’q bo’lib ketmaydigan va qayta tiklanadigan tuproq, o’simliklar va hayvonot dunyosi (qisman), shuningdek, ba’zi bir cho’kindi jinslar, tuzlar kiradi. Chunonchi, tuproq foydalanish natijasida butunlay yo’q bo’lib ketmaydi, balki eroziyaga uchrashi, unumdorligini yo’qotishi mumkin. Kishilarning xo’jalik faoliyati natijasida ba’zi bir o’simlik va hayvonot dunyosi kamayib yoki butunlay yo’q qilib yuborilishi mumkin. Bu resurslar (unumsiz tuproq, turi kamaygan o’simlik va hayvonlar) foydalanish jarayonida qayta tiklanishi mumkin. Lekin, ularning tiklanish tezligi turlicha. Ovlangan hayvonlar populyatsiyasining qaytadan tiklanishi uchun o’nlab yillar kerak bo’lsa, kesilgan o’rmonlar tiklanishi uchun 60 yildan ortiq vaqt, 1 santimetr chirindili tuproqning paydo bo’lishi uchun 300-600 yil kerak bo’ladi.

Tiklanadigan tabiiy resurslardan rejali, ilmiy va ularni muhofaza qilish qoidalariga rioya qilgan holda foydalanilsa, bu resurslar insonga abadiy xizmat qiladi.

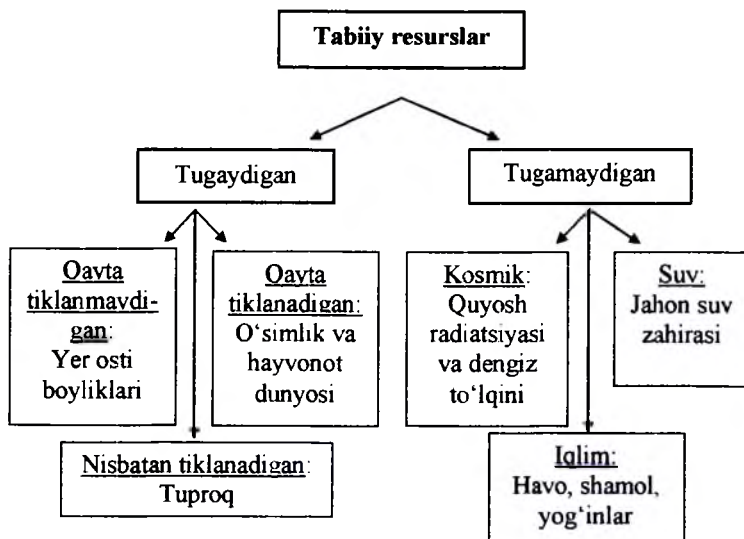
Tugamavdigan tabiiy resurslarga atmosfera havosi, suv, quyosh energiyasi va hokazolar kiradi. Biroq, kishilarning xo'jalik faoliyati ta'sirida suv ifloslanib, natijada chuchuk suvning ba'zi bir hududlarda yetishmasligi sezilmoqda. Chuchuk suv muammosi nafaqat respublikamizda balki, dunyoning katta-katta mamlakatlari (AQSH, Yaponiya, Germaniya va boshqalar) da ham sezilarli darajada paydo bo'lmoqda.

Inson uzoq vaqt davomida jamiyat uchun zarur bo'lgan tabiiy resurslar tugalmas, ulardan qancha foydalanilsa ham tugamaydi, degan tushunchaga ega edi. Ammo insonning tabiatga ko'rsatgan ta'siri, uning tabiiy resurslaridan noto'g'ri foydalanilishi tufayli tabiiy muhit (havo, suv, tuproq va boshqalar) ifloslanib, xo'jalikka va ayniqsa inson salomatligiga ta'sir eta boshladi.

Bugungi kunda, O'zbekistonda 1800 dan ortiq kon, 1000 ga yaqin istiqbolli qazilma boyliklari hosil bo'lgan, 118 turdagi mavjud mineral xomashyodan 65 turi o'zlashtirilmoqda. O'zbekiston oltin, kumush, plavikli shpat, mis zahiralari bo'yicha dunyoda birinchi o'nlik davlatlari qatoriga kiradi. MDH da O'zbekiston oltin zahirasi va uni qazib olinishi bo'yicha ikkinchi o'rin; kumush, mis, plavikli shpat, tabiiy gaz bo'yicha uchinchi o'rinni egallaydi. Bugungi kunda, O'zbekistonda ochilgan 900 ta konlarda mineral xom ashyoning qariyb 100 turi qazib olinadi, shundan 60 turdan ortig'i sanoatda o'zlashtirilgan va ishlatiladi. Respublikada ochilgan mineral xom ashyo resurslarining umumiy iqtisodiy bahosi 300 milliard AQSH dollari miqdorida baholanadi.

O'zbekiston Respublikasining yer osti boyliklaridan foydalanish masalalarini boshqarishda "Yer osti boyliklari to'g'risida"gi Qonuni 2002-yilning 13-dekabrida, yangi tahrirda qabul qilingan. U yer osti boyliklariga egalik qilish, ulardan foydalanish va qo'llash, yer osti boyliklaridan foydalanishda yer osti boyliklari, atrof-muhitni muhofaza qilish va ish xavfsizligi munosabatlarini tartibga soladi.

1-shakl. Tabiiy resurslar klassifikatsiyasi



Savol va topshiriqlar

1. *Tabiiy resurs* tushunchasi nimani anglatadi?
2. Tabiiy resurslarning qanday turlari mavjud?
3. *Tugaydigan tabiiy resurslarni* sanab bering?
4. *Tugamaydigan tabiiy resurslarga* nimalar kiradi?

11-§. Chiqindilar muammosi

Atrof-muhitni ishlab chiqarish va iste'mol qilish chiqindilaridan muhofaza qilish, tabiiy resurslardan oqilona va kompleks foydalanish hamda ekologik toza texnologiyalarni amaliyotga tatbiq etish muammolari, ayni chog'da, dolzarb hisoblanadi. Energetika, rangli va qora metallurgiya, kimyo sanoati va qurilish industriyasi obyektlari chiqindilarni hosil qiluvchi, atrof-muhitni ifloslantiruvchi asosiy manbalar hisoblanadi.

Shaharlarda qattiq maishiy chiqindilar va katta o'lchamli axlatlar yig' ilmoqdaki, ular o'z vaqtida va to'g'ri olib chiqilmasa hamda zararsizlantirilmasa, atrof tabiiy muhitni jiddiy ifloslantirishi mumkin.

Qattiq maishiy chiqindilarning chiqindixonalarda to'planib qolishi, changlarning hosil bo'lishiga va yoqimsiz hidlarning tarqalishiga olib keladi. Bir qator mamlakatlarda chiqindilarni utilitatsiya qilish - kuydirish, poligonlarga ko'mish yoki yig'ish, shuningdek kompostlash texnologiyalari bilan amalga oshiriladi (2-jadval).

O'zbekistonda har yili 100 million tonnadan ortiq sanoat chiqindilari hosil bo'ladi, ularning 14 % i toksik (zaharli) toifaga mansub hisoblanadi. Bundan tashqari, Respublikamiz hududida va unga yaqin hududlarda radioaktiv rudalarni qazib olish o'tgan asrning 40-yillarida kuchaygan. Shu davr mobaynida 150 ga yaqin radioaktiv ifloslanish maydonlari paydo bo'ldi. O'zbekistonning Andijon viloyatidan 30 kilometr uzoq masofada joylashgan, Qirg'iziston Respublikasining Maylu-Su daryosi qirg'oqlari bo'ylab joylashgan, umumiy hajmi 2,5 million m³ bo'lgan radioaktiv chiqindilar ko'milgan 23 ta ombor va 13 ta balanslangan rudalar to'plamlari mintaqaviy ekologik falokat yuzaga kelishida katta xavfga ega. Sel kelishi va yer ko'chishi hollari yuz berganda, radioaktiv chiqindilar Maylu-Su, Qoradaryo va Sirdaryo suvlariga tushishi mumkin, bu esa 1,5 million kishi yashaydigan 300 km² maydondagi O'zbekiston hududini radioaktiv chiqindilar bilan ifloslanishiga olib keladi. Radioaktiv chiqindilar tarkibini radionuklidlar va sinov maydonlaridagi yadro portlashlar tashkil etadi. Radionuklidlar o'zidan radioaktiv nur chiqaradigan elementlarning izotoplari hisoblanadi. Ancha xavfliroq sanalgan radioaktiv moddalarga strontsiy-90 va seziiy-137 izotoplari kiradi. Ular inson organizmining qon va suyak ko'migi, oshqozon-ichak, teri qoplami va o'pkasida patologik o'zgarishlarni olib keladi.

Markaziy Osiyo davlatlari transchegaraviy hududlaridagi radioekologik holat ziddiyatini pasaytirish maqsadida 1996-yil 5-aprelda (Toshkent), 1999-yil 17-iyulda (Bishkek), 1999-yil 17-dekabrda (Dushanbe) hamkorlikdagi ishlar bo'yicha bitimlar imzolaniib, harakat Dasturlari haqida qarorlar chiqarilgan. Hozirgi paytda, Maylu-Suu daryosi vodiysida reabilitatsiya ishlari davom etmoqda.

Chiqindilar hosil bo'ladigan korxonalar ustidan davlat nazoratini "Chiqindilar to'g'risida" gi (2002-yil) Qonunga muvofiq, O'zbekiston Respublikasi Tabiatni muhofaza qilish davlat qo'mitasi amalga oshiradi.

**2-jadval. Dunyo mamlakatlari bo'yicha maishiy chiqindilarni
utilizatsiya qilishning nisbiy ko'rsatkichi, %**

Mamlakat	Kuydirish	Chiqindixonaga chiqarish	Kompostlash	Boshqalar
Shveysariya	80	18	2	-
Yaponiya	72	24.5	1.5	2
Shvetsiya	56	34	9.9	0.1
Belgiya	47	44	9	-
Niderlandiya	40	44	15	1
Frantsiya	36	47	8	9
Daniya	32	64	4	-
Germaniya	28	69	2	1
Italiya	18.5	35	5.5	41
AQSH	8	82	-	10
Kanada	6	93	-	1
Ispaniya	5	76	19	-
Buyuk Britaniya	2	2	98	-
Rossiya va MDH	5	95	-	-



Savol va topshiriqlar

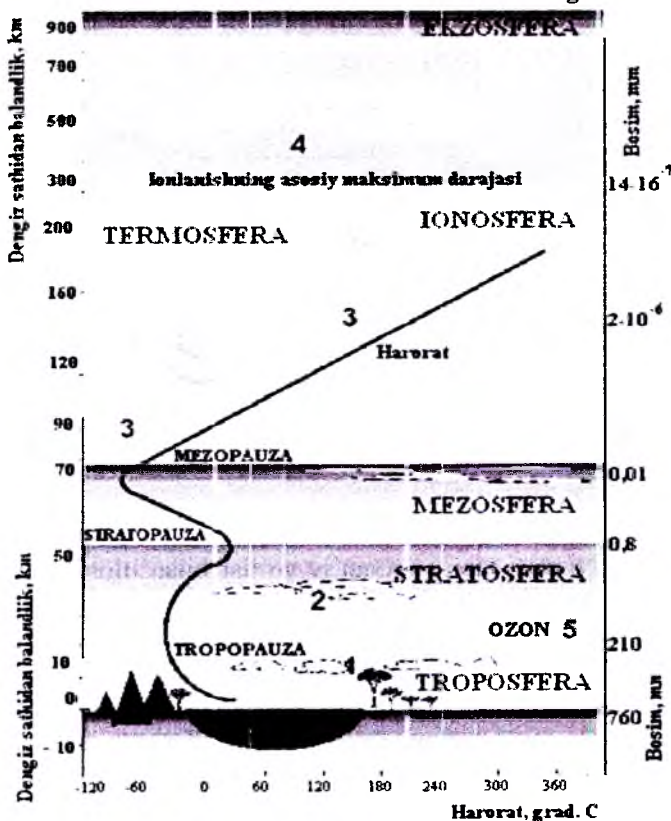
1. *Chiqindilar* deganda nimani tushunasiz?
2. O'zbekistonning qaysi shaharlarida *chiqindilar* ko'p to'planadi?
3. *Radioaktiv chiqindi* tushunchasini izohlab bering?
4. *Radioaktiv chiqindilarning* qanday xavfi bor?

VII BOB. ATMOSFERA VA UNI MUHOFAZASI

12-§. Atmosfera havosini muhofaza qilish

Atmosfera - bu yerning havo qobig'i hisoblanib, biosferada hayot mavjudligini ta'minlovchi asosiy manbalardan biridir. Atmosfera barcha jonzotlarni zararli kosmik nurlardan himoya qilib turadi, sayyora yuzasidagi issiqlikni saqlaydi. Agar havo qobig'i bo'lmaganida, Yer yuzasida kunduzi $+100^{\circ}\text{C}$ va kechqurun -100°C harorat kuzatilgan bo'lar edi (2-shakl).

2-shakl Atmosferaning vertikal tuzilishi

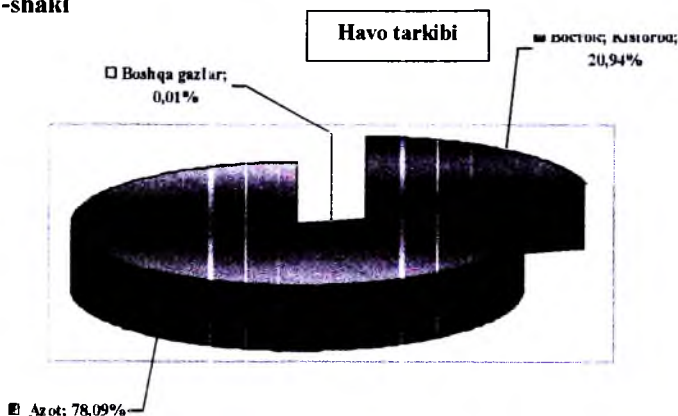


1- konveksion va patsimon cho'zilgan yupqa bulutlar; 2- sadaf rangli bulutlar; 3- quyi ionosferadagi qutb yog'dusi; 4- yuqori ionosferadagi qutb yog'dusi; 5- ozon konsentratsiyasining eng yuqori qatlami.

Yerning yuza qismidagi havo qobig'ida azot 78.09 %, kislorod 20.94 %, argon 0.93 %, karbonat anhidrid 0.03 % ni tashkil etadi. Boshqa gazlar esa (kripton Kr, ksenon Xe, neon Ne, geliy He, vodorod H₂, ozon O₃, radon Rn, metan CH₄, ammiak NH₃, vodorod peroksidi H₂O₂, va boshqalar), taxminan 0,01 % ni tashkil etadi (3-shakl). Havoda doim 3-4 % suv bug'lari ham mavjud.

Yuqoridagi tarkibning buzilishi, karbonat anhidrid miqdorining ortishi va kislorod miqdorining kamayishi natijasida tirik organizmlar zarar ko'radi, ularning nafas olishi qiyinlashadi. Odam ovqatsiz 5 hafta, suvsiz 5 kun, havosiz 5 daqiqa yashashi mumkin. Insonlar normal yashashlari uchun nafaqat havo, balki uning tozaligi ham muhim hisoblanadi.

3-shakl



Atmosfera havosi tabiiy va sun'iy yo'llar bilan ifloslanadi. *Tabiiy ifloslanish* changlar ko'rinishida bo'lib, ular mineral, organik, kosmik turlarga ajraladi.

Mineral ifloslanishga tog' jinslarinnig yemirilishi, vulqonlar otilishi, o'rmon yong'inlari kabilar kiradi. O'simlik va hayvon qoldiqlari va parchalanish mahsulotlari organik changlarga misol bo'ladi. Meteoritlarning atmosfera qatlamidagi yongan qoldiqlari kosmik changlarga kiradi.

Sun'iy ifloslanishga antropogen ifloslantiruvchilar kirib, ular ichida oltingugurt dioksidi, ammiak, azot oksidi, uglerod oksidi chiqindilari atrof-muhitni ko'proq ifloslaydi.

Global isish muammosi. Ilk bor, 1896-yilda shved ximigi Arrenius: «Ko'mirmi yoqish natijasida atmosferaga tashlanadigan karbonat anhidrid global isishga olib keladi», degan farazni aytgan.

Ma'lumki, karbonat anhidrid (CO_2) zaharli emas, u o'simliklar uchun oziqa hisoblanadi. CO_2 qisqa to'liqlik quyosh nurlarini o'tkazadi, lekin Yerdan qaytarilgan uzun to'liqlik issiqlik nurlanishini ushlab qoladi. Natijada, *issiqxona effekti* vujudga keladi.

XX asrning oxirgi 30 yilida olimlarga xlorofloroglerodlar (XFU), metan (CH_4) va azot oksidi (N_2O) ham *issiqxona effekti*ga olib kelishi ayon bo'ldi.

Issiqxona effekti hosil qiluvchi gazlar emissiyasining asosiy antropogen manbalari xususida to'xtalib o'taylik:

- Karbonat anhidrid – energiya olish, transport va boshqa qazib olinadigan yoqilg'ini yoqishda ajralib chiqadi.

- Metan – qishloq xo'jaligi ishlab chiqarishida (chorvachilik, sholi o'stirish va boshqalar) va tabiiy gazni qazib olishda hamda iste'molchiga yetkazib berishdagi yo'qotishlarda hosil bo'ladi.

- Azot oksidi – energetik jarayonlarda va qishloq xo'jaligida o'g'itlar ishlatilganda ajralib chiqadi.

- Ftoruglevodorodlar, deb ataluvchi sun'iy kimyoviy moddalar va oltingugurt geksaftoridi (SF_6) kabi uzoq yashovchi gazlar sanoat ishlab chiqarishi jarayonlarida ajralib chiqadi.

Iqlimning global o'zgarishi haroratning ko'tarilishidagina aks etmay, balki quyidagi ayrim hodisalar soni va jadalligining ortishida ham ifodalanadi: jazirama issiq kunlar, qurg'oqchilik, suv toshqinlari, haroratning keskin ko'tarilishi yoki sovushi, sellar, kuchli shamollar. Iqlim isishining oqibatlari aholi sog'lig'iga bevosita va bilvosita ta'sir ko'rsatishi mumkin.

Bevosita ta'sir oqibatlariga suv toshqinlari, dovullar, to'fonlar, bo'ronlar natijasida halokatga uchragan odamlarni kiritish mumkin. Bundan tashqari, jazirama ob-havo yurak qon-tomir kasalliklari, nafas olish organlari, nerv sistemasi, bo'yрак va boshqalardan kasallanishga hamda o'limning ortishiga olib keladi.

Bilvosita ta'sir oqibatlari natijasi yog'inlar va botqoqliklar maydonining ortishi bilan bog'liq. Bu – chivin infeksiyasi, birinchi navbatda malyariya xavfining ortishiga olib keladi. Yuqori haroratli davrning kattalashishi kanalarning faollashishiga va ular sababchi bo'ladigan yuqumli kasalliklarning o'sishiga olib keladi.

Iqlim o'zgarishi muammosining muhimligi va uning salbiy oqibatlarini yumshatish bo'yicha shoshilinch choralar ko'rish lozimligini hisobga olib, O'zbekiston Respublikasi 1993 - yilda Iqlim o'zgarishi haqida BMT ning Doiraviy Konventsiyasiga qo'shildi, 1998 - yilning noyabrda esa Kioto protokolini imzoladi. Kioto protokoli 1999 - yilning 20 - avgustida O'zbekiston Respublikasi Oliy Majlisi tomonidan ratifikatsiya qilindi.

Ozon muammosi. Atmosferaning 20-30 kilometr oralig'ida joylashgan o'ziga xos himoya qobig'i – ozon (O₃) qatlamining siyraklashuvi ham dolzarb ekologik muammolardan hisoblanadi.

Ozon qatlami Yer atmosferasining bir qismini tashkil etib, tarkibida katta miqdorda ozon bor. Ushbu qatlam Quyoshning taxminan 93 dan 99 foizgacha qattiq ultrabinafsha nurlarini yutadiki, ular to'siqsiz Yerga yetib kelgudek bo'lsa, Yerdagi hayotni to'xtatishi mumkin. Yer yuzida, dastlab 1970-yillarda stratosferadagi ozonning kamayishi kuzatildi. 1980-yillarda Antarktida ustida ozonning 50 % ga kamayishi qayd qilindi.

Ozon qatlami insonlar va barcha jonzotlarni Quyoshning qisqa to'lqinli ultrabinafsha nurlanishidan himoya qiluvchi ekran vazifasini o'taydi. Galogenli uglevodorodlar (xlorforuglerodlar, galonlar, tetraxlorometan, metil bromid) ozonni buzuvchi moddalar hisoblanadi.

Ozonning siyraklashuvi teri saratoni, immunotizimning kuchsizlanishi va pardali katarakta, o'simliklar jarohati, shu jumladan, o'simliklar hosildorligining pasayishi, plankton va fitoplankton singari dengiz hayvon turlari xilma-xilligining qisqarishi kabi salomatlik va ekologik muammolarning ortishiga olib keladi.

1987 - yilning 16-sentabrda ozon qatlamini yemiruvchi moddalar bo'yicha Monreal Protokoli ishlab chiqilgan. Ushbu sana har yili Xalqaro Ozon qatlamini himoya qilish kuni sifatida nishonlanadi.

O'zbekiston Respublikasi Prezidenti I.A.Karimov tomonidan 2006 - yilning 7-sentabrda O'zbekiston Respublikasining "Ozon qatlamini buzuvchi moddalar bo'yicha Monreal protokoliga tuzatmalarni (Monreal, 1997-yil, 17-sentabr) ratifikatsiya qilish to'g'risida" gi va "Ozon qatlamini buzuvchi moddalar bo'yicha Monreal bayonnomasiga tuzatmalar (Pekin, 1999-yil, 3-dekabr) ni ratifikatsiya qilish to'g'risida"gi qonunlar imzolandi.

Avtomobil transporti havoning ifloslanishida katta o'rin egallaydi. Avtotransportdan chiqadigan gazlar tarkibida zararli moddalar mavjud. Atrof-muhitga is gazi (oltingugurt) va azot birikmalari bilan

birga 3,4 - benzapiren va qo'rg'oshin kabi kantserogen moddalar ham ajralib chiqadi. Ushbu chiqqan gazlar o'simlik, hayvonlar va odam salomatligiga salbiy ta'sir etadi. Havoning ifloslanishida transportlarning hissasi 60-65% ni tashkil etar ekan. Tranzit avtomobillarini halqa yo'li orqali harakatga keltirish, avtomobillarni ekologik toza bo'lgan gazokondensat, gaz yonilg'isiga o'tkazish hamda gaz va dudlarni o'lchaydigan asboblari, kuchli diagnostik laboratoriyalarning mavjudligi atmosfera havosining ifloslanishini oldini olishda muhim o'rin egallaydi.

Radioaktiv ifloslanish atmosferani ifloslaydigan eng xavfli manbalardan biri hisoblanadi. Bu esa inson salomatligiga salbiy ta'sir etib, ularning avlodlarida turli xildagi mutatsiyalarni keltirib chiqarishi bilan xavfli bo'ladi.

Radioaktiv ifloslanishning manbalari atom va vodorod bombalarini sinovdan o'tkazish bo'lsa, bundan tashqari, radioaktiv ifloslanish yadro qurollarini tayyorlash jarayonidagi elektrostantsiyalarning atom reaktorlari va radioaktiv chiqindilaridan ham atmosferaga tarqaladi.

Qirg'iziston va Tojikistondagi O'zbekiston chegaralariga yaqin joylardagi foydalanilayotgan ruda konlari radioaktiv va boshqa xavfli chiqindilarning transchegaraviy manbalari hisoblanadi. Qirg'iziston hududida avvalgi Moylisuv, Shakontar uran konlari, Sumsar qo'rg'oshin koni, Haydarkam simob-surmali flokrit koni, Qadamjon surma koni bor. Qayd etilgan obyektlarda balansdan tashqari rudalar chiqindilari saqlanadigan joy va yerlar radionuklidlar, zararlangan og'ir metallar, toshqin suvlar bilan yuvilmoqda va ular o'z navbatida, O'zbekiston Respublikasi hududlarini ham zararlashi mumkin.

Umuman olganda, atmosfera havosining ifloslanishi natijasida odamlarda darmonsizlanish, ish qobiliyatining pasayishi, yo'tal, bosh aylanishi, ovoz boylamlarining siqilishi, o'pka, ko'z bilan bog'liq har xil kasalliklar, organizmning umumiy zaharlanishi, kasallikka qarshi kurashishning susayishi kabilari kelib chiqadi.

Kislotali yomg'irlar. Ingliz ximigi Robert Anges Smit sanoat shahri Manchesterda havoning 3 ta turi:

- karbonat ammoniyli havo $(\text{NH}_4)_2\text{CO}_3$;
- sulfat ammoniyli havo $(\text{NH}_2)_2\text{SO}_4$;
- sulfat kislota H_2SO_4 ni aniqlaydi va 1872 - yilda «kislotali yomg'ir», degan so'zni o'zining «Havo va yomg'ir» asarida tasvirlaydi. Turli xil qazilma yoqilg'i yondirilganda chiqindi gazlar tarkibida

oltingugurt va azot qo'shoksidlari bo'ladi. Atmosfera havosiga tonnalab chiqadigan bu birikmalar yomg'irni kislotaga aylantiradi. *Kislotali yomg'irlar* ta'sirida o'simliklarda hosildorlik pasayadi, o'rmonlar quriydi, binolar, tarixiy yodgorliklar yemirilib ketadi, inson sog'lig'iga zarar yetkaziladi.

O'zbekistonda «Atmosferani muhofaza qilish to'g'risida»gi maxsus Qonun 1996-yilning 27-dekabrda qabul qilingan. Ushbu Qonunga muvofiq, atmosferaga salbiy ta'siri uchun korxonalar, tashkilotlar va muassasalar uchun jarima to'lovlari belgilangan va boshqa majburiyatlar yuklangan.



Savol va topshiriqlar

1. Atmosfera tarkibidagi gazlarni aytib bering?
2. Atmosferaning ifloslanishi deganda nimani tushunasiz?
3. Global isishni izohlang?
4. Issiqxona effekti nima?
5. Kislotali yomg'irlarning qanday salbiy ta'siri bor?
6. Ozon tuynugi muammosi deganda nimani tushunasiz?
7. O'zbekistonda atmosfera havosini muhofaza qilish borasida qanday ishlar qilinmoqda?

VIII BOB. SUV RESURSI VA UNI MUHOFAZASI

13-§. Suv resursi

Suv vodorod bilan kislorodning barqaror birikmasi bo'lib, suvda vodorodning ulushi massa bo'yicha 11,19 %, kislorod esa 88,81 % ni tashkil etadi.

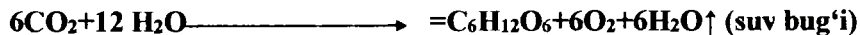
Oddiy sharoitda *toza suv* - bu rangsiz suyuqlik bo'lib, hidsiz va ta'msizdir. Faqatgina 2 metrdan ortiq chuqurlikda u ko'k rangga o'tadi.

Bilib qo'ygan yaxshi!

Yer yuzida 97,5 % suv sho'rlangan (dengiz, okeanlar, sho'r ko'llar va boshqalar). Atigi 2,24 % suv chuchuk hisoblanadi. Chuchuk suvning katta ulushi Antarktida va Grenlandiyada joylashgan.

Ma'lumki, tirik organizmning fiziologik ehtiyojini faqat suv qondiradi. Kishilarning kundalik hayotini suvsiz tasavvur qilib bo'lmaydi. Suv bo'lmasa, inson uch kundan ortiq yashay olmaydi. *Suv* - eng qimmatli tabiiy resurs. U hayotni tashkil qiluvchi moddalar almashinuvi jarayonida muhim rol o'ynaydi. Suv sanoat va qishloq xo'jaligi ishlab chiqarishida, maishiy turmushda katta ahamiyatga ega. Suv yer yuzidagi modda va energiya aylanishida qatnashadi. Fotosintez jarayoni ham suv orqali kechadi:

yorug'lik



674 kkal energiya

O'zbekiston Respublikasida mavjud chuchuk suvning taxminan 92 % i qishloq xo'jaligida, 6 % i sanoatda, 0,5 % i kommunal xo'jalikda sarflansa, 1,5 % i esa bo'linib ketadi.

Hozirgi paytda dunyodagi 50 dan ortiq mamlakatlarda chuchuk suv tanqisligi uchraydi. Belgiya, Angliya, Fransiya, Germaniya, Gollandiya, Daniya, Meksika, Yaponiya, Afrikaning bir qator mamlakatlari (Janubiy Afrika Respublikasi, Jazoir), Yaqin Sharq

mamlakatlarida chuchuk suv tanqisligi sezilmoqda. Ma'lumotlarga qaraganda, rivojlangan mamlakatlarda shaharlar va aholi punktlarida suv sarfi jon boshiga sutkasiga 150 litrni, Rossiyada 250 litrni tashkil qiladi. Toshkent shahrida jon boshiga sutkada maishiy xo'jaliklar uchun 300 litrgacha suv sarflanadi. Ayniqsa, qishloq xo'jaligi va sanoat tarmoqlarida, boshqa sohalarga qaraganda ko'proq suv ishlatiladi.

O'ZBEKISTONNING SUV RESURSLARI HAQIDA

O'zbekistondagi asosiy daryolar Sirdaryo, Amudaryo va uning irmoqlari hisoblanadi.

Respublikaning yirik daryolari: Norin, So'x, Chirchiq, Zarafshon, Surxondaryo, Qashqadaryo, Sherobod daryolaridir.

Amudaryo. Amudaryo havzasining umumiy maydoni 227800 km² ni tashkil etadi, shundan 61 % i O'rta Osiyo respublikalariga, 39 % i esa Afg'oniston hissasiga to'g'ri keladi. Amudaryo havzasining suv resursi 77,15 km³ ni tashkil etadi, shundan O'zbekistonning ulushi 5,66 km³.

Sirdaryo. Sirdaryo daryosi Qirg'iziston, Tojikiston, O'zbekiston, Qozog'iston hududlaridan oqib o'tadi.

Sirdaryo Norin va Qoradaryodan shakllanadi. Uzunligi - 2137 kilometr.

Sirdaryoning umumiy suv maydoni - 150100 km².

Sirdaryonig o'rtacha suv sig'imi - 36,0 km³, shundan O'zbekiston qismiga taalluqlisi - 8,0 km³.

Orol dengizi. Orol dengizi berk suv havzasi bo'lib, O'rta Osiyoning shimoliy-g'arbiy qismida joylashgan. Akvatoriyasining hajmi bo'yicha MDH mamlakatlari ichida ikkinchi (Kaspiydan keyin), dunyoda to'rtinchi (Kaspiy dengizi, Amerikadagi Yuqori ko'l va Afrikadagi Viktoriya ko'lidan keyin) o'rinda turadi. Uning asosiy suv manbalari - Amudaryo va Sirdaryodir.

SUV STRESSI HAQIDA

Suv stressi (suv bilan ta'minlanganlik darajasi) har bir mamlakatda har yili meyor sifatida foydalaniladigan suv zahirasini umumiy baholangan suv resursi miqdoriga nisbatan foizlarda ifodalanishi orqali aniqlanadi.

Suv stressining to'rtta darajasi ajratiladi (YUNESKO materiallari bo'yicha):

Suv stressi past – 10 % dan kamroq suv zahirasidan foydalaniladigan mamlakatlar kirib, o'zining suv resurslaridan noqulaylik sezmaydi (Janubiy Amerika mamlakatlari, Skandinaviya, Kanada, Rossiya, Avstraliya va boshqa mamlakatlar).

Suv stressi o'rtacha – bu yerda suv iste'moli 10 dan 20% ni tashkil etadi (Xitoy, Yaponiya, Ukraina, Turkiya, Frantsiya, Buyuk Britaniya va boshqa mamlakatlar).

Suv stressi o'rtacha va yuqori – bu yerda suvdan foydalanish 20 dan 40 % ni tashkil etadi. Suvdan barqaror foydalanishda zarur shart-sharoitlar yaratilishi zarurligi ko'zda tutiladi (AQSH, Meksika, Aljir, Germaniya, Polsha, Hindiston, Qozog'iston, Turkmaniston va boshqa davlatlar).

Suv stressi yuqori – 40 % dan ortiq suvdan foydalaniladi va bu suv yetishmasligini bildiradi, unga suvdan intensiv foydalanadigan mamlakatlar kirib, suvdan oqilona foydalanish talab etiladi (Pokiston, Eron, O'zbekiston, Yaqin Sharq mamlakatlari, Liviya, Misr).

O'ZBEKISTONDA SUV RESURSLARIDAN FOYDALANISH

Umumiy suv iste'moli O'zbekistonda 62-65 km³ darajasida bo'lib, undan taxminan 36 km³ suv Amudaryo va Sirdaryodan olinadi. Amudaryo havzasi suvlaridan 2 million gektardan ortiq yer maydonlari sug'oriladi. Shuningdek, O'zbekiston hududida bevosita shakllanadigan suv resurslarining hissasi Amudaryo havzasi bo'yicha 6 % ni, Sirdaryo havzasi bo'yicha 16 % ni, umuman respublika bo'yicha olganda umumiy oqimning taxminan 8 % ini tashkil etadi. Chirchiq va Ohangarondan tashqari barcha daryolar transchegaraviy hisoblanadi.

SUVNING IFLOSLANISHI VA UNI OLDINI OLISH CHORA-TADBIRLARI

Suvni ifloslovchi manbalar orasida eng muhim o'rinni sanoat va maishiy kommunal xo'jalikdan chiqqan oqova suvlar egallaydi.

Suvning ifloslanishi deganda, uning tarkibida sifatini kamaytiruvchi begona birikmalarning mavjudligi tushuniladi. Sanoat chiqindi suvlarida tirik organizm uchun xavfli bo'lgan har xil kislotalar,

fenollar, vodorod sulfati, ammiak, mis, rux, simob, tsionid, mishyak, xrom va boshqa zaharli moddalar mavjud bo'lib, ular sanoat korxonalarida ishlatilgan oqova suvlar bilan birga daryo, ko'l va suv omborlariga qo'shilib, ularni ifloslaydi.

Oqova suvlarga tushadigan mineral, organik, bakterial va biologik ifloslovchi birikmalar ajratiladi. *Mineral ifloslovchilar* odatda qum, loy, turli mineral tuzlar, kislota va ishqorlar eritmasidan iborat.

Organik ifloslovchilar o'simlik va hayvonlarning qoldiqlari, inson va hayvonlarning fiziologik chiqindilaridan iborat. Bakterial va biologik ifloslovchilar asosan maishiy oqova suvlarda mavjud.

Suv resurslarini ifloslantirishda temir yo'l, aviatsiya, transport vositalari, shuningdek avtokorxonalarining ham hissalari bor.

Bundan tashqari, atom elektrostantsiyalaridan chiqadigan radioaktiv chiqindilar ham daryo suvlarini ifloslantiradi. Ular suvdagi plankton va baliqlar organizmida to'planib, ulardan boshqa organizmlarga o'tadi.

Maishiy turmushdagi oqova suvlar daryo va ko'l suvlarini kasallik tug'diruvchi bakteriyalar va gelmintlar bilan ifloslanish manbaiga aylantirmoqda. Shuningdek, suv havzalarining maishiy turmushda keng foydalanilayotgan sintetik yuvuvchi vositalardan ifloslanishi ham inson sog'lig'iga xavf soladi.

Oqova suvlarni tozalashning quyidagi usullarini ajratish mumkin:

1. Mexanik.
2. Fizik-kimyoviy.
3. Biologik.

Mexanik yo'l bilan tozalash suzish, tindirish, filtrlash va qattiq jismlarni ajratib olish orqali amalga oshiriladi.

Fizik-kimyoviy tozalashda oqova suvlardagi oksidlanadigan yoki yomon oksidlanadigan organik moddalar parchalab yuboriladi. Bunda elektroliz usuli keng qo'llaniladi. Xlorlash ham yaxshi samara beradi.

Biologik usul ham oqova suvlarni tozalashda katta rol o'ynaydi. Bu usulni tabiiy yoki sun'iy suv havzalarida amalga oshirish mumkin. Tabiiy havzalarda suvlarni biologik tozalash filtrlash maydonlarida yoki sug'orish kanallarida amalga oshiriladi. Biologik tozalashdan asosiy maqsad shuki, oqova suvlarni maydonlarda filtrlanganda, suv bir necha tuproq qatlamlaridan o'tib, undagi erimagan og'ir va kolloid holdagi moddalar to'planib qoladi, ular esa vaqt o'tishi bilan tuproqda mikrobiologik yupqa qatlam hosil qiladi. Bu yupqa qatlam organik

moddalarni ushlab qolib, ularni oksidlaydi va mineral birikmalarga aylantiradi.

Sun'iy biologik tozalash maxsus qurilgan suv inshootlarida biologik filtrlar va aerotenklar yordamida amalga oshiriladi.

Aerotenklar - temir betondan qurilgan katta rezervuarlardir. U yerda, oqova suv bakteriyalar va mayda jonivorlardan tashkil topgan faol loyqalarda tozalanadi.

O'zbekiston Respublikasida "Suv va suvdan foydalanish to'g'risida" gi (1993-yil, 6-may) Qonun qabul qilingan.

Useful information !

There are 97,5 % salty water on the earth (sea,oceans, salty lakes and etc.). There are only 2,4 % fresh water. Most part of the fresh water is situated on Antarctic and Greenland.



Savol va topshiriqlar

1. Suvning ahamiyatini tushuntiring?
2. *Suvdan global foydalanish* nima?
3. *Suv yetishmaslik indeksi* haqida to'xtaling?
4. Suvni ifloslanishi qanday ro'y beradi?
5. Oqova suvlar qanday tozalanadi?
6. O'zbekistonda suv iste'moli qanday taqsimlangan?

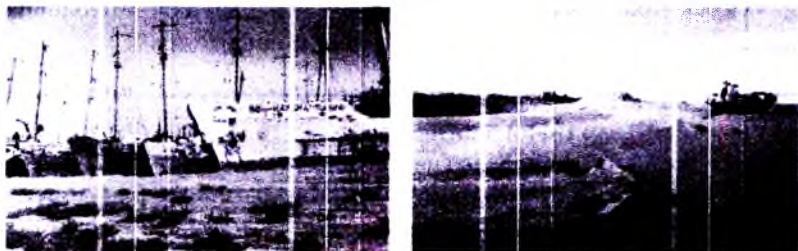
14-§. Orol va Orolbo'yi ekologik muammolari

Orol dengizini Markaziy Osiyoning ikki buyuk daryosi – Amudaryo va Sirdaryo to'yintiradi. Sobiq Ittifoq davrida paxta dalalarining kengaytirilishi sug'orish uchun ikkala daryoning suvlaridan keng miqyosda foydalanishni taqozo etdi. Suvni olish va isrofgarchilik bilan foydalanish natijasida dengizga kam hajmda suv keldi.

Ayniqsa, XX asrning 80-yillarida Amudaryo va Sirdaryodan Orol dengiziga suv quyilishi amalda to'xtadi. Natijada Orol dengizi quriy

boshladi (4-rasm). Yillar davomida Orol dengiziga suvning kam quyilishi holatlarini, ya'ni 1977-yildan 2012-yillar oralig'idagi Orol dengizi suv sathining pasayib ketishi bilan bog'liq holatlarni tahlil qilish orqali, Orol dengizi muammosining global ekologik muammoga aylanganligiga guvoh bo'lamiz (5-rasm).

Orol dengizining qurib qolgan joylari

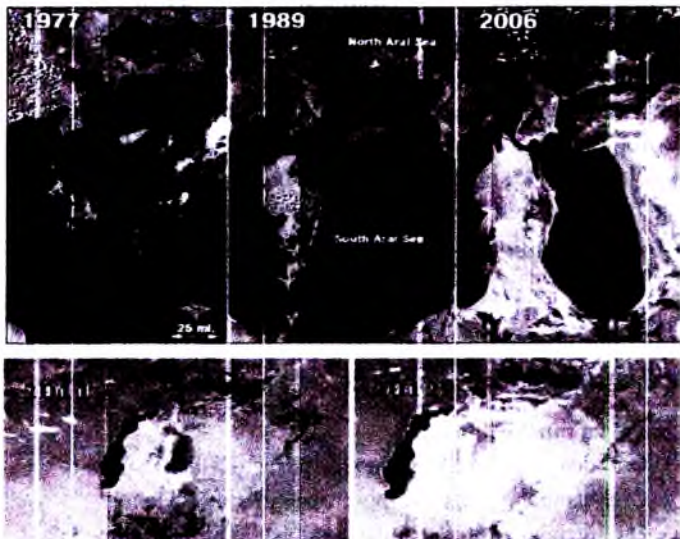


4-rasm

O'z vaqtida dunyoda ichki dengizlar orasida kattaligi bo'yicha to'rtinchi o'rinda turgan Orol dengizining qurishi atrof mintaqa iqlimi va bioxilma-xilligi uchun, uzoq muddatli salbiy oqibatlariga olib keldi. Cho'l shamollari qum va tuzni katta masofalarga uchirdi, havzaning butun hududi maydonlarida millionlab tonna tuz to'plandi, ba'zi ma'lumotlarga ko'ra, bu holat dengizdan ancha uzoqdagi tog'li tizmalar muzliklariga ham ta'sir ko'rsatdi.

Orol va Orolbo'yidagi ekologik ahvolning keskinlashuvi jahon jamoatchiligini tashvishga solmoqda. Orol tangligi eng yirik regional ekologik halokatlardan biri bo'lib, dengiz havzasida yashaydigan 35 milliondan ortiq kishi, shu jumladan O'zbekiston aholisining katta qismi ham uning ta'siri ostida yashamoqda. Orolbo'yi aholisining kasallanishi ko'p jihatdan Orol dengizining qurigan tubidan ko'chadigan chang to'zonlar tuz va zararli moddalar bilan atmosfera havosining ifloslanishiga, shuningdek sifatli ichimlik suvi bilan yetarli darajada ta'minlanmaganligi bilan bevosita bog'liq. Hozirgi kunda Orol dengizi havzasidagi sug'oriladigan yerlarning 60 % idan ortig'i sho'rlangan (2007-yil ma'lumoti).

Orol dengizi suv zahirasining yillar davomidagi o'zgarishi



5-rasm.

2007-yilga kelib Orol dengizi suv sathi 29 metrga pasaydi, akvatoriya maydoni 5,8 baravar kamaydi, suv hajmi 1064 km^3 dan 80 km^3 gacha pasaydi, suv sho'rligi dengizning g'arbiy qismida 110-112 g/l, sharqiy chuqurligida esa 280 g/l ga yetdi. Dengiz sohildan 120-200 kilometr ga uzoqlashdi va o'zining orqasida sobiq dengiz tubida 45 ming km^2 dan ortiq tuzli cho'l qoldirdi. 2011 - yildagi ma'lumotga asosan, Orol dengizining suv sathi 26 metrga pasaygan. Sho'rlanish darajasi esa, g'arbiy qismda 120 g/l gacha, sharqiy qismda esa 280 g/l gacha yetgan.

Orolbo'yining butun hududi bo'yicha ichimlik suvining minerallashuvi, umumiy qattiqligi, sulfatlar va xloridlar miqdori bo'yicha sifati yomonlashgani qayd qilindi.

Har yili Orol dengizining qurigan tubidan 15 - 75 million tonnagacha tuz va chang ko'tarilib, juda katta hududda havo va tuproqning ifloslanishiga olib kelmoqda. Orolbo'yida tabiiy va antropogen cho'llashishning sur'ati ortib bormoqda.

O'sib borayotgan suv tanqisligi va uning sifatining yomonlashishi tuproq va o'simlik qoplarning tanazzulga uchrashini, hududning flora va faunasidagi keskin o'zgarishlarni, ondatrachilik, baliqchilik, baliqni

qayta ishlash tarmoqlarining inqirozini keltirib chiqardi. Jumladan, bu yerda 23 turdagi yovvoyi holda o'sadigan o'simliklar yo'qoldi.

Orol dengizining qurigan o'rnida qum va tuzlarning shamol bilan uchirilishiga qarshi chora ko'rish uchun sun'iy o'rmonlar bunyod qilish katta ahamiyatga egadir. So'nggi yillarda Orol dengizining qurigan tubida qumloq yerlarga mo'ljallangan oq va qora saksovul, qandim, cherkez va boshka o'simliklarning o'stirilishi amalga oshirilmogda. 2008 - yilgi ma'lumotga asosan, 200 ming gektardan ortiq maydonda himoya daraxtlari ekilgan va ularning asosiy qismining o'sib ketishiga erishilgan.

Orol muammolari bo'yicha, hozirda Germaniya, Frantsiya, Xitoy, Rossiya, Qozog'iston, Qirg'iziston, Turkmaniston va Tojikiston davlatlari bilan hamkorlik qilinmogda.



Savol va topshiriqlar

1. Orol dengizi muammosi qanday yuzaga keldi?
2. Orol dengizi qanday ekologik vaziyatlarni olib keldi?
3. Orol dengizi atrofida qanday rejali ishlar olib borilmogda?
4. Orol dengizi va Orolbo'yi atrofidagi ekologik muammolar boshqa davlatlarni ham tashvishga soladimi?

15-§. Aydar – Arnasoy ko'llar tizimidagi ekologik vaziyat

Chordara – Arnasoy ko'llar tizimi, falokatli suv ko'p bo'lgan 1969-yilda Qozog'iston Respublikasi hududidagi Chordara suv omboridan 21,8 km³ dan ortiq suvni tashlash natijasida shakllandi. Vaqt o'tishi bilan, muntazam suv kelishi natijasida bu hududda ko'llar tizimi shakllandi: Arnasoy, Aydarko'l va Tuzkon ko'llarining umumiy hajmi 22 km³ va maydoni qariyb 2500 km² bo'lgan Aydar – Arnasoy ko'llar tizimini tashkil qildi.

1993-yildan boshlab Qirg'iziston Respublikasi Toktogul suv omboridan foydalanishning irrigatsiya tartibidan energetik tartibga o'tdi. Shu yillarda qishki yog'ingarchiliklar oldinma-кетин ro'y berdi va 1994 - yilda Arnasoy pastligiga 9 km³ dan ortiq suv tashlandi. Oqibatda, mavjud yaylov, dam olish zonalari, baliq tutish joylarini suv bosdi. Keyinchalik, Aydarko'l sohilbo'yi zonasida uch marta (1998, 2003, 2005-yillarda) favqulodda vaziyat ro'y berdi. Natijada, bu sohillarni mustahkamlash, aholi, chorva va moddiy boyliklarni xavfsiz joylarga vaqtinchalik ko'chirish bo'yicha amalga oshirilgan ishlar katta

moliyaviy xarajatlarni talab etdi. 2006-yilda Chordaradan pastda Sirdaryo o'zaning suv o'tkazish qobiliyatini oshirish bo'yicha ishlar yakunlandi. Endilikda Qozog'iston Respublikasi Arnasoyga suv tashlamay, pastki oqimga yetarlicha suv hajmini o'tkazishi mumkin. 2006-yilning mart oyidan boshlab Chordara suv omboridan Arnasoyga suv tashlanishi to'xtatildi. Chordara suv omboridan belgilangan miqdorda sug'orish ishlari uchun Sirdaryoga tashlanadigan suvdan orttirgan holda, Aydar-Arnasoy ko'llar tizimiga doimiy parlanadigan suvning o'mini qoplaydigan hajm (4-4,5 km³) da suv tashlab turilmasa, Navoiy viloyatining shimoliy hududlari va Qozog'iston Respublikasining janubiy hududlari uchun keskin salbiy holat yuzaga kelishi xavfi mavjud. Aydar - Arnasoy ko'llar tizimi suv sathini 245 metrgacha ko'rsatkich darajasida saqlab turish eng maqbul yo'l hisoblanadi. Bu bilan ushbu hududda mavjud o'simlik va hayvonot dunyosining qulay sharoitda yashashi uchun zamin yaratiladi. Xulosa o'mida shuni aytish mumkinki, suv tashlanmalari tartibga solinmasa, bu mintaqada ekologik mushkul vaziyat vujudga keladi.

Yuqoridagi ma'lumotlardan kelib chiqqan holda, suvda suzuvchi qushlarning yashashi uchun joy sifatida, mintaqaviy va xalqaro ahamiyatga ega bo'lgan obyekt sifatida, uni Ramsar konvensiyasi ro'yxatiga kiritish bo'yicha ishlar ham amalga oshirilmoqda. Shuningdek, bu yerdagi ekologik muammolarni hal etish maqsadida, O'zbekiston Respublikasi Vazirlar Mahkamasi tomonidan "2008-2015-yillar davrida O'zbekiston Respublikasi Aydar - Arnasoy ko'llar tizimi (AAKT) ekologik holatini barqarorlashtirish va foydalanish samaradorligini ta'minlash bo'yicha harakatlar Dasturi" ishlab chiqildi va qabul qilindi.

Bilib qo'ygan yaxshi!

O'zbekiston hukumati qorarlari asosida O'zbekiston Respublikasi Tabiatni muhofaza qilish davlat qo'mitasi rahbariyati va sa'yi-harakatlari natijasida bugun Aydar - Arnasoy suv havzalari tizimida o'nlab baliq turlari mavjud, bu yer ko'plab noyob qush turlarining yashash va uchib o'tish, qishlash makoniga aylangan, qamishzorlarda turfa xil yovvoyi va yirtqich hayvonlar yashaydi.

2008-yilning 28 - oktabri - 4 - noyabrida Koreya Respublikasining Changvon shahrida bo'lib o'tgan konferentsiyada O'zbekistonning Aydar - Arnasoy suv havzalari tizimi va unga chegaradosh hududlar Ramsar konvensiyasining suv-botqoqlik mulki ro'yxatiga kiritildi.

IX BOB. TUPROQ RESURSI VA UNI MUHOFAZASI

16-§. Tuproq resursi

Yer qobig'ining yuza unumdor qismi tuproq sanalib, tabiiy tarixiy jism hisoblanadi. Uning qalinligi o'rtacha 18-20 santimetrni tashkil etib, Yer yuzasining turli joylarida bir necha millimetrdan 1,5-2 metrgacha bo'ladi. Tuproqning eng muhim xususiyatlaridan biri - o'simlikni suv, havo va ozuqa moddalar bilan ta'minlaydi.

Tuproq barcha elementlarni o'zida saqlab, ularni suv bilan yuvilib ketishidan asraydi. Tuproqning gumusi uning umumiy unumdorligini belgilab beradi. Tuproq barcha moddiy farovonligimizning manbaidir, u oziq-ovqat mahsulotlari, chorva uchun yem-xashak, kiyim-kechak uchun tola, yog'och materiallari va boshqalarni beradi.

Xo'jalik faoliyatida yerlarning unumdorligini saqlash va ulardan oqilona foydalanish katta ahamiyat kasb etadi. U dehqonchilikni rivojlantirishning tabiiy sharti bo'lib, qishloq xo'jaligi ekinlari hosildorligi va yalpi hosilning ko'payishiga yordam beradi.

Respublikamizda yerlarning uzluksiz o'zlashtirilishi va foydalanilishi natijasida sho'rlanishning darajasi ortib bordi. O'zbekistonda sho'rlangan yerlar sug'oriladigan yerlarning 50,7 % (2170,7 ming gektar) ini tashkil etadi. O'simlikning normal o'sishi va rivojlanishiga to'sinlik qiluvchi, tuproqning yuza qatlamida natriy, kaltsiy, magniy tuzlarining to'planishi sho'rlanish deyiladi. Ma'lumki, sho'rlanish natijasida har yili Yer shari bo'yicha 300000 gektar sug'oriladigan yerlar ishdan chiqadi. O'zbekiston bo'yicha tuproqning sho'rlanish darajasi nisbatan barqaror.

Suv, shamol va antropogen omillarning tuproqqa salbiy ta'sir etishi natijasida uning ustki unumdor qatlamining yuvilib va uchib ketishi eroziya (lotinchada *erosia* – kenirilish, yemirilish), deb yuritiladi.

Shamol erozivasi yoki deflyatsiya tuproqning quruq va mayda zarrachalarini shamol ta'sirida uchirilishidan kelib chiqadi. Quruq, yengil, qumoq tuproqlar, nam tuproqqa nisbatan bunday eroziyaga ko'p uchraydi.

O'zbekistonda shamol ta'siri ostidagi tuproq deflyatsiyasi 50 % dan ortiq cho'l va bo'z tuproq mintaqalarini qamrab olgan. Farg'ona vodiysining g'arbiy va markaziy qismi, Buxoro vohasi, Mirzacho'lning

shimoliy–g‘arbiy cho‘li, Qarshi va Sherobod cho‘llari, shuningdek, Qoraqalpog‘iston Respublikasi va Xorazm viloyatining sug‘oriladigan yerlari shamol ta‘siri ostida ko‘proq deflyatsiyaga uchragan.

Suv erozivasi ko‘pincha sug‘oriladigan dehqonchilik bilan shug‘ullaniladigan, qiyalik joylarda kuzatiladi. Bunda o‘simlik uchun zarur bo‘lgan gumus va boshqa oziqa elementlari yuvilib ketadi. Unumdorlik pasayib, sug‘orish shahobchalari ham ishdan chiqadi. Respublikamizning Qashqadaryo, Toshkent, Samarqand viloyatlarida sug‘oriladigan yerlarni ko‘p qismi irrigatsiya eroziyasiga uchragan. Bunday maydonlar respublika bo‘yicha 643,2 ming gektarni tashkil qiladi.

Antropogen eroziya – suv va shamol bilan bog‘liq ravishda insonning o‘z xo‘jalik faoliyatini noto‘g‘ri yurgizishi tufayli yuzaga keladi.

Neft qazish va qidiruv ishlari ham tuproqning ifloslanishiga olib keladi, natijada tuproq yuzasida bitum hosil bo‘ladi, shuningdek, burg‘ulash ishlarida foydalaniladigan suyuqliklar tuproqning sho‘rlanishiga olib keladi, bu esa shu yerdagi o‘simliklarning nobud bo‘lishiga sabab bo‘ladi.

Sanoat chiqindilari hisoblanadigan turli xil chiqindilar havodan atmosfera yog‘inlari bilan tuproqqa tushib, uning xususiyatlarini o‘zgartiradi. Tuproq maishiy xo‘jalik chiqindilari bilan ham ifloslanadi. Ya‘ni, turli xildagi axlatlar, polietilen plyonkalar va boshqa xil qadoqlash chiqindilari tuproqni ifloslaydi.

Bilib qo‘ygan yaxshi!

**Birlashgan Millatlar Tashkilotining Bosh Assambleyasi
22-aprel kunini Xalqaro Yerni muhofaza qilish kuni, deb
e‘lon qilgan.**

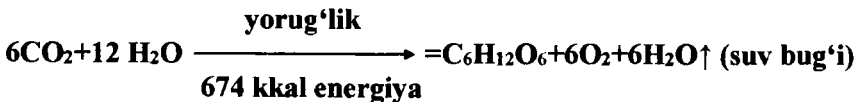
O‘zbekiston Respublikasida «Yer haqidagi kodeks» 1998 - yilda joriy etildi. Shunga ko‘ra, yerlardan foydalanish mahsuldorligini oshirish fermer va dehqon xo‘jaliklarida yetarli bilim va malakani hosil qilish bilan bevosita bog‘liq. O‘g‘itlarning ilmiy asoslangan holda yerga to‘g‘ri qo‘llanilishi hamda qo‘llash meyorlariga rioya qilish orqali yerlar ifloslanishining oldi olinadi. Bundan tashqari, sug‘oriladigan yerlarda ikkilamchi sho‘rlanish xavfini bartaraf etish ham zarur chora-tadbirlarni vaqtida amalga oshirish orqali bartaraf etiladi.

X BOB. O‘SIMLIK RESURSLARI VA ULARNI MUHOFAZA QILISH

17-§. O‘simliklar dunyosi

Insoniyat hayotida o‘simliklarning o‘mi biqiyosdir. Ular birgina inson hayotidagina emas, balki tabiatdagi mavjud barcha qurt-qumursqalardan tortib to ulkan umurtqali hayvonlar hayotida ham g‘oyat katta ahamiyatga egadir. Chunki, ularsiz tirik organizmning yashashi mumkin emas. Fotosintez jarayoni faqat o‘simliklarda sodir bo‘ladi. O‘simliklar CO₂ gazini atmosferadan, suvni va unda erigan mineral tuzlarni ildizi orqali tuproqdan shimib oladi. O‘simlikdagi xlorofill donalarida yorug‘lik ta‘sirida CO₂ va H₂O birikib, birinchi navbatda glyukoza (organik modda) sintezlanadi, erkin O₂ atmosferaga ajralib chiqadi. Shakar eritmasi bargdan o‘simliklarning hamma boshqa organlariga oqib boradi va kraxmal, boshqa organik moddalarga aylanadi. Yutilgan yorug‘lik energiyasi kimyoviy energiyaga aylanib, sintezlangan organik moddalarda to‘planadi. Hosil bo‘lgan bu organik moddalar hamma tirik organizm uchun oziqa sifatida sarflanadi. Atmosferaga ajralib chiqqan kisloroddan tirik organizmlar, shuningdek, o‘simliklarni o‘zi ham nafas oladi. Oziq zanjirda bu organik modda va unda to‘plangan energiya bir organizmdan ikkinchisiga va boshqalarga o‘tadi.

Suv muhitida yashaydigan hayvonlar uchun oziq modda va O₂ ni tuban o‘simliklar – suv o‘tlari ta‘minlab beradi. Lekin CO₂ va O₂ gazlari suvda erigan holda bo‘ladi.



Bu jarayonda hosil bo‘lgan kislorod bilan barcha tirik organizmlar, shuningdek, o‘simliklar ham nafas oladi. Hosil bo‘lgan organik moddalardan hamma tirik organizmlar oziqlanadi.

O‘simliklar biz uchun oziq-ovqat, kiyim-kechak, dori-darmon manbasi, qurilish materiallari uchun xom ashyo, yoqilg‘i, chorva mollari uchun yem-xashak vazifasini o‘taydi, chorva mollari esa, o‘z navbatida go‘sht, sut, teri, yog‘ kabi inson uchun zarur bo‘lgan mahsulotlarni

yetkazib beradi. Mutaxassislarning aniqlashicha, bir gektardagi o'rmonzor kuniga 280-300 kilogramm karbonat angidriddan foydalanib, inson uchun kerakli organik moddalar (yog', oqsil, vitaminlar va hokazo) to'plashdan tashqari, 180-220 kilogrammgacha nafas olish uchun havo-kislorodni yetkazib berar ekan. Bundan tashqari, ular deyarli barcha mintaqalardagi tuproq qoplamini suv va shamol eroziyasidan, qolaversa, o'zlari o'sayotgan joylardagi tuproqning suv rejimini ham bir meyorda saqlab turadilar.

O'simliklar dunyosi - yerdagi hayotning birlamchi manbaidir. Ular yiliga 380 milliard tonna organik modda hosil qiladi, buning 325 milliard tonnasi dengiz va okean o'simliklariga, 38 milliard tonnasi o'rmonlarga, 6 milliard tonnasi o'tloqlarga to'g'ri keladi.

Bir qator mamlakatlarda juda ko'p o'rmonlar kesilib, ularning o'rniga katta-katta zavod, fabrikalar qurilmoqda. Ulardan chiqayotgan chiqindilarning atrof-muhitni ifloslantirishi ko'plab nodir va noyob o'simlik turlarining qirilib ketishiga sabab bo'lmoqda.

O'zbekiston Respublikasi mustaqillikka erishgach, atrof-muhitni, hayvonot va o'simliklar dunyosini muhofaza qilishga alohida e'tibor qaratmoqda. 1992-yilning 9-dekabrida «Tabiatni muhofaza qilish» to'g'risida, 1993-yilning 7-mayida «Alohida muhofaza qilinadigan hududlar» to'g'risida, 1997-yilning 26-dekabrida «O'simliklar dunyosini muhofaza qilish va undan oqilona foydalanish» to'g'risidagi qonunlar qabul qilindi. Ushbu hujjatlarda tabiiy sharoitda o'sadigan o'simliklar dunyosini, shuningdek, takror yetishtirish va genofondini saqlash uchun ekib o'stiriladigan yovvoyi o'simliklarni muhofaza qilish va ulardan foydalanish haqida ma'lumotlar keltirilgan va vazifalar belgilab berilgan.

Ma'lumki, har qanday turning yo'qolishi uni tiklab bo'lmaydigan oqibatlariga olib keladi, binobarin, yovvoyi o'simliklar qishloq xo'jaligida ekiladigan madaniy navlarni barpo etishda manba sifatida juda katta rol o'ynaydi. Hozirgi kunda dunyo bo'yicha 500 mingga yaqin o'simlik turi mavjud bo'lib, shulardan 8 % i suv o'tlari, 50 % dan ortig'i gulli o'simliklar, 27 % i zamburug'lar, qolganlari mox va lishayniklardir. Ochiq urug'lilar – archalar O'zbekistonda o'rmonlarni tashkil qiladi.

O'zbekiston Respublikasi hududida 4,5 mingga yaqin yovvoyi o'simlik va 2000 dan ziyod zamburug' turlari mavjud. Shundan 577 tasi dorivor, 103 turi bo'yoqbop, 560 turi efir moyli o'simliklar hisoblanadi. Ular orasida jiddiy muhofazaga muhtoj ko'pgina kamyob, endem va

relik turlar ham bor. Bunday turlarning soni 400 ta atrofida bo'lib, ular O'zbekiston florasining 10-12 % ini tashkil etadi.

Yer yuzida dorivor o'simliklarning 10-12 ming turi bor. 1000 dan ortiq o'simlik turlarining kimyoviy, farmakologik va dorivorlik xossalari tekshirilgan. O'zbekistonda mavjud dorivor o'simliklarning 577 turidan hozirgi vaqtda 250 turi ilmiy tabobatda ishlatilmoqda. Dorivor o'simliklarning ta'sir etuvchi moddasi — alkaloidlar, turli glikozidlar (antroglikozidlar, yurakka ta'sir etuvchi glikozidlar, saponinlar va b.), flavonoidlar, kumarinlar, oshlovchi va boshqa shilliq moddalar. Efir moylari, vitaminlar, smolalar va boshqa birikmalar bo'lishi mumkin. O'zbekistonda dorivor o'simliklardan ko'proq anor, achchiqmiya, bodom, dorivor gulxayri, yong'oq, jag'-jag', zubturum, isiriq, itsigek, omonqora, pista daraxti, sachratqi, choyo't, shildirbosh, shirinmiya, shuvoq, yantoq, qizilcha, qoqio't va boshqalar tarqalgan. Achchiqmiyadan — paxikarin, isiriqdan garmin, omonqoradan galantamin, shildirboshdan sferofizin alkaloidlari olinadi. Anor po'stidan gija haydovchi pelterin tanat va ekstrakt tayyorlanadi. Dorivor gulxayri preparatlari balg'am ko'chiruvchi va yumshatuvchi, jag'-jag' va lagoxilus dorilari qon ketishni to'xtatuvchi, pista va choyo'tdan tayyorlangan dorilar meda-ichak kasalliklarini davolovchi sifatida ishlatiladi.

Dorivor o'simliklarni tabiatdagi zahirasini saqlab qolish va har yili ulardan ma'lum miqdorda mahsulot tayyorlab turish maqsadida quyidagi qoidalarga rioya qilish kerak:

1. Dorivor o'simlik mahsulotlarini ilmiy asoslangan reja bo'yicha, ko'p o'sadigan joylarni va zaxirasini to'g'ri aniqlab bilgan hamda tayyorlanadigan joylarini vaqt-vaqtida almashtirib turgan holda yig'ish lozim.

2. Ko'p yillik o'simliklarning yer ustki qismi (bargi, guli, mevasi) dan dori tayyorlanadigan bo'lsa, ularning ildizi bilan sug'urib olmaslik lozim. Bordi-yu, yer ostki organlari (ildizpoya, ildiz, tukanak) kovlanadigan bo'lsa, mevasi pishib to'kilgandan so'ng yig'ish kerak. Aks holda shu dorivor o'simliklar keyinchalik o'sha joyida



o'sib chiqmasligi mumkin.

3. Yovvoyi holda o'sadigan dorivor o'simliklar dori tayyorlash uchun yig'ib olingandan so'ng (ayniqsa, yer osti organlari kavlab olingandan so'ng) ularning keyinchalik yana o'sib chiqishiga katta ahamiyat berish lozim. Buning uchun bir yerdan necha yilgacha o'simlik mahsulotini yig'ish mumkin va necha yil dam berish kerakligi haqidagi qoidalarga qat'iy rioya qilish kerak.

4. Dorivor o'simliklarni sug'oriladigan yerlarga ko'proq ekib o'stirish va ularni agrotexnikasini yaratilsa, respublikamizda tabiiy sharoitda o'sayotgan dorivor o'simliklar zahirasini saqlab qolish imkoniyati yaratiladi.



Aholining tabiatga noto'g'ri munosabati ham o'simliklarning kamayib ketishiga sabab bo'lmoqda. Ayniqsa, keyingi yillarda qizil lola, sallagul, shirach va shunga o'xshash nafis gulli o'simliklarning juda kamayib ketganligining guvohi bo'lib turibmiz.

O'simlik turlarini saqlash va muhofaza qilish uchun 1979-yilda O'zbekiston "**Qizil kitobi**" ta'sis etildi. *Qizil rang* - xavfli, ta'qiqlovchi va man qiluvchi ramziy ma'noni anglatadi. "**Qizil kitob**" nabotot olamining kamyob, yo'qolib ketish xavfi ostidagi turlari haqida mukammal ma'lumot beradi. Uning vazifasi - jamoatchilik va davlat idoralarini tabiat muhofazasi masalasiga jalb etishdan va turlar genofondini saqlab qolishga ko'maklashishdan iborat.

O'zbekiston florasining yo'qolib ketish xavfi ostida turgan 163 turi "**Qizil kitob**"ning 1984-yilgi nashriga kiritilgan. Shuni esda tutish kerakki, "**Qizil kitob**" ning birinchi jildi (tomi) hayvonlar bo'yicha bo'lib, 1983-yilda nashr qilingan. 1998-yilga kelib, O'zbekiston "**Qizil kitobi**" ga kiritilgan o'simlik turlarining soni 301 taga yetdi. 2009-yilda nashr etilgan O'zbekiston Respublikasining «**Qizil kitobi**» ga esa 321 ta o'simlik va 3 ta zamburug' turlari kiritilgan.

Eslatib o'tamiz, xalqaro Qizil kitobga (1996-yil) 34 ming turdagi o'simliklar (dunyo florasining 12,5 % i) va 5,5 ming turdan ziyod hayvonlar kiritilgan.

O'simlik dunyosini muhofaza qilish jarayonida keng omma ishtirok etgan taqdirdagina ijobiy natijalarga ega bo'lish mumkin.

Shundagina, biz kelgusi avlodlar uchun nabotot olamining bebaho boyligini saqlab qoldirgan bo'lamiz.

Bilib qo'rgan yaxshi!

Ma'lumotlarga qaraganda, har yili Yer yuzasida 13 million gektar o'rmonlar yo'qolmoqda. Rossiya, Qozog'iston, AQSH, Kanada, Xitoy, Braziliyada yerlarni o'zlashtirish keng ko'lamda olib borilmoqda.

Esda tuting!

Flora lotincha "flora" - gullar, bahor va yoshlikning xudosi; o'simlik turlarinnig majmui.

Bilib qo'rgan yaxshi!

Botanika bog'i 1950-yilda Toshkent shahrining shimoliy-g'arbiy qismida tashkil etilgan. Uning asoschisi botanik F.N.Rusanov hisoblanadi. Bu yerda dunyoning turli mamlakatlaridan keltirilgan daraxtlarni iqlimlashtirish, O'rta Osiyoda noyob va yo'qolib borayotgan o'simlik turlarini saqlash, gulli o'simliklarni iqlimlashtirish, tropik va subtropik o'simliklarni ko'paytirish maqsadida tibbiy botanika, sanoat botanika, geobotanika, o'simliklar ekologiyasi kabi ilmiy laboratoriyalar ishlab turibdi.



Savol va topshiriqlar

1. *O'simliklar dunyosi* tabiatda qanday ahamiyatga ega?
2. Yer yuzida qancha tur o'simliklar bor?
3. *O'zbekiston o'simliklar dunyosida* qancha o'simliklar turi mavjud?
4. "*Qizil kitob*" haqida fikr yuriting.
5. O'zbekistonda o'simliklarni muhofaza qilish borasida davlatimiz tomonidan qanday ishlar olib borilmoqda?

XI BOB. HAYVONOT DUNYOSI VA UNI MUHOFAZA QILISH

18-§. Hayvonot dunyosi

Respublikamiz o‘simlik olamiga boy bo‘libgina qolmay, balki hayvonot olamiga ham boydir. Hayvonot olami, umuman, insoniyatning yashashi, hayoti faoliyatida juda muhimdir. Ma‘lumki, uy hayvonlari hisoblanadigan qoramol, qo‘y, echki, to‘ng‘iz, ot, eshak, tuya, qolaversa it, mushuk kabi jonzotlar bizning hayotimizda aniq bir maqsad uchun boqiladi. Ayrim hayvon turlari biz uchun oqsil, moy, sut manbai bo‘lsa, boshqasi xo‘jalik uchun asqotadigan ishlarni bajaradi, transport sifatida, uylarni qo‘riqlashda, zararkunandalar bilan kurashishda beminnat dastyor hisoblanadi.

Tabiat qo‘ynida yovvoyi holda yashaydigan hayvonlarning ham o‘ziga xos foydali xususiyatlari mavjud, jumladan, ulardan mo‘yna, dorivor vositalar, oziq-ovqat mahsulotlari, jun olinadi.

O‘zbekistondagi asosiy xo‘jalik ahamiyatiga ega bo‘lgan hayvonlar, jumladan, suv havzalarida yashovchilar: baliqlar, ondatralar; quruqlikda yashovchilar: sayg‘oqlar, toshbaqalar, zaharli ilonlar, kakliklar, tog‘ echkilari va umurtqasiz hayvonlar kabilar muhim o‘rin egallaydi.

Hayvonlar tabiatda tabiiy vositalarning muvozanatini saqlab turishda xizmat qiladi. Darhaqiqat, sayyoramizda hayvonlarning *bir yarim milliondan* ziyod turi bor.

Tuproq tarkibini yaxshilashda va uning hosildorligini oshirishda hayvonlarning, xususan, yomg‘ir chuvalchangining, chumolining, umurtqali yer qazuvchilarning va boshqa jonzotlarning ahamiyati juda katta. Bu hayvonlar tuproqni yumshatadi, aralastiradi, najas va o‘simlik qoldiqlari bilan o‘g‘itlaydi.

O‘simliklarning changlanishida, urug‘ va mevalarini tarqatishda ham hayvonlarning ishtiroki bor. Ayrim yirtqich qushlar esa zararkunandalar (kemiruvchilar) ni qirib, o‘simliklar hosildorligini oshiradi yoki ba‘zi hasharotlar o‘simliklarni zararkunanda hasharotlardan va kasalliklardan saqlaydi. Masalan: bitta boyqush bir yilda 1000 ta sichqonni yo‘q qilib, 0,5 tonna donni saqlab qoladi.

Bir hujayrali dengiz hayvonlarining qoldiqlaridan cho‘kindi jinslar (bo‘r, ohaktosh) vujudga kelsa, polioplarning faoliyati tufayli okeanlarning sayoz va iliq suvli qismida marjon orollari vujudga keladi.

Qadimda ham, texnika taraqqiyoti rivojlangan hozirgi kun ham odamlar hayvonlarga chiroyli terisi, mazali go'shti, qimmatbaho suyagi uchun qiziqishgan bo'lsa, o'ta johil kishilar ov qilishni ermak bilib, hayvonot olamini yo'q qilishgan. Masalan, 1800 yilgacha sut emizuvchilarning 33 turi, qushlarning 30 turi yo'q qilingan bo'lsa, undan keyingi 100 yilda 73 tur sut emizuvchi, 124 qushlar batamom yo'qolgan. Manbalardan ma'lumki, 1872-1874- yillarda AQSh dagi Kanzas temir yo'li qurilishi vaqtida "ishtiyoqmand" ovchilar har yili 2,5 million bosh bizonni otib tashlaganlar, ularni bu beozor jonivorning na mazali go'shti va na terisi qiziqitirmagan. Oqibatda, bizonlar shu qadar kamayib ketganki, hozir ular qisman maxsus qo'riqxonalaridagina saqlanib qolgan, xolos.

O'zbekiston hududida hayvonot olami qanchalik muhofaza qilinmasin va ularning ko'payishiga sharoit yaratib berilgan bo'lmasin, goho ularni pinhoni ov qiluvchi shaxslar uchrab turishini e'tirof etish o'rinli bo'ladi, albatta. O'zbekistonning hayvonot olamida 688 tur umurtqali hayvonlar bo'lib, shulardan: sut emizuvchilar - 105; qushlar - 441; sudralib yuruvchilar - 60; amfibiyalar - 3; baliqlar - 76 turni o'z ichiga oladi. Umurtqasiz hayvonlar esa 15 ming turdan ortiqdir (O'zbekiston "Qizil kitobi", II jild, 2009-yil).

So'ngi yarim asrdan ortiq davr mobaynida, tabiatdan foydalanishning kuchayishi natijasida ko'plab hayvon turlari inson ta'siri ostida qolib, ularning yashash joylari, soni qisqardi. Asosiy sababi - hududlarning xo'jalik maqsadlarida tabiat qonunlariga e'tiborsiz o'zlashtirilishi, atrof - muhitning ifloslanishi, biologik resurslardan meyersiz foydalanishdir. O'lka hududidan turon yo'lbarisi, shuningdek, qizil bo'ri butunlay yo'qolib ketgan bo'lib, qoplon, Old Osiyo qoplioni, yo'l-yo'l sirtlon, tuvaloq kabi jonzotlarning yo'qolib ketish xavfi bor.

Hayvonlarning noyob va yo'qolib borayotgan turlarini muhofaza qilishda, ularning yashash sharoitini yaxshilash va ko'payishi uchun qulay imkoniyatlar yaratib berish kerak. Buning uchun birinchidan, yo'qolib ketayotgan va noyob hayvon turlarini qat'iy nazorat ostiga olib, ov qilishga mutlaqo yo'l qo'ymaslik va ikkinchidan, o'sha hayvonlar yashaydigan hududlarni tabiiy holicha saqlab, qo'riqxonalariga, buyurtmaxonalarga aylantirish zarur.

O'zbekistonda chop etilgan yangi «Qizil kitob» ga (2009-yil) 23 tur sut emizuvchilar (kenja turlar bilan 24), 48 tur qushlar (kenja turlar bilan 51), 16 tur sudralib yuruvchilar, 17 tur baliqlar (kenja turlar bilan 18), halqasimon chuvalchaglarning 3 turi, mollyuskalarning 14 turi

(kenja turlar bilan 15) va bo'g'imoyoqlilarning 60 turi (kenja turlar bilan 61) kiritildi.

O'zbekiston mustaqillikka erishganidan boshlab jamiyatni demokratlashtirish va tabiatni muhofaza qilish sohasidagi qonunchilik ishlari tobora takomillashtirilib borilmoqda. Jumladan, "Tabiatni muhofaza qilish to'g'risida" (1992-yil.), "Alohida muhofaza qilinadigan tabiiy hududlar to'g'risida" (1993-yil.), "Hayvonot olamini muhofaza qilish va undan foydalanish to'g'risida" (1997-yil) kabi qonunlar asosida hayvonot olami muhofaza qilinmoqda.

Ona tabiatimizning rang-barangligi kecha, bugun paydo bo'lgan emas, balki bu bebaho ne'mat bir necha ming yillar davomida ajdodlarimizdan bizga qoldirilgan aziz merosdir. Shuning uchun ham har birimiz tabiat boyliklarini muhofaza qilish, uni ko'z qorachig'iday avaylab-asrashimizda o'zimizni mas'ul, javobgar sezishimiz darkor.

Esda tuting!

Fauna lotincha "fauna" - o'rmon va dalalar xudosi, hayvonlar to'dasining himoyachisi (hayvonot olami).

Bilib qo'ygan yaxshi!

Toshkent hayvonot bog'i 1920-yilda tashkil etilgan. Hayvonot bog'i kattalar va bolalar uchun sevimli dam olish maskani bo'libgina qolmay, balki u kishilarning hayvonot olami haqidagi bilimlarini kengaytirishga xizmat qiladi hamda O'zbekiston "Qizil kitobi" ga kiritilgan noyob va yo'qolib borayotgan turlar bilan ham tanishtiradi.



Savol va topshiriqlar

1. Hayvonot dunyosining qanday ahamiyati bor?
2. O'zbekiston hayvonot olamida qancha tur hayvonlar bor?
3. O'zbekistonda hayvonot olamini muhofaza qilish borasida qanday ishlar olib borilmoqda?
4. O'zbekiston hayvonot olamida qanday turlar yo'qolib ketgan?

XII BOB. ALOHIDA MUHOFAZA QILINADIGAN HUDUDLAR VA BIOLOGIK XILMA-XILLIK

19-§. Alohida muhofaza qilinadigan hududlar

O'zbekiston o'simlik va hayvonot dunyosini saqlab qolishda muhofaza etiladigan tabiiy hududlar katta ahamiyatga ega. O'zbekistonning bunday tabiiy hududlari tizimiga umumiy maydoni 2274 km² bo'lgan 9 ta davlat qo'riqxonasi, umumiy maydoni 5987 km² bo'lgan 2 ta milliy bog', maydoni 15092,5 km² bo'lgan 10 ta davlat buyurtmaxonasi va noyob hayvon turlarini ko'paytirish bo'yicha maydoni 51,6 km² bo'lgan 3 ta tabiiy pitomniklar, maydoni 37,5 km² bo'lgan 5 ta tabiat yodgorliklari kiradi. Muhofaza qilinadigan tabiiy hududlarning umumiy maydoni 23442,6 km² ni tashkil qiladi.

Tabiatni muhofaza qilish ishlari, O'zbekiston Respublikasining "Tabiatni muhofaza qilish to'g'risida"gi (1992-yil 9-dekabr), "Muhofaza etiladigan tabiiy hududlar to'g'risida"gi (2004-yil 3-dekabr) Qonunlarga asosan, maxsus muhofazaga olingan hududlarni tashkil etish va tabiiy obyektlarni saqlash orqali amalga oshiriladi. Bular esa, qo'riqxonalar, buyurtmaxonalar, tabiat yodgorliklari, milliy bog'lar va ovchilik xo'jaliklari hisoblanadi (3 – 4 – 5- jadvallar).

Qo'riqxonalar – quruqlik yoki suv havzasining bir qismi hisoblanib, ulardan xo'jalik maqsadida foydalanilmaydi.

Qo'riqxonalarining asosiy vazifasi – tabiatning diqqatga sazovor, go'zal va saxiy tabiatini muhofaza qiladi va kelajak avlod uchun saqlab qolishdan iborat. Qo'riqxonadan xo'jalik maqsadlarida foydalanish, hatto pichan tayyorlash, ov qilish, baliq tutish, zamburug'lar terish, mevalar yig'ish, suv havzalaridan foydalanish kabilar qat'iy an ta'qiqlanadi.

O'zbekistonda birinchi qo'riqxonasi 1926-yilda Zomin tumanida «Go'ralash» tog'-archa qo'riqxonasi nomi bilan tashkil etilgan. Keyinchalik, Zomin tog' archazor qo'riqxonasi nomi bilan 1960-yilda qayta nomlandi.

Buyurtmaxonalar doimiy va vaqtinchalik bo'lib, ayrim o'simlik va hayvonlarning turlarini tiklash va ko'paytirish uchun tashkil etiladi hamda ulardan xo'jalik maqsadida foydalanishga ruxsat etiladi. Shuningdek, buyurtmaxonalar har xil maqsadlarda ham tashkil etilishi mumkin. Masalan: kompleks, botanik, geologik, gidrologik, zoologik, landshaft va boshqalar.

Milliy bog'lar dunyodagi ko'pgina mamlakatlarda tabiat go'shalarini muhofaza qilishning asosiy yo'llaridan biri hisoblanadi. Ular - landshaftlarni saqlash bilan birga aholini dam olishi, sog'lomlashtirish va estetik maqsadlarda, shuningdek, fan, madaniyat-ma'rifat nuqtai nazaridan ham muhofazaga olingan hududlardir.

1872-yilda birinchi milliy bog' AQShda Yelouston (Yellow stone) daryosining yuqori qismida tashkil etilgan. Bugungi kunda dunyo bo'yicha 2300 dan ortiq milliy bog'lar mavjud. 1974-yilda Grenlandiya (Daniya)da tashkil etilgan milliy park.

O'zbekiston Respublikasida Zomin va Ugom-Chotqol milliy bog'larida insonlarning dam olishi, sport o'yinlari va turizm bilan shug'ullanishlari bilan birga tog' landshaftlari, hayvonlar va tabiatning ajoyib namunalari muhofazaga olingan.

Tabiat yodgorliklari ilmiy, madaniy, tarixiy jihatdan tabiat obyektlarini muhofaza qilish uchun tashkil etiladi. Tabiat yodgorliklariga g'orlar, buloqlar, sharsharalar, geyzerlar, relyef shakllari, ayrim noyob daraxtlar, geologik ochilib qolgan joylar, tarixiy obidalar va boshqa obyektlar kiritiladi. Tabiat yodgorliklari maqsadiga ko'ra geologik, geomorfologik, botanik, paleontologik, astronomik va landshaft yodgorliklariga bo'linadi.

Tabiiy pitomniklar O'zbekistonda tabiatni muhofaza qilish va biologik xilma-xillikni saqlash maqsadida, noyob hayvon turlarini ko'paytirishning samarali shakllaridan hisoblanadi. Bu pitomniklarda xalqaro va respublika ahamiyatiga ega jayron va yo'rg'a tuvaloq kabi noyob hayvon turlari sun'iy ravishda ko'paytiriladi.

Shunday qilib, O'zbekistonda faoliyat yuritayotgan maxsus muhofazaga olingan hududlar o'simlik, hayvonot dunyosi va go'zal tabiatimizning ajoyib namunalari himoya qilish va ko'paytirishda muhim rol o'ynaydi.

3-jadval

O'zbekiston Respublikasining muhofaza etiladigan tabiiy hududlari

№	Rasmiy nomi va tashkil etilgan yili	Joylashgan yeri	Maydoni, km ²
Davlat qo'riqxonalari			
1	Chotqol tog' o'rmonzorlari biosfera qo'riqxonasi, 1947-yil	Toshkent viloyati Ohangaron va Parkent tumanlari	451,6
	Hisor tog' archazorlari qo'riqxonasi, 1983-yil	Qashqadaryo viloyati Yakkabog' va	814,3

		Shahrisabz tumanlari	
3	Zomin tog' archazorlari qo'riqxonasi, 1926-yil, 1960-yil	Jizzax viloyati Zomin va Baxmal tumanlari	268,4
4	Baday-to'qay yalanglik to'qayzorlari qo'riqxonasi, 1971-yil	Qoraqalpog'iston Respublikasi Beruniy tumani	64,6
5	Qizilqum to'qay qumliklari qo'riqxonasi, 1971-yil	Buxoro viloyati Romitan tumani, Xorazm viloyati	101,4
6	Zarafshon yaylov-to'qayzorlari qo'riqxonasi, 1979-yil	Samarqand viloyati Bulung'ur va Jomboy tumanlari	23,5
7	Nurota tog' yong'oqzorlari davlat qo'riqxonasi, 1975-yil	Jizzax viloyati Forish tumani	177,5
8	Surxon tog' o'rmonzorlari qo'riqxonasi, 1987-yil	Surxondaryo viloyati Termiz va Sherobod tumanlari	276,7
9	Kitob geologiya qo'riqxonasi, 1979-yil	Qashqadaryo viloyati Kitob tumani	53,7

4-jadval

O'zbekiston Respublikasining muhofaza etiladigan tabiiy hududlari

№	Rasmiy nomi va tashkil etilgan yili	Joylashgan yeri	Maydoni, km ²
Davlat milliy bog'lari			
1	Zomin milliy bog'i, 1976-yil	Jizzax viloyati Zomin tumani	241,1
2	Ugom-Chotqol davlat-tabiat milliy bog'i, 1990-yil	Toshkent viloyati Bustonliq, Parkent, Ohangaron tumanlari	5745,9
Tabiiy pitomniklar			
1	"Jayron" ekomarkazi noyob hayvonlarni parvarishlash bo'yicha respublika markazi, 1976-yil	Buxoro viloyati Qoravulbozor tumani	51,4
2	"Emirates birds Breeding"	Buxoro viloyati	0,1

	MCHJ yo'rg'a-tuvaloq parvarishlash pitomnigi, 2007-yil	Peshku tumani	
3	"Emirates Centre for Conservation of Houbara" MCHJ yo'rg'a-tuvaloq parvarishlash pitomnigi, 2008-yil	Navoiy viloyati Karmana tumani	0,1
Tabiat yodgorliklari			
1	Vardanzi, 1997-yil	Buxoro viloyati	3,2
2	Mingbuloq, 1991-yil	Namangan viloyati	10
3	Chust, 1990-yil	Namangan viloyati	1
4	Yozyovon, 1994-yil	Farg'ona viloyati	18,4
5	Yangibozor, 2003-yil	Xorazm viloyati	4,9

5-jadval

O'zbekiston Respublikasining muhofaza etiladigan tabiiy hududlari

№	Rasmiy nomi va tashkil etilgan yili	Joylashgan yeri	Maydoni, km ²
Davlat buyurtmaxonalari			
1	Armasoy, 1983-yil	Jizzax viloyati	633
2	Dengizko'l, 1973-yil	Buxoro viloyati	500
3	Qoraqir, 1992-yil	Buxoro viloyati	300
4	Saygachi, 1991-yil	Qoraqalpog'iston Respublikasi	10000
5	Sudochye, 1991-yil	Qoraqalpog'iston Respublikasi	500
6	Muborak, 1998-yil	Qashqadaryo viloyati	2195,3
7	Oqtog', 1997-yil	Navoiy viloyati	154,2
8	Qarnobcho'l, 1998-yil	Samarqand viloyati	250
9	Qo'shrabot, 1998-yil	Samarqand viloyati	160
10	Nurobod, 1992-yil	Samarqand viloyati	400



Savol va topshiriqlar

1. O'zbekistonda alohida muhofazaga olingan hududlarning qanday turlari mavjud?
2. *Qo'riqxonalar*ning vazifasini ayting?
3. *Buyurtmaxonalar* nima uchun tashkil qilinadi?
4. *Pitomniklar* nima?
5. *Milliy bog'larni* tashkil etishdan maqsad nima?

20-§. Biologik xilma-xillik nima?

Sayyoramizdagi tiriklikning asosiy xususiyatlaridan biri xilma-xillik hisoblanadi. Bu esa evolyutsiya jarayonida tirik organizmlarning adaptogenezi natijasida yuzaga kelgan. Hozirgi vaqtda olimlarimiz tomonidan hayvonlarning 1,5 milliondan ziyod turi, 500 mingga yaqin o'simlik turi, 100 mingdan ortiq zamburug' turi va 40 mingdan ortiq sodd hayvonlar turi qayd qilingan. Bu raqamlar doimiy emas, chunki olimlar tomonidan yangi turlarning kashf etilishi natijasida bu raqamlar o'zgarishi mumkin.

Shunday qilib, biologik xilma-xillik deganda tirik organizmlarning xilma-xilligi, shuningdek, ekotizimlar, ekologik komplekslar va ular mavjud bo'lgan bo'g'inlar tushuniladi.

Biologik xilma-xillikni bir necha jihatlar bo'yicha tasvirlash mumkin:

- 1) Genetik xilma-xillik;
- 2) Turlar xilma-xilligi;
- 3) Ekotizimlar xilma-xilligi.

Genetik xilma-xillik bitta turga mansub bo'lgan organizmlar o'rtasidagi genotiplarning turli tumanligini nazarda tutadi.

Turlar xilma-xilligi, bu - qandaydir organizmlar jamoasi, ekotizimlar, regionlar ichidagi har xil turlar sonidir. Agar ekotizimda qanchalik tur xilma-xilligi yuqori bo'lsa, har xil noqulay sharoitlarga uning barqarorligi shuncha yuqori bo'ladi.

Ekotizimlar xilma-xilligi (landshaftlar xilma-xilligi) yashash joy xilma-xilligi, biosferadagi biotik jamoalar va ekologik jarayonlarni o'z ichiga oladi.

Yer yuzasida tiriklikni ta'minlab turish uchun turli-tuman mavjud turlarning barcha majmui xizmat qiladi.

Biologik xilma-xillik muammolari ancha keng va murakkab. Biologik xilma-xillikni o'rganishning asosiy maqsadi – genofondni saqlab qolishdan iborat. Erkin chatishuvchi organizmlar guruhi o'rtasida taqsimlangan ushbu genetik axborotning jamini genofond tashkil etadi.

Biologik xilma-xillik – bu jamiyat ehtiyojini iqtisodiy, ekologik va madaniy-estetik jihatdan qondirishning zaruriy potensial zahirasi hamdir. Hozirgi kunda biologik resurslarga insonlarning ta'siri o'smoqda. Bunga asosiy sabab, aholining o'sishi, qishloq xo'jaligi va sanoatning rivojlanishi, savdo, ishlab chiqarish, dunyo bo'yicha ehtiyojlarning turli-tumanligidir.

Inson faoliyatining rivojlanishi natijasida o'rmonlarni kesish, cho'llarni haydash, botqoqliklarni quritish, sahroga suv chiqarish kabi ekotizimlarning buzilishi ro'y bermoqda. O'simlik, hayvon yoki biron bir mikroorganizm turini yo'qotilishi oziqa zanjirining uzilishiga olib keladi. Bu holatni yuqori rivojlangan texnologiya ham to'xtata olmaydi.

1992-yilda Braziliyaning Rio-de-Janeyro shahrida tabiiy ekotizimdagi turlarning yo'qolishi va notirik komponentlarning o'zgarishiga qarshi kurashishga qaratilgan biologik xilma-xillikni asrash bo'yicha Xalqaro Konvensiyaga imzo chekildi. Ushbu hujjatda biologik xilma-xillikni saqlash, biologik xilma-xillikning komponentlaridan oqilona foydalanish, davlatlararo genetik resurslar va moddiy resurslardan, xalqaro savdoda teng huquqlilik, hamma qonun doirasiga mos keluvchi texnologiyalardan foydalanib ish yuritish ko'zda tutilgan. U hozirgi kunda 170 dan ortiq davlat tomonidan tasdiqlangan.

1993-yilda BMTning bioxilma-xillikni asrash bo'yicha xalqaro Konvensiyasi rasman kuchga kirgan. U 192 davlat tomonidan ratifikatsiya qilingan bo'lib, unga asosan, biologik turlarni muhofaza etish, tabiiy zahiralardan tejamkorlik bilan foydalanish, atrof-muhitni asrashda o'zaro hamkorlikni mustahkamlash bosh maqsad qilib olindi.

O'zbekiston 1995-yilning iyun oyida ushbu Konvensiyani tasdiqlash to'g'risidagi hujjatga imzo chekdi. Respublikamizda «Biologik xilma-xillikni saqlash Milliy strategiya va harakat rejasi» dasturi 1998-yilda qabul qilingan bo'lib, o'simlik va hayvonot dunyosining turi, tarkibi, tahlilini, zaruriy xilma-xillikni baholash va ekotizimdagi zamonaviy asosiy sinflar statusini ko'rib chiqishni vazifa qilib qo'ydi. Alqissa, 2010- yilda BMT tomonidan "Butunjahon bioxilma-xillik yili", deb e'lon qilinishi e'tiborga molikdir.

Respublikamizda biologik xilma-xillikni saqlash bo'yicha 9 ta qo'riqxonaga, 2 ta milliy bog' faoliyat ko'rsatmoqda.

Prezidentimiz I.A.Karimov 2010-yilning sentabr oyida BMT Bosh Assambleyasining Mingyillik rivojlanish maqsadlariga bag'ishlangan Sammitidagi nutqida xalqaro hamjamiyat e'tiborini Orol muammosiga qaratdi. Orol dengizining qurishi davom etayotgani va uning atrofida gumanitar falokat sodir bo'layotgani sababli, Orol bo'yining tabiiy biologik fondini asrab avaylash, Orol inqirozining atrof-muhitga, eng muhimi, bu yerda istiqomat qilayotgan yuz minglab odamlar hayotiga halokatli ta'sirini kamaytirish bugungi kundagi o'ta dolzarb vazifa ekanligini ta'kidladi. Bu borada ilgari surilgan taklif va mulohazalari xalqaro hamjamiyat tomonidan yuksak baholandi.

Xulosa qilib shuni aytish mumkinki, biologik xilma-xillik Yer yuzida barcha ekotizimlarda mavjud. Biron bir turning yo'qolishi yoki kamayib ketishi har xil tur populyatsiyasi uchun noqulaylik keltirib chiqaradi, zero, turlar doimo bir-biri bilan turlicha o'zaro bog'langan. Suv ekotizimi va quruqlik ekotizimlarida turlar xilma-xilligini saqlash hozirgi kunning dolzarb muammolaridan biri bo'lib qolmoqda.

Tabiat resurslaridan oqilona foydalanmasligimiz oqibatida, qanchadan-qancha turlar va notirik komponentlar xavf ostida qolayapti. Tabiatning chiroyli manzarasi, ko'rkam go'shalari, o'zining hayvonot va o'simlik olamining g'aroyibotligi bilan ajralib turuvchi biosferani saqlash har birimizning insoniylik burchimizdir. Maxsus muhofaza etilgan hududlar yaratish; tabiat yodgorliklari yoki o'rmon rezervatlarini asrash; qo'riqxonalar, buyurtmaxonalar, milliy bog'lar barpo etish; noyob endemik va reлект turlarni «Qizil kitob»ga kiritish; Botanika bog'larida sun'iy ekotizim yaratish, pitomniklar qurish, genofondni yaratish bugungi kunning asosiy vazifalaridan biridir.

Shuni ta'kidlash kerakki, biologik xilma-xillik, hayvon va o'simliklarning genetik resurslari maxsus muhofaza qilinadigan hududlarda samarali saqlanmoqda, biroq ular qiyosiy darajada katta bo'lmagan maydonlarni tashkil etadi.

Inson yashash muhitini yaxshilashi, zarur ehtiyojlarini to'laroq qondirishi uchun ekotizimlar mahsuldorligi va uning barqarorligini oshirish talab etiladi. Chunki, tabiat va jamiyat orasidagi muvozanatning buzilishiga yo'l qo'ymaslik har bir shaxsning burchidir.

Bilasizmi!

22 may – Xalqaro bioxilma-xillik kuni.

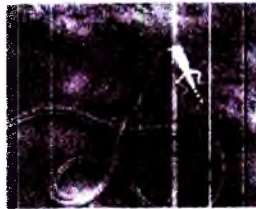
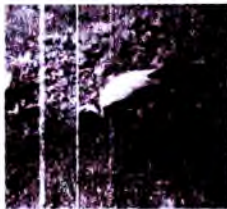
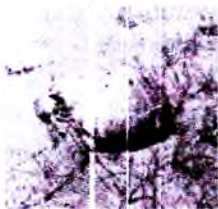
?

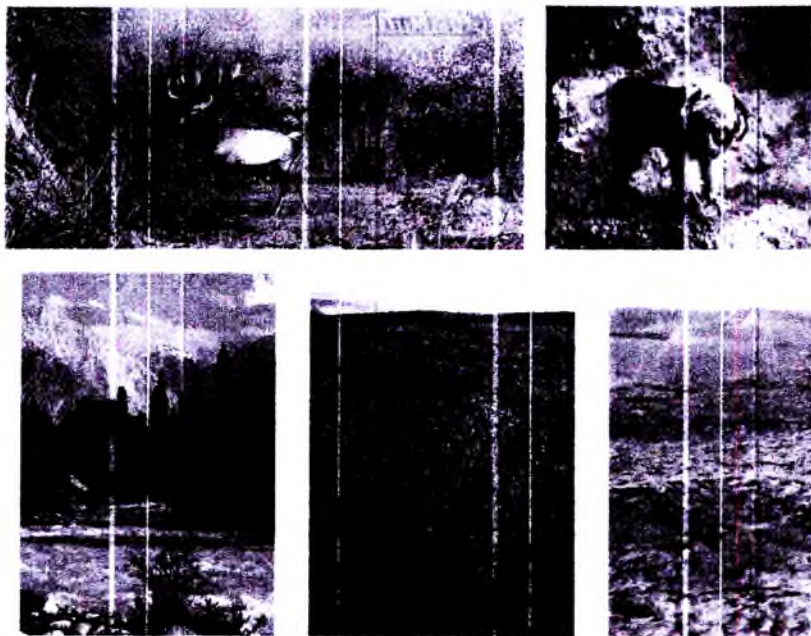
Savol va topshiriqlar

1. *Biologik xilma-xillik* deganda nimani tushunasiz?
2. *Biologik xilma-xillikning* qanday turlari mavjud?
3. *Genofond* nima?
4. O'zbekistonda *biologik xilma-xillikni* asrash bo'yicha qanday ishlar olib borilmoqda?

BIOLOGIK XILMA-XILLIK MAVZUSIGA QO'SHIMCHA MA'LUMOTLAR

1. *Tur xilma-xilligi* – butun o'simlik, hayvon, qo'ziqorin va mikroorganizmlar xilma-xilligini o'z ichiga oladi;





2. *Genetik xilma-xillik* – turlarning genetik materiali xilma-xilligi tushuniladi;

3. *Ekotizimlar xilma-xilligi* – ekotizimlar xilma-xilligi (masalan: o'rmon, tog', cho'l, savanna, adir va boshqalar).

Bu darajalarning umumiy ko'rinishi *biologik xilma-xillikni* tashkil etadi.

2003-yilda Kardiff universiteti professori Anthony Campbell biologik xilma-xilikning 4 darajasi – Molekulyar bioxilma - xillikni aniqlaydi.

Biologik xilma-xillik termini birinchi marta jonli tabiat olimi Raymond F. Dasmann tomonidan 1968-yilda "*A Different Kind of Country*" nomli kitobida aks ettirildi. Bu termin 10 yildan keyin, ya'ni 1980-yillarda ommalashdi. Robert E. Jenkins va Thomas Lovejoy lar Amerikada "biological diversity" terminini foydalanish uchun yoqlab chiqishdi.

Biologik xilma-xillik evolyutsiyaning 3,5 milliard yillik vaqt natijasidir.

Ko'p turlar ilmiy izlanish orqali topilmoqda. Har yili o'rtacha 5-10 000 atrofida yangi turlar, ulardan ko'pchiligi hashoratlar aniqlanadi.

Lekin ular klassifikatsiyaga solingani yo'q. Baholangan Bo'g'imoyoqlilarning 90 % ga yaqini klassifikatsiya qilingani yo'q.

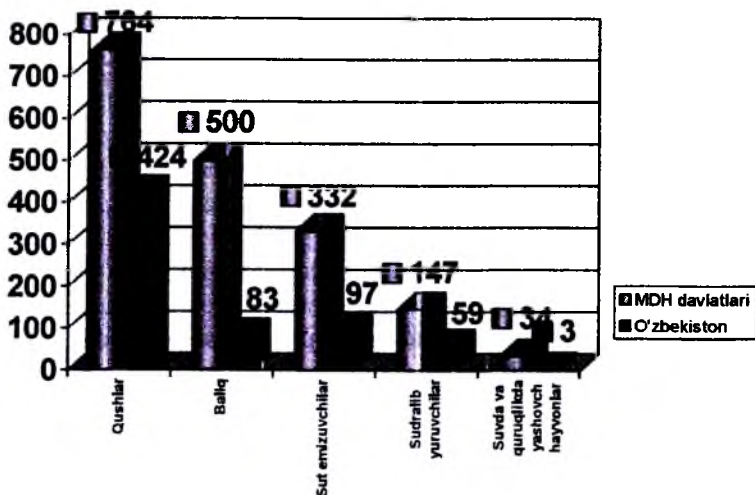
Biologik xilma - xillik tropik o'rmonlarda, ya'ni doimiy nam iqlimli hududlarda, jumladan, Ekvadordagi Yasuni milliy bog'ida yuqori bioxilma-xillik mavjud. Quruqlik bioxilma-xilligi okean bioxilma - xilligidan 25 marotaba yuqori. Yer yuzida mavjud bo'lgan 8,7 million turning 2,1 millioni okean uchun xos ekanligi baholandi.

Kolumbiya yuqori bioxilma - xillikka ega bo'lgan mamlakat hisoblanib, u yerda endemik turlar ko'p. Ya'ni bu turlar boshqa biro mamlakatda uchramaydi. Yerda mavjud bo'lgan turlarning 10 % ga yaqini Kolumbiyada uchraydi va 1900 dan ko'proq qush turlari Yevropa va SHimoliy amerikaga qaraganda ko'proq. Kolumbiyada dunyo sut emizuvchi turlarining 10 % i uchraydi. Dunyoning suvda va quruqda yashovchilarining 14 % i va dunyo qushlarining 18 % i Kolumbiyada uchraydi.

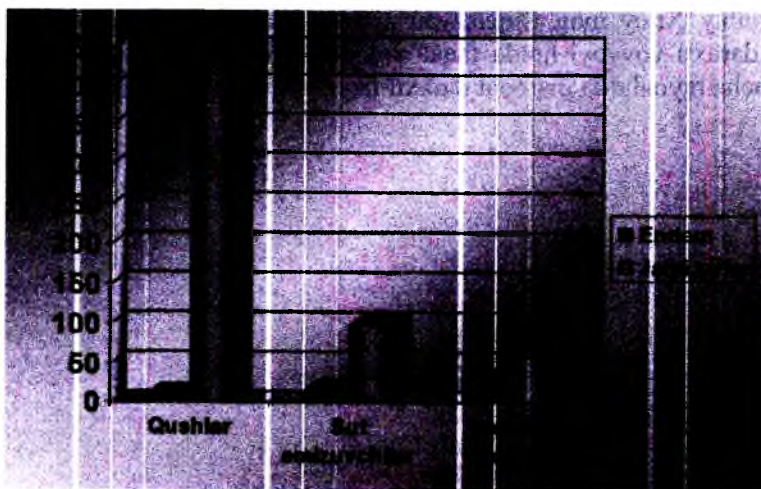
Indoneziya dunyo gulli o'simliklarining 10 % ini, sut emizuvchilarning 12 % ini, sudralib yuruvchilar, amfibiyalar va qushlarning 17 % ini o'z ichiga oladi.

Madagaskar orolidagi florada o'simlik turlarining 66 % i endemik, Yangi Zelandiya orolida esa 72 %, Gavaya orollarida 82- 90 %. Janubiy Xitoy ning Chjetszyan proventsiyasida Sharqiy osiyoning ginko daraxti yovvoyi holda faqat shu yerda o'sadi. AQSH g'arbidagi bir qancha rayonlarda mamont daraxti faqat shu yerlarda o'sadi.

4-shakl. Umurtqali hayvonlarning tur xilna-xilligini qiyosiy baholash



5-shakl. O'zbekistonning quruqlikdagi umurtqali hayvonlari endem turlarining darajasi



Hozirgi vaqtda, O'zbekiston va Markaziy Osiyoda mavjud endemlarning umurtqali hayvonlar bo'yicha 53 turi va kenja turi ma'lum. Endemizm darajasi, xususan, baliqlarda yuqori bo'lib, 52 % ni tashkil etadi (4-5 – shakllar).

XIII BOB. CHO‘LLANISH

21-§. Cho‘llanish muammosi

Markaziy Osiyoda, shu jumladan, O‘zbekistonda cho‘lga aylanish, ya’ni mavjud cho‘l hududining kengayish jarayonlari alohida tashvishli holatdir. Bu faqatgina cho‘l hududlarining kengayib borishidagina emas, balki biologik mahsuldorlik darajasining o‘zgarishida ham namoyon bo‘lmoqda.

1977-yilda BMTning cho‘llanishga qarshi kurash bo‘yicha Konferentsiyasida “Cho‘llanishga qarshi kurash bo‘yicha Harakatlar rejasi” qabul qilindi. O‘zbekiston Respublikasi “Cho‘llanishga qarshi kurash Konventsiyasi”ni 1994-yilning 7-dekabrida imzoladi va 1995-yilning 31-avgustida ratifikatsiya qildi.

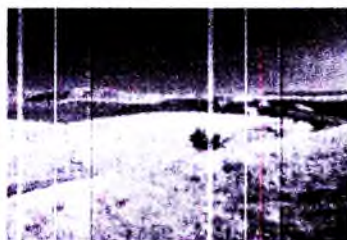
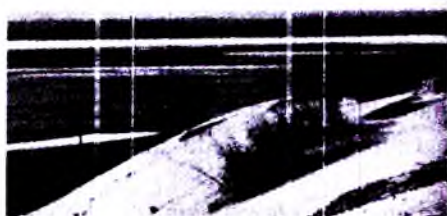
O‘zbekistondagi cho‘llanish jarayonlari u yoki bu darajada hududning 80 % ini qamrab olgan. Konventsiya majburiyatlarini samarali amalga oshirish sharoitlarini yaratish maqsadida, 1999-yilda “Cho‘llanishga qarshi kurash Milliy harakatlar dasturi” ishlab chiqilib, qabul qilindi va amaliyotga tadbiq etish amalga oshirilmoqda. Unda quyidagi ustuvorliklar belgilangan:

- Cho‘llanish rivojlanishining iqtisodiy va ijtimoiy oqibatlarini baholash;
- Hayot darajasini oshirishning zarur sharti sifatida yer, suv resurslari va ekotizimning boshqa elementlarini saqlash va tiklash;
- Cho‘llanish jarayonlari va oqibatlari to‘g‘risida aholini ma’lumotlar bilan ta’minlash;
- Monitoring tizimini rivojlantirish, axborotlar bazasi va ma’lumotlar banklarini yaratish;
- Qurg‘oqchilik va boshqa o‘ta xavfli hodisalarning erta oldini olish va oqibatlarini yumshatish tizimini yaratish;
- Ekologik xavf hududlariga alohida e’tibor bergan holda cho‘llanish va qurg‘oqchilik muammolarini hal etishga jamoatchilikni jalb etish;
- Mintaqaviy hamkorlik.

Cho‘llanish biologik hosildorlik va yerning unumdorligini keskin kamayib ketishiga olib keladi, o‘rmon, yaylov, pichanzorlarnig qisqarishini keltirib chiqaradi.

Degradatsiya, taxminan, qishloq xo‘jaligi uchun ishlatiladigan 5200 million gektar quruq yerning 70 % ini egallagan. Jahonda

cho'llanish har yili 23 million gektarga yaqin yerni o'z domiga tortmoqda.



Tabiiy o'rmonlarning va o'simlik qoplaminig qisqarishi, Orol dengizining qurishi, yangi katta tuzli cho'llarning shakllanishi, haddan tashqari chorva mollarini boqish, hudud gidrologiyasining o'zgarishi va shunga o'xshash holatlar, butun O'rta Osiyo mamlakatlarida, cho'llanish jarayonining faol harakatiga olib keldi. Ayniqsa, O'zbekiston, Qozog'iston va Turkmanistonda bu jarayon yaqqol ko'zga tashlanadi.

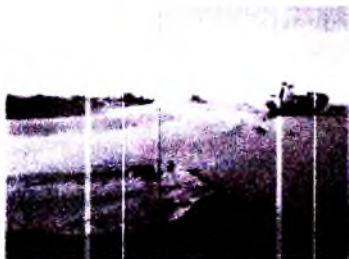
Cho'llanishni keltirib chiqaradigan omillar quyidagicha farqlanadi:

Tabiiy omillar:

- *iqlim* – yuqori harorat va quruq, juda quruq havo, kam miqdordagi yog'ingarchilik;
- *gidrologik* – namlikning katta miqdorda yo'qotilishi;
- *relyef* – qum va sho'rlangan yerlarning tabiiy holda tarqalishi;
- *tabiiy ofatlar* – toshqinlar, tog' va tog' oldi hududlardagi o'pirilish, nurash.

Antropogen omillar:

- *sug'orma dehqonchilik* – nomukammal irrigatsion tizim va agrotexnika tufayli yuzaga keladi, o'g'itlarning meyor bo'yicha berilmasligi va hokazolar;
- *haddan tashqari mollarni o'tlatish* – mollarni o'simlik qoplaminig rivojlanish fazalariga e'tibor bermasdan, rejasiz boqish;
- *muntazam inshootlarni qurish*: yo'l, neft va gaz o'tkazish, elektr tarmoqlarini o'tkazish, muhim ekologik chegara va yaroqsiz yerlarni hisobga olmasdan, kanal qurish va hokazolar;
- *cho'llanishga olib keluvchi boshqa omillar* (o'rmonlarni rejasiz kesish, buta va yarimbutalarni chorva mollari va yoqilg'i uchun kesish, tuproq va yer osti suvlarining zaharli moddalar bilan ifloslanishi, transport ta'siri, aholi punktlari atrofida chiqindilarning to'planishi).



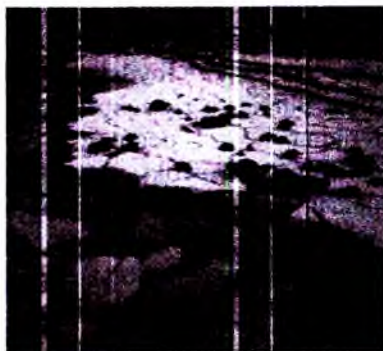
Cho'llanish yuzaga keltirgan salbiy holatlar

Demak, cho'llanish jarayonini keltirib chiqaradigan asosiy holatlar quyidagilar:

- tuproq sho'rlanishi;
- shamol va suv eroziyasi;
- tuproq chirindi qatlaminnig kamayishi;
- o'simlik qoplaminig degradatsiyasi;
- tuproqning kimyoviy zaharlanishi.

Tuproq sho'rlanishi

Tuproq sho'rlanishi – sug'orma dehqonchilikda rivojlanishni chegaralaydigan sabablardan biri hisoblanadi. Masalan: Iroqda sug'oriladigan maydonlarning 50 % ga yaqini, Amerikada esa, 27 % dan ortiqroq maydon sho'rlangan. Tuproq sho'rlanishi agrobiotsenoz (sun'iy) va biotsenozlar (tabiiy) hosildorligini to'satdan cheklab qo'yadi, organizmlarning tur tarkibi va ekotizimlarning xilma-xilligini kamaytiradi va hududlarni cho'lanishiga olib keladi.



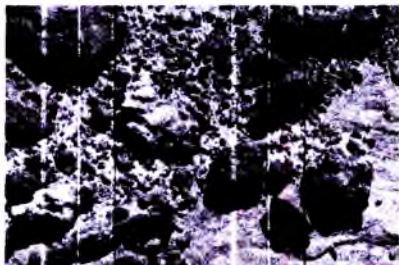
Sho'rlanish Qoraqalpog'iston, Buxoro, Sirdaryo, Qashqadaryo, Xorazm vohalaridagi yerlarni zararlagan. Asoslanmagan holda yerlarni o'zlashtirish, suv taqchilligi va Orol dengizi suvining kamayishi hisobiga 1991-yildan e'tiboran, O'zbekistonda ko'plab yerlarni o'zlashtirish to'xtatildi.

Tuproq eroziyasi

Tuproqning hosildorligiga salbiy ta'sir qiladigan omillar:

- shamol eroziyasi (deflyatsiya);
- suv eroziyasi.

Deflyatsiya. Shamol ta'sirida mayda tuproq bo'lakchalari uchib ketadi va tuproqda qum miqdori oshadi. Deflyatsiya ta'sirida tuproqda gumus miqdori kamayadi va agroximik, suvning fizik xossalari yomonlashadi.

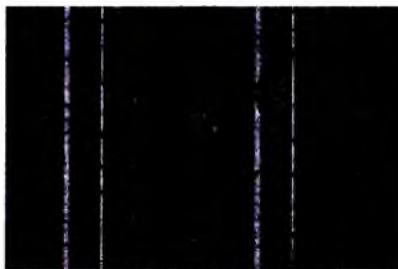


Deflyatsiyaga uchragan yerlar Farg'ona, Surxondaryo, Qashqadaryo, Buxoro viloyatlarida uchraydi.

Ayniqsa, sezilarli darajada deflyatsiya Orol dengizi qurishi hisobiga Qoraqalpog'iston Respublikasida uchraydi. Orol dengizining qurigan tubidan chang, qum, tuz kabilar O'zbekistonning yuzlab kilometr masofalariga tarqalmoqda.

Tuproqning degumidlanishi (degumifikatsiya)

Keng miqyosda sug'orma dehqonchilik uchun yerlarni o'zlashtirish hamda yaylovlardan oqilona foydalanmaslik cho'llanishning o'ziga xos turi – tuproqning degumidlanishi (degumifikatsiya) yoki tuproqning oriqlanishiga va hosildorlikning pasayib ketishiga olib keladi.

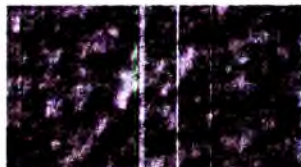


Degumidlanish (lot. “de”-ajralish, pasayish, “humus” – tuproq, “facere”-qilmoq) deganda, organik qoldiqlarning sernam va kislorod yetishmaydigan sharoitda biokimyoviy jarayonlarga uchrab, parchalanmay qolishi tushuniladi. Bu - gumusning yo'qotilishidir. Gumus yo'qotilishi atrof-muhitda cho'llanish jarayonini kuchaytiradi va irrigatsion eroziyani keltirib chiqaradi. Yaylov tuproqlarining oriqlashi – chorva mollarini bir maydonning o'zida haddan tashqari ko'p boqish natijasida o'simlik qoplaminin degradatsiyasi paydo bo'lishidandir.

O'zbekistonda tuproqning past va juda past gumus bilan ta'minlanganligi (0,4 % dan 1,0 % gacha) butun sug'oriladigan yerlarning 40 % ini egallaydi (1,7 million gektar yer).

O'simlik qoplami degradatsiyasi

O'simlik qoplami degradatsiyasi - (tur tarkibi, zichlik va holatning o'zgarishi) cho'llanishning eng ko'p tarqalgan va oson aniqlanadigan jarayonlaridan biridir.



Degradatsiya - (fran. "degradation" - asta-sekin yomonlashuv) - biron bir narsa yoki holatning son va sifat jihatdan oldingi holatidan yomonlashuvi, yemirilishi.

Degradatsiya - hosildorlik kamayishi, fotosintetik faoliyat va o'simlik qoplaminin landshaftni muvozanatlab turadigan funktsiyasini pasayishi bilan izohlanadi. Asosiy sabab esa, inson ta'siri va shuningdek, kuchayadigan salbiy omillardir (masalan: qurg'oqchilik, bug'lanish va boshqalar).

Yaylovlar degradatsiyasi. Chorva mollarining ortiqcha o'tlatilishi, o'tloqlarda qayta tiklanish jarayonlarini olib bormaslik (fitomelioratsiya) natijasida yaylovlarning degradatsiyasi kuzatiladi.



O'zbekistonda qishloq xo'jaligida 22 million gektar yaylovdan foydalaniladi, shundan:

17,4 million gektar - cho'l; 4 million gektar - adir; 1,0 million gektar - tog'; 0,6 million gektar - baland tog' (yaylov) hududlariga to'g'ri keladi.

Cho'llanish natijasida:

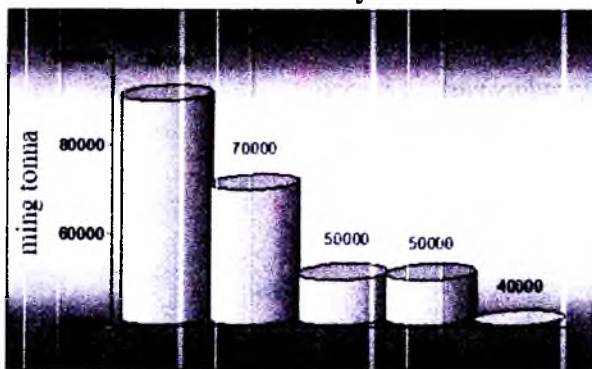
- yaylovlarda hosildorlik pasayadi;
- chorva mollari yemaydigan begona o'tlar ko'payadi;
- yaylov tiplarida barqaror va rang-barang turlar yo'qolishi yuz beradi;
- tur tarkibi kamayadi;
- chorva mollarini boqish uchun yaroqsiz bo'lgan ochiq yalangliklar paydo bo'ladi.

Tuproqning pestitsidlar va mineral o'g'itlar bilan ifloslanishi

Ko'p yillar davomida paxta yakkahokimligining olib borilishi va almashlab ekishga rioya qilmaslik, chorvachilikka e'tibor berilmaslik (chorva mollaridan olinadigan organik o'g'itlar taqchilligi) natijasida, keng miqyosda, yerga mineral o'g'it va pestitsidlarni qo'llashga olib keldi. Bularning hammasi tabiiy biologik jarayonlarning buzilishiga, tabiatni boshqarib turadigan mexanizmlarning degradatsiyasiga olib keldi, tuproqning mineral o'g'itlar bilan ifloslanishi kuchaydi. Ushbu jarayonda kimyoviy preparatlarning samaradorligi past koeffitsiyentga egaligi tufayli 30 % dan ortiq fosfor-kaliyli va 50 % dan ortiq azotli o'g'itlar o'simliklar tomonidan o'zlashtirilmay, tuproqdan yuvilib ketadi, bu esa, o'z navbatida, yuza va yer osti suvlarini tuz, zaharli ximikatlarni, og'ir metallar va boshqa xavfli moddalar bilan zararladi (6-7 – shakllar).

6-shakl.

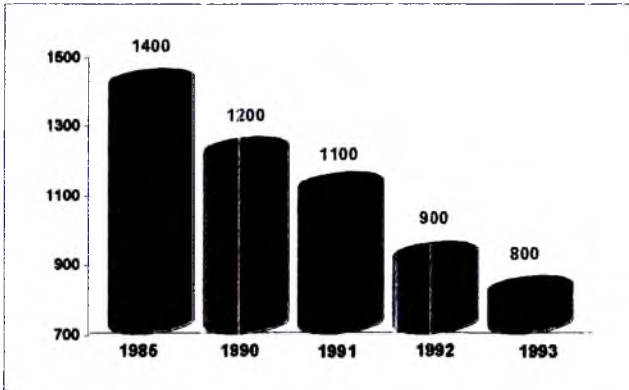
Pestitsidlardan foydalanish



Qishloq xo'jaligi organik, mineral o'g'itlar va o'simliklarning kimyoviy himoya vositalarisiz rivojlanmaydi. Shu sababdan ham respublikamizning har bir hududlarida maqbul dozani qo'llash zarur.

Og'ir metallarning yuqori miqdori tuproqda sanoat rivojlangan shaharlar (Toshkent, Ohnaliq, Bekobod, Chirchiq) atrofida ko'zga tashlanadi.

O'g'itlardan foydalanish



Respublikamiz hududidagi sug'orma dehqonchilikda xlororganik pestitsidlarning parchalanishi va migratsiyasi kuzatiladi. 1983-yildan e'tiboran, DDT preparatidan foydalanish to'xtatilgan bo'lsada, hamon yuqori qoldiq miqdori tuproq namunalarida kuzatiladi. 1939-yilda G'arbiy Yevropada birinchi marta kuchli ta'sir etuvchi insektitsidlar – DDT, GXSG lar ishlab chiqildi. Bularning yaratuvchisi Paul Myuller 1948-yilda Nobel mukofotiga sazovar bo'ladi. G'o'za o'simligiga ziyon yetkazuvchi 10 ta tur pestitsidlar ta'sirida yo'qotilishi bilan bir vaqtning o'zida 300 ga yaqin foydali turlar ham nobud bo'ladi. 1962-yilda amerikalik tadqiqotchi Rechil Karson tomonidan "Sokin bahor" nomli kitob nashrdan chiqadi. Bu kitobda pestitsidlarning tirik organizmlar uchun salbiy oqibatlarini bayon etiladi.

Keyingi yillarda, pestitsidlardan foydalanish keskin pasaydi. Amalda GXSG, tiordan, sevin kabi preparatlardan foydalanilmaydi. Ularning o'miga, yuqori biologik faol moddalar hisoblanadigan karate, danitol, detsis, simbush kabi preparatlar ishlatilmoqda, chunki ular inson organizmi uchun past toksiklik xususiyatiga ega.

Yaroqsiz yerlar sifatini yaxshilash

Sho'rlangan yerlar melioratsiyasi. Sug'orma dehqonchilikda yerlarning ikkilamchi sho'rlanishi jiddiy muammo hisoblanadi.

Ikkilamchi sho'rlanishning asosiy sababi - quvursiz, yer zaxini qochirmasdan sug'orishdir. Bunda grunt suvlari ko'tarilib,

mineralizatsiya jarayoni oshadi, sug'orish me'yorini oshirish va suvdan oqilona foydalanmaslik esa ikkilamchi sho'rlanishga olib keladi.

Erozivaga uchragan yerlarning hosildorligini tiklash. Bu borada meliorativ va o'rmon meliorativ tadbirlarini, tabiiy ekotizim va agroekotizim munosabatidagi mutanosiblikni (balans) saqlash, agrolandshaftlarni rekultivatsiya qilish zarur.

Degumidlangan (oriqlagan) tuproq hosildorligini tiklash. Tuproq haydalma qatlamidagi organik moddalar zahirasini saqlash uni biologik usullar bilan (hududlarga optimal o't o'simliklar ekish) qayta ishlash masalasini, organik o'g'itlarni qo'llash, yerlarni qayta ishlashni mukammallashtirish, kaliforniya chuvalchangi bilan organik chiqindilarni qayta ishlash, gumusning optimal holatini tiklashni talab etadi.

Yaylovlarda fitomelioratsiya ishlarini olib borish. Bunda agrotexnik tadbirlar, shuningdek, mavjud o'simliklarning hosildorligini oshirishda o'g'itlardan foydalanish, begona o'tlarni yo'qotish, toshlardan tozalash, suv rejimini boshqarish talab etiladi. Bu tadbirlarni qo'llash hisobiga, yaylov va pichanlar hosildorligi 1,5 - 2,5 marta oshadi.

Yaroqsiz holga kelgan yerlarni rekultivatsiya qilish yo'nalishlari:

1. Rekreatsion yo'nalish – obodonchilik, hovuzlar, sport maydonlari, o'yin maydonlari, bolalar maydonchalari qurish.
2. Qishloq xo'jaligi yo'nalishi – yaylov, bog', uzumzorlar yaratish.
3. Sanitar-gigiyenik yo'nalish – biologik yoki texnik yo'l bilan yaroqsiz yerlarni atrof-muhitga ta'sir qilmaydigan sharoitda konservatsiya (buzilmaydigan holga keltirish) qilish.
4. O'rmon xo'jaligi yo'nalishi – turli tipdagi o'rmonzorlar barpo qilish.
5. Baliqchilik yo'nalishi – baliqchilikni rivojlantirish shart-sharoitlariga amal qilgan holda suv havzalarini barpo etish.



Savol va topshiriqlar

1. *Cho'llanishga* olib keladigan asosiy sabablar qaysilar?
2. *Cho'llanishni* keltirib chiqaradigan omillarni ayting?
3. *Tuproq eroziyasi* nima?
4. *Tuproq degumidlanishi* nima?
5. *O'simliklar degradatsiyasini* tushuntiring?
6. Yaroqsiz yerlar sifatini qanday yaxshilash mumkin?

TEST TOPSHIRIQLARI

1. O'zbekistondagi eng muhim ekologik muammo?

1. Atmosfera havosining ifloslanishi. 2. CHuchuk suv muammosi. 3. CHo'llanish jarayonining ortib borishi.

4. Orol va Orolbo'yi muammosi.

2. Prezident I.A.Karimovning ekologik muammolarga bag'ishlangan asari:

1. O'zbekiston buyuk kelajak sari.

2. O'zbekiston XXI asr bo'sag'asida: havfsizlikka tahdid, barqarorlik shartlari va taraqqiyot kafolatlari.

3. O'zbekistonning o'z istiqlol va tarraqqiyot yo'li.

4. O'zbekiston: bozor munosabatlariga o'tishining o'ziga xos yo'li.

3. Ekologik muammolarning xillarini ajrating?

1. Mahalliy, hayotiy, milliy. 2. Mahalliy, mintaqaviy, umumbashariy. 3. Siyosiy, global, mahalliy

4. Ijtimoiy, mintaqaviy, umumbashariy.

4. Jamiyat va tabiat o'rtasidagi munosabatlarning buzilishi qanday oqibatlarga olib keladi?

1. Jonsiz tabiatning tanazzuliga. 2. Urushlarga. 3. Ekologik tanglik, ekologik halokat, ekologik inqirozga.

4. Organizmlarni muhitlarga moslashishiga.

5. Oqova suvlarni tozalashni qanday usullari mavjud?

1. Mexanik, fizik, biologik, tsentrafugalash. 2. Mexanik, fizik, biologik, geologik. 3. Mexanik, fizik-kimyoviy, biologik. 4. Mexanik, fizik, kimyoviy, tarixiy.

6. Pestitsidlar ta'sirida kelib chiqadigan xavfli kasallikni ayting?

1. Vabo kasalligi. 2. Ichburug' kasalligi. 3. Sariq kasalligi. 4. Saraton (rak) kasalligi.

7. Ekologik tanglik deganda...

1. Noqulay iqtisodiy oqibatlarining kelib chiqishi tushuniladi.

2. Jamiyatning ishlab chiqaruvchi kuchlari bilan ishlab chiqarish munosabatlarining nomuvofiqligi tushuniladi.

3. Aholining yalpi nobud bo'lishi tushuniladi. 4. Ma'lum mintaqada aholi sonining ortishi.

8. "Tabiatni muhofaza qilish" termini dastlab qachon va qayerda tarqaldi?

1. 1913yil, Angliya. 2. 1913 yil, Shveysariya. 3. 1949 yil, Angliya. 4. 1970 yil, Germaniya.

9. Tugaydigan, tiklanadigan resurslarni ajrating?

1. Suv, havo, energiya. 2. O'simlik va hayvonlar, tuproq. 3. Yer osti qazilmalari. 4. Tuproq, suv, havo.

10. Fotokimyoviy smog (qurum)ga sabab bo'luvchi moddani to'g'ri ko'rsating?

1. Formaldegid. 2. Formalin. 3. Pestitsid. 4. Azot oksidi.

11. Asosiy issiqxona effektini paydo bo'lishiga sababchi gazlar qaysilar?

1. Karbonat angidrid, metan, azot (II)oksid. 2. Oltinugurt (II) oksidi, is gazi, karbonat angidrid.

3. Oltinugurt (IV) oksidi, kislorod, azot (IV) oksidi.

4. Karbonat angidrid, oltinugurt (II) oksidi, azot (IV) oksidi.

12. CHo'llanish qaysi qit'ada kuchli darajada sodir bo'lmoqda?

1. Osiyo, Afrika, Avstraliya. 2. Amerika, Yevropa, Avstraliya. 3. Yevropa, Osiyo, Afrika.

4. Hindiston, Antarktida, Afrika.

13. Seysmik ko'rinish okean tubida paydo bo'lib, okean yuzasida katta uzunlikdagi gravitatsion to'lqin hosil qiladi va u "tsunami" deyiladi. Bu so'z qaysi tildan olingan va XXI asrda qaysi mintaqada u ko'p halokatga olib keldi?

1. Yaponcha, SHimoliy Amerika. 2. Frantsuzcha, Janubiy Amerika. 3. Ruscha, SHimoliy Yevropa.

4. Italiyancha, Janubiy Yevropa.

14. O'zbekiston Respublikasida "Suv haqidagi va suvdan foydalanish to'g'risida" gi qonun qachon qabul qilindi?

1. 1993 yil 6 may. 2. 1994 yil 6 may. 3. 1995 yil 26 dekabr. 4. 1996 yil 26 dekabr.

15. O'zbekiston Respublikasida "Tabiatni muhofaza qilish" haqidagi qonun qachon qabul qilindi?

1. 1993 yil 9 dekabr. 2. 1992 yil 9 dekabr. 3. 1996 yil 9 dekabr. 4. 1996 yil 26 dekabr.

16. Orol dengizidagi suvning sho'rlanish darajasi qanchaga ortgan?

1. 9-10 g/l dan 34-37 g/l gacha. 2. 9-10 g/l dan 72 g/l gacha. 3. 9-10 g/l dan 100-125 g/l gacha.

4. 9-10 g/l dan 140-280 g/l gacha.

17. SHO'rlanish deb nimaga aytiladi?

1. Tuproqning yuza qatlamida natriy, magniy, alyuminiy tuzlarining to'planishi.

2. Tuproqning yuza qatlamida kaltsiy, natriy, mis tuzlarining to'planishi.

3. Tuproqning yuza qatlamida xlor, natriy, magniy tuzlarining to'planishi.

4. Tuproqning yuza qatlamida natriy, magniy, kaltsiy tuzlarining to'planishi.

18. Dunyo o'simlik va hayvon turlari xilma-xilligini ko'rsating?

1. O'simliklar 500 ming, hayvonlar 2 mln. 2. O'simliklar 550 ming, hayvonlar 1,6 mln.

3. O'simliklar 700 ming, hayvonlar 1,7 mln. 4. O'simliklar 1 mln., hayvonlar 2 mln.

19. O'zbekiston Respublikasida "O'simliklar dunyosini muhofaza qilish va undan oqilona foydalanish" to'g'risidagi qonun qachon qabul qilindi?

1. 1993 yil 25 dekabr. 2. 1994 yil 28 dekabr. 3. 1997 yil 26 dekabr. 4. 1998 yil 9 dekabr.

20. O'zbekiston Respublikasi hududida qancha o'simlik turi mavjud?

1. 4500 ga yaqin. 2. 4600 ga yaqin. 3. 4700 ga yaqin. 4. 5000 ga yaqin.

21. O'zbekiston Respublikasi hududidan Xalqaro "Qizil kitob" ga kirgan hayvonlarni ko'rsating?

1. Menzbir sug'uri, Buxoro bug'usi. 2. Buxoro bug'usi, tulki. 3. Ilvirs, bo'ri. 4. Kapcha ilon, mayna.

22. Birinchi Xalqaro "Qizil kitob" qachon yaratilgan?

1. 1966 yil. 2. 1978 yil. 3. 1979 yil. 4. 1983 yil.

23. O'zbekistonda "Qizil kitob" qachon ta'sis etildi?

1. 1978 yil. 2. 1980 yil. 3. 1983 yil. 4. 1984 yil.

24. O'lkamiz hududidan qaysi hayvonlar yo'qolib ketgan?

1. Turon yo'lbarasi. 2. Qizil bo'ri. 3. Qoplon, qizil bo'ri. 4. Turon yo'lbarasi, qizil bo'ri.

25. O'zbekiston Respublikasida "Hayvonot olamini muxofaza qilish va undan foydalanish to'g'risida"gi qonun qachon qabul qilingan?

1. 1992 yil. 2. 1993 yil. 3. 1997 yil. 4. 1998 yil.

26. O'zbekiston Respublikasi Konstitutsiyasining qaysi moddalarida atrof-muhit masalalari ko'rilgan?

1. 50, 53, 54. 2. 50, 53, 58. 3. 50, 55, 100. 4. 50, 55, 105.

27. Tabiat va jamiyatning mutanosib, bir-biriga mos rivojlanishi nima deyiladi?

1. Koevolyutsiya. 2. Degressiya. 3. Suktessiya. 4. Konsortsiya.

28. Ozon qatlamining yemirilish sabablari

1. Xlorfformetan (freonlar) birikmalar. 2. Ultrabinafsha nurlar. 3. Zavod va fabrikalardan chiqadigan uglerod oksidlar. 4. Avtotransportlardan chiqadigan gazlar.

XIV BOB. BARQAROR RIVOJLANISH

22-§. Barqaror rivojlanish vazifalari

Barqaror rivojlanish g'oyasi umumjahon ahamiyatiga ega bo'lib, buni faqat sayyoramiz miqyosidagina amalga oshirish mumkin. Jamiyat barqaror rivojlanishining aniq mezonlari insonlarga kelajakda hayot tarzini o'zgartirishga yordam beradi. Demak, kelajak avlodlarning ravnaqi yo'lida, qisqa muddatli foydadan va shaxsiy manfaatdorlikdan voz kechish lozim bo'ladi.

Hozirgi davrda Barqaror rivojlanish Kontsepsiyasi iste'molchi talablarini qondirish uchun kam miqdordagi resurslardan foydalanishga, atrof-muhitga ko'rsatilayotgan salbiy ta'sirni kamaytirishga mo'ljallangan uzluksiz jarayonni o'z ichiga oladi.

Asosiy maqsad – atrof-muhitni ifloslanishini oldini olishning eng yaxshi usuli - uning paydo bo'lishiga yo'l qo'ymaslikdir. Shuning uchun ham, xom ashyo boyliklaridan oqilona foydalanish, elektr energiyasidan foydalanishni kamaytirish, ozon qatlamini buzuvchi kimyoviy moddalardan voz kechish ushbu dasturning asosiy vazifalari hisoblanadi. Bu maqsadlarni amalga oshirishda quyidagilarni hisobga olish kerak:

- Zararli chiqindilarning miqdorini 35 % ga, zaharli chiqindilarning atmosferaga chiqishini 60 % ga pasaytirish;
- Kantserogen moddalarning chiqishini 96 % ga kamaytirish;
- Yer usti va yer osti suvlarida zaharlovchi moddalarni to'liq yo'q qilish yoki ularni zararsizlantirish;
- Polimerlar ishlab chiqarishda og'ir metallardan foydalanishdan voz kechish;
- Plastik chiqindilarni yo'qotishning yo'llarini izlash;
- Ekologik xavfsizlik tizimlarini rejalashtirishda mahalliy jamoatchilikni jalb etish;
- Yovvoyi tabiatning yashash muhitini muhofaza qilish va undan oqilona foydalanishni ta'minlash;
- Xlor, ftorlardan foydalanishni to'xtatish va uning o'rni to'ldiruvchi xavfsiz moddalarni topish va hokozolar.

Barqaror rivojlanish - insoniyatning kelajagini belgilab beradigan yagona taraqqiyot yo'lidir. Bunda iqtisodiy, ijtimoiy va ekologik barqarorlik ko'zda tutiladi.

Ekologik barqaror rivojlanish deyilganda, tashqi omillar ta'sirida ma'lum ekotizim (yoki hudud) ning o'z tuzilmasi va faoliyatini saqlab qolish xususiyatiga aytiladi.

Atrof-muhit sifati va ekologik inqirozlarning oldini olishda aholining xabardorligi, ayniqsa, o'sib kelayotgan avlodning ekologik ta'limi, madaniyati hal qiluvchi omillardan biri sanaladi. Inson tomonidan yuritilgan xo'jalik faoliyatining jadal rivojlanishi tabiat qonuniyatlarini va uning rivojlanish qonuniyatlarini hisobga olmay turib, «XXI asrga yo'l» Rim klubining ishlaridan birida hamda Yurtboshimizning "O'zbekiston XXI asr bo'sag'asida: xavfsizlikka tahdid, barqarorlik shartlari va kafolatlari" asarida ta'kidlanganidek: "Yer yuzidagi barcha qarama-qarshiliklar: tuproq eroziyasi, o'rmonlarning yo'q bo'lib ketishi, baliqlarning ortiqcha ovlanishi, kislotali yomg'irlar yog'ishi, atmosferaning ifloslanishi, ozon qatlaminin buzilishi va hokazolar" ning yuzaga kelishiga olib keldi.

Darhaqiqat, respublikamizdagi mavjud mintaqaviy muammolardan sanalgan Orol dengizi muammosi eng yirik ekologik va gumanitar fojialardan biri bo'lib qoldi. Ayni paytda, Amudaryo va Sirdaryo deltalarida yerlarning tabiiy holati buzilib, cho'lga aylanish sur'atlari o'sib bormoqda.

Shveysariyalik ekolog V.Gisvelerning e'tirof etishicha, keyingi 300 yil davomida 150 dan ortiq hayvon turi yer yuzidan butunlay qirilib ketgan. Afsuski, endi ularni qaytarib bo'lmaydi. Hozirgi sharoitda yo'qolib ketish arafasida turgan hayvon turlarini qanday saqlab qolish masalasi muammo bo'lib turibdi.

O'zbekistonda yovvoyi o'simliklar dunyosining 3000 dan ortig'ini yuksak o'simliklar tashkil etadi, ular orasida ko'plab endemik va qadimgi o'simliklar bor. O'simlik dunyosini saqlab qolishga mas'uliyatsiz munosabatda bo'lish va undan nooqilona foydalanish o'simliklar dunyosidagi ba'zi turlarning qisqarib ketishiga olib keldi.

Respublikamizda yuqoridagi masalalarni hal qilish borasida ko'p ishlar qilinmoqda. Jumladan, 1998-yilda ishlab chiqilgan Barqaror rivojlanish kontseptsiyasiga amal qilinishi natijasida bir qator muammolar hal etilmoqda. Zero, hozirgi avlod ehtiyojiga zarar yetkazmasdan keyingi avlod ehtiyojini qondirishni ham amalga oshirish bugungi kunning vazifalaridan biridir. Qaysi bir mamlakatda tabiatga ziyon yetkazilsa yoki tabiat qonuniyatlarini hisobga olmasdan zid ishlar amalga oshirilsa, ekologik inqiroz paydo bo'ladi. Bu esa shu mamlakat uchun eng kuchli iqtisodiy, gumanitar fojiga olib keladi. Shu o'rinda

hozirgi avlodda ekologik madaniyat va ongni shakllantirish davr talabi hisoblanishiga e'tiborni qaratish o'rinni bo'ladi. Alqissa, amerikalik ekolog B.Kommonerning quyidagi ekologiya qonunlarini hisobga olish ayni kunda muhim sanaladi:

- Hammasi o'zaro bog'langan;
- Hammasi qayergadir yo'qoladi;
- Tabiat yaxshiroq biladi;
- Hammasi uchun to'lash kerak.

Xulosa qilib shuni aytish joizki, butun borliqni hayotbaxsh nafasi bilan ta'minlab turadigan, to'ydirib, kiyintiradigan Ona tabiatni asrash va avaylash borasida amaliy ishlarni bajarish O'zbekistonning har bir fuqarosining kundalik vazifasidir.



Savol va topshiriqlar

1. *Barqaror rivojlanishda* qanday maqsadlar amalga oshirilishi kerak?
2. *Ekologik barqaror rivojlanish* deganda nimani tushunasiz?
3. *Barqaror rivojlanishning kontseptsiyasi* O'zbekistonda qachon ishlab chiqildi?
4. B.Kommonerning ekologik qonunlarini tushuntirib bering?

QO'SHIMCHA MA'LUMOTLAR

«*Barqaror rivojlanish*» tushunchasining paydo bo'lishi

«*Barqaror rivojlanish*» termini birinchi marta «Bizning umumiy kelajagimiz» kitobining tarjimasidan (1989-yilda) ishlatilgan. Bu nashrdagi inglizcha termin «sustainable development» sifatida tarjima qilingan.

Brundtland Komissiyasida:

«*Sustainable development*» – bu shunday rivojlanishki, hozirgi avlod ehtiyojini ta'minlash bilan birgalikda, kelajak avlodning ehtiyojiga ham zarar yetkazmasdan rivojlanishdir.

Ushbu asardagi Komissiya dokladida «*rivojlanish*» tushunchasi – “inson ehtiyoj va xohishlarini qondirish yoki ta'minlash” sifatida izohlangan. Bu bilan atmosfera, suv resurslari, tuproq va tirik organizmlarni xavf-xatarga solmasdan rivojlanish ko'zda tutilgan.

“Barqaror rivojlanish” termini tarixi haqida

1960-yillarning oxirida Kanadada birinchi marta «sustained yield» termini o'n yillik ichida suv havzalarida baliqlarni maksimal ovlash bilan izohlangan.

1970-yillar o'rtalarida bu termin «sustainable yield» bilan almashdi, ya'ni resurslardan maksimal emas, balki optimal foydalanish, saqlash, tiklash nazarda tutildi.

L. Braun 1981-yildan «sustainable development» terminini qo'llay boshladi. U ushbu termini ekologiya bilan bog'liq bo'lsada, undan tashqarida, jumladan shahar, qishloq xo'jaligi, sanoat va boshqa sferalarning rivojlanishiga ishlatdi. 1989-yilda chop etilgan «Bizning umumiy kelajagimiz» kitobida L. Braun termini atrof-muhitni muhofaza qilish, iqtisodiyatni muvozanatga keltirish va insonlarni ta'minlash uchun ishlatildi.

“Barqaror rivojlanish” termini Barbara Uord tomonidan 1970-yillar o'rtalarida foydalanilgan, kontsepsiya esa 1980-yilda «Atrof-muhitni muhofaza qilishning Butunjahon strategiyasi» da ta'riflangan.

Jamiyatning rivojlanishini atrof-muhitni muhofaza qilmasdan ta'minlab bo'lmaydi.

Haligacha “Barqaror rivojlanish”ning umumqabul qilingan va universal ta'rifi berilmagan. 1989-yilga kelib 30 dan ortiq ta'riflar keltirilgan.

Barqaror rivojlanishning (BR) bir qator ta'riflari

➤ BR avlod, tur, va guruhlar orasida ma'naviy printsipda tenglikka asoslanadi.

➤ Insoniyat uchun uzoq muddatli maksimallashtirilgan yo'l.

➤ Bir – birini to'ldiradigan iqtisodiy o'sish va rivojlanish atrof-muhit, jamiyatga ziyon yetkazmasligi zarur (ko'pgina xalqaro tashkilotlar nuqtai nazari bo'yicha).

➤ BR – bu iqtisodiy rivojlanish bo'lib, unda atrof-muhit barqarorligi va barqaror, doimiy iqtisodiy o'sish ta'minlanadi.

➤ BR – insoniyat va atrof-muhitning uyg'unlashgan jarayoni.

➤ Inson va biosferaning koevolyutsiyasi (birgalikda rivojlanishi).

Rivojlanishni ta'min etishda atrof - muhitga g'amxo'rlik qilish.

➤ Bizni rivojlanish yo'liga boshlab boradigan rahbarlik.

➤ Bugun kelajakni tushunib yetishga urinib ko'rish.

➤ Ekosistemada hayot kechirayotgan insonlar hayot sifatini yaxshilash.

Milliy va xalqaro tashabbuslar asosida BMTning BR bo'yicha Komissiyasi 1995-yilda BR ko'rsatkichlari bo'yicha Dastur qabul qildi. Dastur 130 ko'rsatkichni o'z ichiga oladi. Ular "Majburiyat" – «Holat» - "Harakat" printsiplariga asoslanadi.

«*Majburiyat*» ko'rsatkichi insonlar faoliyatini o'z ichiga olib, unda insoniyat rivojlanishidagi majburiyatlar keltirib o'tiladi.

«*Holat*» ko'rsatkichi barqaror rivojlanish sohasidagi holatni ifodalaydi.

«*Harakat*» ko'rsatkichi barqaror rivojlanishda qanday choralar va qadamlar tashlash, o'zgarishlar qilish to'g'risida ma'lumot beradi.

XV BOB. SHOVQIN MUAMMOSI

23-§. Shovqinning atrof-muhitga ta'siri

Shovqin atrof-muhiting fizikaviy ifloslanish komponentlaridan biri hisoblanib, hozirgi kunda dunyoda har ikki kishidan biri o'zida uning ta'sirini sezadi.

Shovqin tabiatning inson oyog'i yetmagan, havosi musaffo, suvi toza, tuprog'i zaharlanmagan go'shalariga ham yetib borgan. Mutaxassislar aholida asab, yurak-qon tizimi, oshqozon-ichak, gipertoniya kasalliklarining keskin ko'payishini aynan shovqin bilan bog'laydilar. Bundan tashqari, shovqin darajasining 1 % ga oshishi ishlab chiqarish unumdorligini shunchaga pasaytirar ekan. Masalan: rok musiqa yulduzi Madonnaning Frankfurt stadionidagi kontsertini sharhlovchi ko'klarga ko'tarib quyidagicha maqtaydi: "150000 Vt quvvatli radioapparat quloq pardalarini yirtib yuboray deydi, qo'shni aerodromga qo'ngan samolayot tovushi umuman eshitilmay qoldi".

Ko'rinib turibdiki, inson organizmi uchun shovqin eng xavfli ekologik omillardan biri ekan. Shovqin faqat inson organizmidagina emas, balki hashoratlar, hayvonot va o'simliklar dunyosiga ham salbiy ta'sir ko'rsatadi. Masalan: shovqin ta'sirida daraxtlar o'rmondagiga nisbatan ancha erta qariydi, reaktiv samolyot shovqini ta'sirida asal arilar lichinkalari o'ladi, o'zlari esa oriyentatsiyasini yo'qotadi, kalamushlar quturadi va hokazo.

Shovqin detsibellarda o'lchanadi. Ochiq havoda tovushning me'yoriy bosim darajasi 50-55 db bo'lishi kerak bo'lgan bir holda, yirik mamlakatlarda u 65-80 db ni tashkil etadi, 130 db da kishi qulog'ida kuchli og'riq sezadi, 154 db lik shovqinga inson umuman dosh bera olmaydi, bunda kuchli bosh og'rig'i, ko'rish organlarining ishdan chiqishi, ko'ngil aynishi va bo'g'ilish holatlari kuzatiladi. Shuni ta'kidlash lozimki, shaharlarda shovqin darajasi yil sayin oshib bormoqda. Tadqiqotchilarning fikriga qaraganda, shaharlarda shovqin intensivligi har 25-30 yil ichida 10 marta oshar ekan, bu - shovqin darajasi 10 db ga oshdi deganidir. Hozirgi kunda shovqin darajasi eng yuqori bo'lgan shaharlar Rim va Berlindir. Ularda shovqin darajasi 80 db ni tashkil etadi. Shovqinning atrof-muhitga ta'siri hozirgi kunda Rossiyada, Amerikada, Yevropa mamlakatlarida ekolog olimlar tomonidan anchagina o'rganilgan, meyorlar ishlab chiqilgan, lekin inson organizmiga ta'sir mexanizmi hali oxirigacha o'rganilmagan

hisoblanadi. Shuningdek, antropogen shovqin manbalarining o'ziga xos tomonlari, ulardan himoyalaniş usullari ham hozirgacha o'rganilmagan.



Savol va topshiriqlar

1. *Shovqim*ing kelib chiqish sabablari nimada?
2. *Shovqim*ing inson organizmiga qanday salbiy oqibatlari bor?
3. *Shovqin* kuchi yuqori bo'lgan mamlakatlarni ayting?
4. *Shovqin*dan qanday himoyalaniş mumkin?

XVI BOB. O'ZBEKISTONNING EKOTURISTIK VA AGROTURISTIK SALOHIYATI

24-§. O'zbekistonda ekologik turizmning rivojlanish Kontsepsiyasi va uning yaqin kelajakdagi istiqbollari

“*Turizm*” so‘zi “sayr qilmoq”, “sayohat” ma‘nolarini anglatadi. Ekoturizm termini, XX asrning 80-yillaridan boshlab, turizm industriyasiga kira boshlagan.

Ekoturizm deganda, birinchi navbatda, inson faoliyati natijasida faqat nisbatan ziyon yetkazilmagan ekzotik tabiiy hududlar, uning noyob o‘simlik va hayvonot dunyosi hamda ushbu hududning tabiiy, tarixiy yodgorliklari, arxeologik topilmalari, geologiyasi, paleontologik qoldiqlariga sayohat, balki shu bilan birga ushbu hududning ekologik muammolarini hal qilish, tabiatini, o‘simlik va hayvonot dunyosini asrash va ko‘paytirish maqsadida, yangi himoya qilinadigan hududlar, milliy bog‘lar, pitomniklar, parvarishxonalar barpo etish, mahalliy aholini yangi ish joylari bilan ta‘minlash natijasida, ularning turmush sharoitini yaxshilash, mahalliy va chet el investorlarini jalb etish orqali davlat valyuta zahirasini boyitish bilan bir-biriga bog‘liq bo‘lgan vazifalar majmuasini, yig‘indisini tushunamiz.

Xorijda ekoturizmga iqtisodiy toifa sifatida qaraladi. Chunki, chet elda jadal sur‘atlar bilan rivojlanib borayotgan ekoturizm iqtisodiy foyda keltiruvchi turizmning eng istiqbolli turlaridan biri, deb baholanadi.

Tadqiqotlar shundan dalolat beradi-ki, ekoturistlar ko‘pincha o‘rta yoki o‘rtadan yuqori sarmoyaga ega bo‘lgan, har tomonlama ta‘minlangan sayohatchilardan iborat. Sayyoramizda inson faoliyati ta‘sir etmagan yovvoyi tabiat go‘shalari juda kam qolganligi sababli, odatda bunday hududlarga sayohat qilish cheklangan hamda ularga sayohat haqi ham yetarli darajada qimmat. Shu sababli, ekoturizmdan kishi boshidan olingan daromad, umumiy turizm va xalqaro turizmdan tushgan daromadlardan bir necha marotaba ko‘pdir.

Ekoturizm quyidagi tarmoqlarga bo‘linadi:

1. Inson faoliyati natijasida, nisbatan ziyon yetkazilmagan yovvoyi tabiat qo‘yniga (piyoda, otlarda, tuyalarda, avtomobilda sayohat).
2. Noyob hayvonot dunyosi va o‘simlik dunyosi bilan tanishish.
3. Kino va fototasvirga tushirish.
4. Ekosafar.

5. Ilmiy ekskursiyalar (botanik, zoologik, geologik, ekologo-entografik, arxeologik, geomorfologik, ekologik va madaniy).
6. Sport (alpinizm va boshqalar).
7. Agroturizm (qishloq aholisining turmushi, urf-odati bilan yaqindan tanishish).

Ekoturizm tabiatni muhofaza qilish tadbirlarini amalga oshirishga katta hissa qo'shadi hamda ularni bekami-ko'st o'tkazishga sezilarli moliyaviy ko'mak beradi. Masalan: Kanada hukumati faqat ekoturizmdan tushgan soliq hisobidan har yili 1,7 milliard AQSH dollari miqdorida foyda oladi. Bu esa hukumat tomonidan yovvoyi tabiatni muhofaza qilish dasturiga ajratilgan mablag'dan (300 million dollar) 5 barobar ko'pdir.

O'zbekistonda dunyoga mashhur, chet el sayyohatchilarini jalb qiluvchi Samarqand, Buxoro, Xiva, Termiz kabi qadimiy shaharlar, tarixiy yodgorliklar bo'lishi bilan birga, respublikamiz ekoturizm bilan bog'liq betakror go'zal tabiati, landshafti (sahro, cho'l, adirlar, tog'lar, past tekisliklar), xilma-xil noyob o'simlik va hayvonot dunyosi, dunyo ahamiyatiga ega bo'lgan nodir arxeologik topilmalar, paleontologik qoldiqlar, dunyoda kam uchraydigan geologik kesimlar kabi 8000 dan ortiq yodgorliklar mavjudligi bilan ham ajralib turadi. Respublikamizda 2006-yildan boshlab, ekologik turizmni rivojlantirish uchun dastlabki qadamlar tashlandi.

Umuman olganda, hozirgi kunda respublikamizda ekoturizmni rivojlantirish uchun qulay imkoniyatlar yaratilgan. Masalan: ekoturizm marshrutlarida hududdagi aholining turmush tarziga xos ravishda ekoturistlar kutib olinadi, ularning yashashi ta'minlanadi. Ekoturistlar ushbu hududlarning betakror tabiati bilan birga aholining qadimiy madaniyati va tarixini o'zida mujassamlashtirgan turli-tuman an'analari, udumlari, to'ylari, bayramlari ishtirokchilariga ham aylanadilar. Shuningdek, mahalliy aholi tomonidan tayyorlangan tandir, qimiz, beshbarmoq, suzma, qurt kabi ekologik toza va shifobaxsh taomlarini ham tatib ko'radilar yoki xohishlariga ko'ra tayyorlov jarayonlarida ham ishtirok etadilar.

Qishloqlarimiz farovonligini oshirish, mahalliy aholining tub madaniyati va ma'rifatini rivojlantirish, saqlash va targ'ib qilinishida ekoturizmning ahamiyati katta. Zero, bunda, aholining atrof-muhitni, tabiiy yodgorliklarni asrashda faolligi oshiriladi, ekoturistlarni jalb etish va ularga servis xizmati ko'rsatish orqali chet el valyutasi tushimiga hissa qo'shiladi. Shuningdek, atrof-muhitga zarar yetkazmagan holda

ekologik turg'unlik ta'minlanadi, hududdagi qishloq aholisining ekologik bilimlari oshiriladi, mahalliy, madaniy muhitning saqlanishiga g'amxo'rlik qilinadi, qishloqlarning har tomonlama rivojlanishiga hissa qo'shiladi.

25-§. Agroturizm

Ma'lumki, Prezidentimiz I.A.Karimovning bevosita tashabbuslari bilan jahon sivilizatsiyasiga ulkan hissa qo'shgan ajdodlarimizning boy madaniy, tarixiy, merosini saqlashga va tiklashga qaratilgan keng ko'lamli ishlar amalga oshirilmoqda.

Biologik xilma-xillikka ega bo'lgan mamlakatlarda *ekologik turizm*, o'ziga xos relyef va gidrografik sharoitga ega mamlakatlarda *ekstremal turizm*, qishloq xo'jaligi tarixan boy an'analarga ega davlatlarda *agroturizm* sohalari rivojlanmoqda.

Agroturizm deganda, sayyohlarni qishloq hayoti bilan yaqindan tanishtirish tushuniladi. *Agroturizm* tabiat qo'ynida bo'lgani uchun inson sog'lig'iga foydali. Uni nafaqat xorijiy sayyohlar uchun, balki shaharlarda yashovchilar, qishloqda tug'ilib o'sib, shaharda yashayotganlar uchun tashkil etish ham qiziqarlidir. Shu jihatdan agroturizmni rivojlantirish ancha qiziqish uyg'otadi.

O'zbekistonda agroturizmni tashkil etish va rivojlantirish uchun barcha imkoniyatlar mavjud. Har yili viloyatlar o'rtasida "O'zbek milliy o'yinlari" tanlovlari uyushtiriladi. Bunda, asosan, milliy kurash, ko'pkari va "Oq terakmi, ko'k terak", "Beshtosh", "Chillak" kabi o'yinlar bo'yicha bellashuvlar kuzatiladi. O'yinlar, albatta, tog'lar bag'rida, tabiat qo'ynida o'tkaziladi. Ushbularning barchasi agroturizmni yo'lga qo'yishda muhim ahamiyat kasb etadi.

Turistik tashkilotlarning diqqat-e'tiboridan chetda qolayotgan me'morchilik obidalari, o'zbekona oddiy turar joylar, masjidlar, choyxonalar agroturizmni rivojlantirishda muhim omil bo'lib xizmat qilishi mumkin. O'lkamizda 8 oy mobaynida quyosh charaqlab turadi va odamlar tabiatning saxovatidan bevosita bahramand bo'lishlari mumkin. Dam olish maqsadida bunyod etilgan shiyponlar, ayvonlar, ko'kalamzorlar, ariq va hovuzlar agroturizmning ommaviylashuviga xizmat qiladi. Shunisi aniqki, chet ellik sayyohlarga zamonaviy binolardan ko'ra, ko'proq milliy uslubda qurilgan mehmonxonalar yoqadi va biz ularga taklif etgan mehmonxonada milliylik

uyg'unlashadi. So'rilar, bolishlar, ko'rpachalar, milliy liboslarimiz, uy-ro'zg'or buyumlari, milliy hunarmandchilik mahsulotlari kabilar sayyohlarga qiziqarli va manzur bo'ladi, albatta. Sayyohlar uchun xizmat ko'rsatishda firma uslubidan foydalanish qo'l keladi. Qizilqum bo'ylab tuyada sayr etish, sayyohlarni tuya yoki otga mindirib, suratga olish va boshqa xizmatlar taklif etiladi.

Milliy taom tayyorlashda ishtirok etish, shu taomlarning tayyorlanishi haqidagi kitoblarni ko'rish va sotib olish ham sayyohlarda qiziqish uyg'otadi.

Qishloq xo'jaligi dalalarida pishiqchilik paytida sayohat qilish sayyohlarda ancha yaxshi taassurot qoldiradi. Poliz va sabzavot mahsulotlarining mazasi, nisbatan arzonligi, milliy bozorlarimiz ham ularda qiziqish uyg'otadi, albatta.



Savol va topshiriqlar

1. *Turizm* nima?
2. *Ekoturizm* deganda nimani tushunasiz?
3. *Ekoturizmning* qanday afzalliklari bor?
4. O'zbekistonda *ekoturizmning* qanday tarmoqlari bor?
5. *Ekoturizm* va *agroturizm* orasida qanday farq bor?
6. *Agroturizmning* rivojlanishi qanday omillarga bog'liq?

XVII BOB. QAYTA TIKLANUVCHI ENERGIYA MANBALARI

26-§. Quyosh energiyasidan foydalanish

O'zbekiston sharoitida Quyosh, shamol va biomassa energiyasidan foydalanadigan qayta tiklanadigan energetika texnologiyalaridan foydalanish dolzarb hisoblanadi.

Quyosh energiyasidan issiqliq ishlab chiqarishda ham, elektr energiyasi ishlab chiqarishda ham foydalanish mumkin. Birinchi holatda, yassi konsentratsiyalashmagan quyosh kollektorlari qo'llaniladi. Ularda issiqlik tashuvchi sifatida suv, havo yoki antifrizlar ishlatilishi mumkin. Ikkinchi holatda esa, yorug'lik oqimi energiyasi fotoelektr o'zgartirgichlarda bevosita elektr energiyasiga aylanadi yoki issiqlik elektr stansiyalarining an'anaviy shakllari ishlatiladi.

Quyoshdan quvvat oladigan suv isitgichlar

Quyoshdan quvvat oladigan suv isitgich moslamalari quyosh kollektorlari orqali suv haroratini oshirish uchun quyosh nurlari energiyasidan foydalanadi (6-7 – shakllar). Shaffof qoplamali havo o'tkazmaydigan korpusli, qora rangga bo'yalgan, suv o'tkazgich naychalarga ega singdiruvchan metall plastina va korpusning orqa hamda yonbosh devorlarida issiqlikni yo'qotmaslik uchun izolyatsiyalangan yassi quyosh kollektorlari keng tarqalgan.

Sovuq hududlarda esa, muzlashdan himoyalangan kollektorlar qo'llaniladi. Aksariyat hollarda, bunga yopiq sirkulyatsiya tizimidan foydalanish orqali erishiladi. Bu tizimda issiqlik o'tkazuvchi suyuqlik (suvga nisbatan uncha muzlamaydigan) quyosh kollektori orqali aylanib, hosil bo'lgan issiqlikni rezervuardagi suvga issiqlikni almashtirib beruvchi qurilma yordamida uzatiladi.

Quyosh nuridan quvvat oladigan suv isitgichlardan foydalaniladigan suv to'plagich rezervuarlar tizimining passiv va aktiv turi mavjud (rasm).

Passiv tizimlarning ikkita – yopiq-qo'shqavat va o'z oqimi bilan uzatiladigan turi mavjud. Yopiq-qo'shqavat tizimlarda gorizontallik suv to'plagich rezervuar bevosita kollektorning ustida – tomda montaj qilinadi. Bu tizim uni montaj qilishga ketadigan xarajatlarga nisbatan ancha tejimli hisoblanadi. Biroq, uning unumdorligi yilning salqin va sovuq vaqtlarida suv to'plagich rezervuarda issiqlikni yo'qotilishi

sababli, pasayadi. Suv to'plagich rezervuarda issiqlikning yo'qotilishini kamaytirish uchun, uni qo'shimcha izolyatsiyalash yoki bu rezervuarni imoratning tomiga joylashtirish kerak bo'ladi.

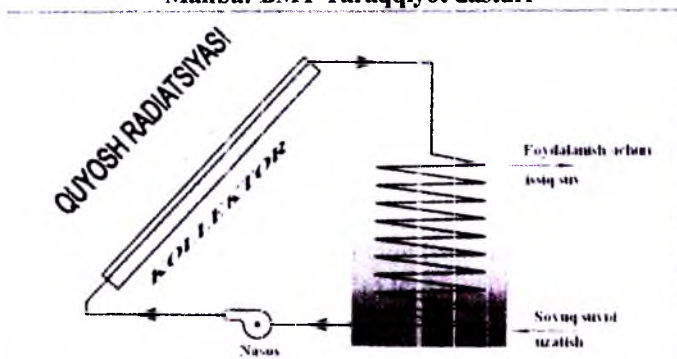
O'z oqimi bilan uzatiladigan tizimda suv to'plagich rezervuar tom ustiga o'rnatiladi. Bunday tizim eng arzon hisoblanadi, biroq, uydagi suv quvurlari tizimi suyuqlikning o'z oqimi bilan oqishi talablariga javob berishi (jumladan, suv isitgich va jumrak o'rtasidagi quvur diametri ham katta bo'lishi) lozim.

Aktiv tizimlarda quyosh kollektori tomda o'rnatiladi, suv to'plagich rezervuarni esa yerda yoki biron-bir qulay joyda o'rnatish mumkin. Suv yoki issiqlik yetkazib beruvchi suyuqlik majburiy aylanishni ta'minlab beruvchi kichik elektr nasos yordamida kollektor orqali tortib chiqariladi. *Aktiv tizimlar*, odatda, passiv tizimlarga qaraganda juda qimmat turadi va jiddiy texnik xizmat ko'rsatishni talab etadi. Ammo, suv to'plagich rezervuarining og'ir ekanligi tufayli uni tomga o'rnatish imkoni bo'lmaganda, ushbu *aktiv tizimlar* samarali hisoblanadi.

Quyosh nuridan quvvat oladigan suv isitgichlar quyosh radiatsiyasi yetarli bo'lmaganida, suvni isitish uchun yetarli darajadagi issiqlik bilan ta'minlash maqsadida, buster (zahira manba) lar bilan jihozlanadi. Buni suv to'plagich rezervuar yoki qo'shimcha qurilmalarda suvni isitish uchun tabiiy gazda (gaz qozonlari) ishlaydigan busterlar yordamida amalga oshirish mumkin. Bundan tashqari, suv to'plagich rezervuar ichidagi elektr elementlardan iborat elektr busterlardan (issiqlik elektr isitgichlar) foydalanish mumkin.

6-shakl.

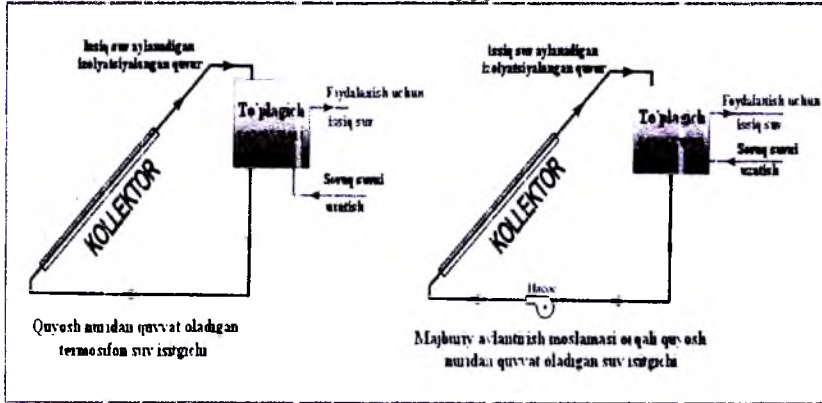
Issiqlikni almashtirib beradigan qurilma o'rnatilgan va muzlashdan himoyalangan Quyoshdan quvvat oladigan suv isitgich
Manba: BMT Taraqqiyot dasturi



7-shakl.

Quyosh nuridan quvvat oladigan *passiv va aktiv suv isitgich tizimlarining soddalashtirilgan shakllari*

Manba: BMT Taraqqiyot dasturi



27-§. Shamol generatorlari

Shamol energiyasidan mexanik yoki elektr energiyasini ishlab chiqarish uchun foydalanish mumkin. Bu energiya esa, bevosita shamol tezligiga bog'liq. Shamol generatorining standart turbinasi quvursimon po'lat tirgakda joylashgan uch parrakli rotordan iboratdir (8-shakl). Buriqish mexanizmi rotorni shamol esayotgan tomonga yo'naltirib turadi. Rotor reduktor va asinxron generatorni ishga tushiradi. Shamol generatori sekundiga 3-4 metr dan yuqori tezlikda ishlaydi. Uning maksimal ishlash tezligi sekundiga 25-30 metrni tashkil etadi.

Shamol generatorlaridan foydalanishning *afzalliklari*:

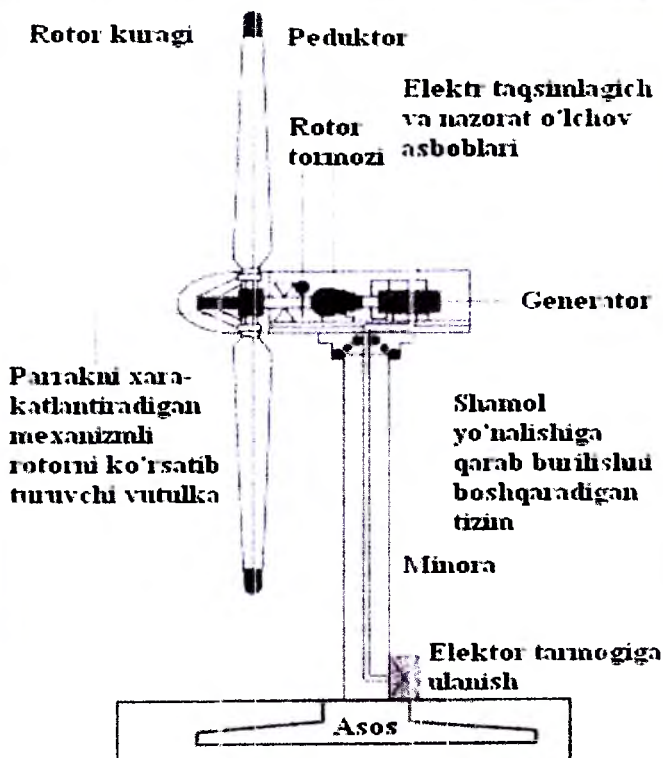
1. Ishlab chiqarilgan elektr energiyasining narxi yoqilg'i narxlarining o'zgarishiga bog'liq emas.
2. Foydalanish xarajatlari past.
3. Zararli chiqindilar chiqarmaydi.

Shamol generatorlaridan foydalanishning *kamchiliklari*:

1. Mustaqil ishlashi uchun zahira ta'minot manbai kerak bo'ladi, ya'ni energiya ishlab chiqarish shamolning kuchiga bog'liq.
2. Boshlang'ich kapital sarflanishi darajasi yuqori.
3. Shovqin chiqarishi va vizual ta'siri katta.

Namunali shamol generatorining tuzilishi

Manba: BMT Taraqqiyot dasturi



28-§. Biomassadan foydalanish

Chorvachilik va oziq-ovqat sanoatining organik chiqindilari biogaz ishlab chiqarish xom ashyosi hisoblanadi. Biomassani anaerob qayta ishlash paytida biogaz qurilmasida maishiy iste'molchilar tomonidan tabiiy yoki suyultirilgan neft gazi (LPG) o'rniga foydalaniladi yoxud uni issiqlik yoki elektr energiyasiga aylantirish mumkin. Ishlab chiqarilgan biogaz tarkibida 60-70 foiz metan (CH_4), 30-40 foiz uglerod oksidi (CO_2) va 500 ppm (promill) vodorod sulfid (H_2S) bor (9-shakl).

Biogaz moslamalarida foydalaniladigan biomassaning 80-90 foizi go'ngdan - sutchilik fermasi va qushxonlarning organik chiqindilari qo'shilgan holda tayyorlanadi. Qoramollarning bir tonna go'ngidan 25 m³, parrandachilik go'ngidan 190 m³, sanoat chiqindilaridan 130 m³ biogaz ishlab chiqarilishi mumkin.

Biogaz ishlab chiqarishda go'ng yig'ish uchun, odatda, qoramollarni fermalarda boqish talab etiladi.

Biogaz moslamalaridan foydalanish quyidagi *afzalliklarga* ega:

1. Biogaz CO₂ ga qaraganda neytral yoqilg'i hisoblanadi, undan foydalanish esa, atmosferada organik chiqindilarni achitishda yuzaga keladigan metan gazi miqdorining ko'payishini oldini oladi.

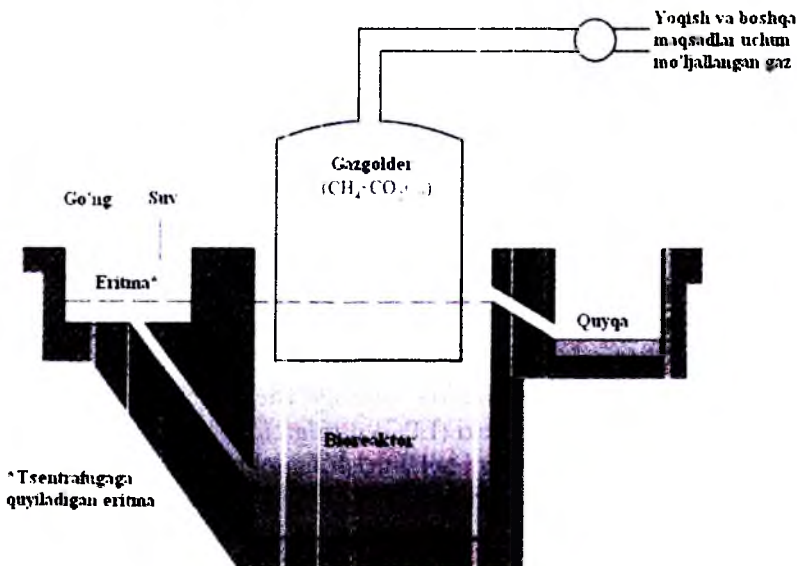
2. Achitilgan biomassadan olinadigan o'g'itlarning qiymati miqdori boshlang'ich xomashyonikidan ancha yuqori.

3. Fermerlarga qarashli yerlarda oziqa moddalarini ekologik xavfsiz va iqtisodiy foydali uslubda, ikkilamchi qayta ishlash - qattiq biomassani biogaz olish uchun achitishning afzalligi hisoblanadi.

Chiqindixona gazini olishning namunaviy shakli 10-shaklda ko'rsatilgan.

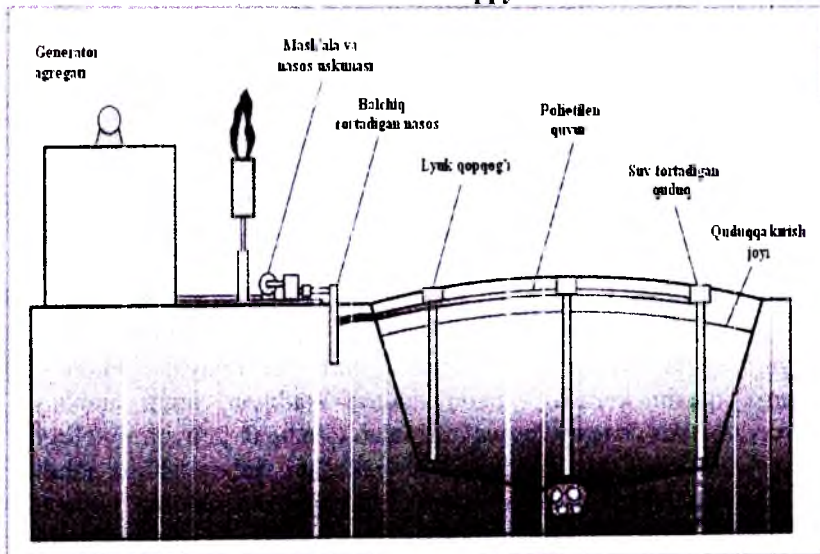
9-shakl. Biogaz reaktorining soddalashtirilgan shakli

Manba: BMT Taraqqiyot dasturi



10-shakl. Chiqindixona gazini olishning namunaviy shakli

Manba: BMT Taraqqiyot dasturi



XVIII BOB. EKOLOGIK XAVFSIZLIK

29-§. Ekologik xavfsizlikka tahdidlar

Prezidentimiz I.A.Karimov asarlarida, nafaqat Markaziy Osiyo mintaqasi ekologik muammolari, balki dunyo aholisi hayotiga xavftahdid solib turgan global ekologik muammolar va ularning yechimi keng qamrovda, ilmiy asosda isbotlab berilganki, ular ekologik muammolar va tahdidlarni bartaraf etishda dasturul-amal vazifasini bajarmoqda.

Ekologik xavf – O‘zbekistonning mustaqilligiga, tinchligiga, yaxlitligiga tahdid soluvchi muammolar sirasiga kiradi. Ularni birdaniga, qisqa muddatda bartaraf qilib bo‘lmaydi. Ekologik tahdidlarga qarshi kurash - uzoq davom etadigan, katta mablag‘, zamonaviy texnika va texnologiyalarni talab qiladigan jarayon. Ekologik xavfning kelib chiqishi va uning globallashib, jahon ahliga tahdid solishida bosh sababchi insonlarning o‘zi, uning atrof-muhitga, hayotga, salomatligiga nisbatan befarqligi, loqaydligidir. O‘zbekistonning ekologik muhiti, endilikda, katta ijtimoiy, siyosiy hodisaga aylandi. Ekologik muhitni yaxshilash, tozalashda yana inson, uning aql-zakovati, ma‘naviy kamolot darajasi bosh, asosiy omil bo‘lib xizmat qiladi.

“Fan-texnika taraqqiyoti jadal suratlar bilan rivojlanib bormoqda. Dunyoning jug‘rofiy-siyosiy tuzilishi o‘zgarimoqda. Bunday sharoitda, inson tomonidan biosferaga ko‘rsatilayotgan ta‘sirni tartibga solish, ijtimoiy taraqqiyot bilan qulay tabiiy muhitni saqlab qolishning o‘zaro ta‘sirini uyg‘unlashtirish, inson va tabiatning o‘zaro munosabatlarida muvozanatga erishish muammolari borgan sari dolzarb bo‘lib qolmoqda”, – deb ta‘kidlagan yurtboshimiz I.A.Karimov (Xavfsizlik va barqaror taraqqiyot yo‘lida, 1998).

Ekologik muammo allaqachon bir mamlakat doirasidan chiqib, butun yer yuzini qoplab oldi. Ammo, uning keskinlik darajasi dunyoning har bir mamlakati va mintaqasida turlicha, o‘ziga xos xususiyatlari mavjud.

Markaziy Osiyo, allaqachon, ekologik xavfli mintaqalar sirasiga kirganligi achchiq haqiqat.

Ekologik xavfsizlik - “shaxs, jamiyat va davlatning tabiiy tashqi muhitga antropogen ta‘siri, shuningdek tabiiy ofat va falokat oqibatlaridan himoyalaniş holati” (“Hamdo‘stlik mamlakatlarida ekologik xavfsizlik tamoyillari to‘g‘risida” gi hujjatdan, 1992-yil).

Ekologik xavfsizlik tabiatni muhofaza qilish to'g'risida, aholi va fuqarolarni tabiiy va texnogen xarakterdagi favqulodda holatlardan himoya qilish to'g'risida, davlat sanitariya nazorati to'g'risida, arxitektura va shahar qurilishi to'g'risidagi qonunlar, shuningdek, tabiat muhofazasiga doir boshqa meyoriy hujjatlarda belgilab berilgan.

Ekologik xavfsizlik muammolarini tabiatni muhofaza qilish sohasidagi milliy, mintaqaviy hamda xalqaro manfaatlar birlashuvisiz hal qilish mumkin emas. Zero, ekologik xavf-xatarlar chegara bilmaydi:

- tabiiy muhitni ifloslantiruvchilarning ko'chib yurishi;
- iqlim haroratining ko'tarilishi;
- ozon qatlamining yemirilishi;
- turlar va bioxilma-xillikning yo'qolib borishi;
- chiqindilar muammosi;
- Orol dengizi va Orolbo'yi muammolari...

Bu - jahon hamjamiyati diqqat markazida turgan umumsayyora miqiyosidagi muammolarning faqat bir qismidir, xolos.

Ekologik xavfsizlikka tashqi tahdidlar sifatida kislotali yomg'irlar, ozon tuynugi, iqlim haroratining ko'tarilishi, cho'llashish va boshqa global ekologik muammolarni kiritish mumkin.



Savol va topshiriqlar

1. *Ekologik xavf* deganda nimani tushunasiz?
2. *Ekologik xavfsizlik* nima?
3. *Ekologik xavfsizlikka* ichki tahdidlarga misollar keltiring?
4. *Ekologik xavfsizlikka* tashqi tahdidlarni tushuntiring?

XIX BOB. EKOLOGIK TA'LIM-TARBIYA VA MADANIYAT. BARQAROR TARAQQIYOT TA'LIMI

30-§. Ekologik ta'lim-tarbiya va madaniyat

O'zbekistonda aholiga uzluksiz ekologik ta'lim berish va bu sohada uning bilimini oshirish masalalari "Ta'lim to'g'risida"gi Qonun, "Kadrlar tayyorlash Milliy dasturi", tabiatni muhofaza qilish va tabiiy resurslardan foydalanish sohasidagi huquqiy meyoriy hujjatlar asosida hal qilinmoqda.

Ekologik vaziyatni yaxshilashga yordam beradigan omillardan biri – barcha aholi qatlamlariga ekologik bilim berish va ularning ekologik madaniyatini hamda tafakkuri darajasini yuksaltirishdan iborat.

Ekologik bilim – kishilarning atrof-tabiiy muhitni muhofaza qilish, tabiiy resurslardan oqilona foydalanish, buzilgan tabiat majmua (kompleks) larini qayta tiklash haqida ma'lumotlarga ega bo'lish, ya'ni ushbu voqelikning inson tafakkurida aks etganlik darajasi.

Ekologik madaniyat – bu insonlarda tabiat haqidagi bilim, ong, idrok, savodxonlik, uning intellektual salohiyati va uni amalda qo'llay bilish faoliyati, atrof-muhitga nisbatan faoliyatning yuksak ko'rsatkichi, ongli va mas'uliyatli yondoshuv.

Tabiatga avaylab munosabatda bo'lish singari azaliy an'analarimizni tiklash, har bir inson va butun jamiyatning axloqiy hamda ma'naviy tarbiyasini takomillashtirish g'oyat muhim.

Ekologik ta'lim-tarbiyaning bosh maqsadi – aholining barcha qatlamlarida, jumladan, maktab o'quvchilarida ularning atrof-muhitga, jonajon tabiatimizga bo'lgan ongli munosabatlarini to'g'ri shakllantirishdan iboratdir.

Buning uchun, barcha aholi ekologiyaga oid umumta'lim davlat standartlari darajasida bilim egallashlari, yetarli ko'nikma va malakaga, o'zining ekotizimga dahldor ekanligini anglatuvchi dunyoqarashga ega bo'lishi va buni ma'nan hamda ruhan his qilishi darkor.

Inson ongiga ekologik ta'lim-tarbiyani singdirish uchun uzluksiz ekologik ta'lim-tarbiyani joriy etish zarur. Bu, birinchi navbatda, oilada o'z aksini topadi va maktabgacha ta'lim muassasalarida, umumta'lim maktablarida, akademik litsey va kasb-hunar kollejlarida, oliy o'quv yurtlarida, kadrlarni tayyorlash va qayta tayyorlash tizimida va aholining katta yoshdagi qatlamlari (mahalalar) da ekologik ruhda, shaxs kamolotini yuksaltiruvchi uzluksiz ekologik ta'limni amalga oshirish

maqsadga muvofiqdir. Masalan: umumiy o'rta ta'lim maktablarida uzluksiz ekologik ta'limni o'quv predmetlaridan bilim berish jarayonida, festivallar, konferentsiyalar, uchrashuvlar, davra suhbatlari, "ochiq darslar", tanlovlar kabi turli tadbirlar va sahna ko'rinishlaridan iborat chiqishlarga jalb qilgan holda amalga oshirish mumkin.

Tabiatdan foydalanish sohasida insonning ekologik jihatdan saviyasiga ta'sir ko'rsatish borasida oqilona tadbirlarni amalga oshirish bosh vazifa hisoblanadi. Bu ishlar atrof-muhitni saqlash bo'yicha uzoq yillarga mo'ljallangan yagona uzluksiz ta'lim-tarbiya tizimini yo'lga qo'yish orqali amalga oshiriladi.

Ekologik ta'lim deganda, o'quvchilarga berilishi lozim bo'lgan tabiat bilan inson o'rtasidagi munosabatlarni ifodalovchi bilimlar tizimi tushuniladi.

Ekologik tarbiya farzand tug'ilgan kundan boshlab berilishi kerak. Bunda fikr nurlantirilishi, axloq go'zallashtirilishi, zehn ravshanlantirilishiga erishish zarurdir. *Ekologik tarbiya*, avvalo, ota-ona zimmasidadir. So'ng bog'cha, maktab, o'rta maxsus kasb-hunar kollejlari, akademik litseylar hamda oliy o'quv yurtlari, mahallalarda amalga oshiriladi.

Har qanday tarbiya, asosan, oila sharoitidan boshlanadi. O'zbek oilalarida "harom - halol", "uvol", "gunoh - savob" kabi tushunchalar ko'proq ekologik vaziyat (masalan: nonning oyoq ostiga tushishi, suvning iflos qilinishi, jonivorlarga shafqatsiz munosabatda bo'lish, dov-daraxtlarning sindirilishi va boshqalar) yuzaga kelganda qo'llaniladi. Bolalar hali bu so'zlarning mohiyatini to'liq tushunmasalarda, kun sayin ta'kidlanaverilsa, ularda milliy ekologik xulq-atvor kurtaklari shakllanib boradi, albatta.

31-§. Barqaror taraqqiyot ta'limi

Birlashgan Millatlar Tashkiloti Bosh Assambleyasining 59-sessiyasida 2005-2014-yillar uchun Barqaror taraqqiyot maqsadlari uchun ta'limni (BTT) amalga oshirish bo'yicha xalqaro sxema tasdiqlangan edi.

Barqaror taraqqiyot ta'limi (BTT) fanlararo yondoshuvi asosida ta'lim olish, tarbiya, o'z-o'zini rivojlantirish va namoyon etish, mustaqil va tanqidiy fikrlash, ma'nan shakllangan, ijtimoiy faol, o'z hatti-harakatlarida axloqiy va ekologik meyorlarga asoslanadigan, o'zbek xalqi qadriyatlariga mos bo'lgan, ekologik bilimga chanqoq, atrof-muhit

holati haqida qayg'uradigan va yangi ijtimoiy, iqtisodiy va ekologik muammolarni oldindan ko'ra olish xususiyatlarini shakllatirishga da'vat etadi.

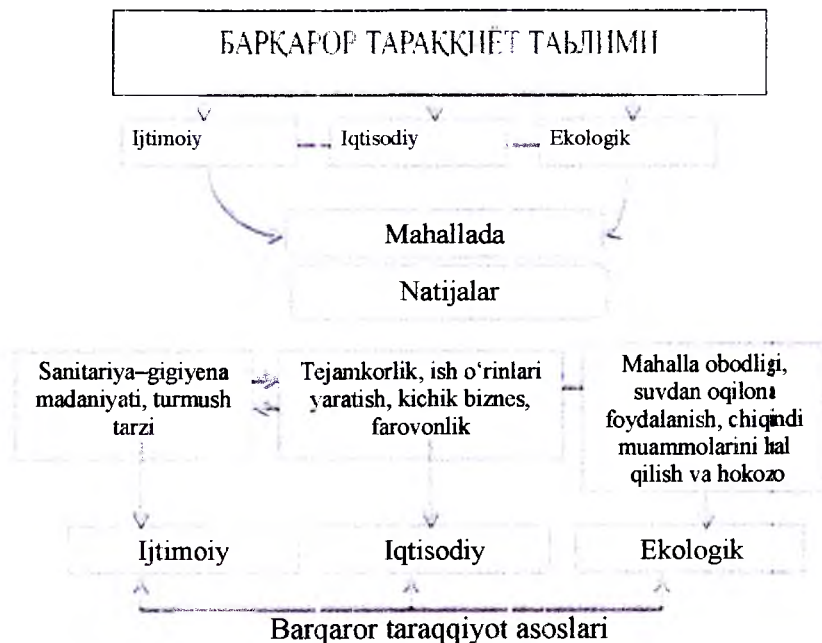
BTT jamiyatning barcha a'zolarini mintaqaviy va global muammolarni hal qilish uchun zarur bilim va ko'nikmalarni rivojlantirishga katta e'tibor qaratadi. Agar ekologik ta'lim ko'proq ekologik mavzularga e'tibor qaratsa, BTT siyosat, iqtisodiyot, jamiyat va atrof-muhit o'rtasidagi o'zaro aloqadorligi masalalariga alohida yondoshadi.

BTT ning asosiy maqsadi – barqaror taraqqiyotning g'oyalari va tamoyillarini ta'limning barcha shakllari va bosqichlari bilan integratsiyalash va mustaqil dunyoqarashga ega, tanqidiy fikrlay oladigan, ijtimoiy, iqtisodiy va ekologik yo'naltirilgan va faol fuqarolik munosabatini bildira oladigan shaxslarni tayyorlash hisoblanadi.

BTT ning hal qiluvchi ahamiyatga ega g'oyalari hozirgi zamon va kelajakdagi ijtimoiy, iqtisodiy va ekologik muammolarni, shu jumladan, Orol inqirozi muammolarini yechish va oldindan ko'ra olishga yo'naltirilgan bilim, ko'nikma va qobiliyatlarni rivojlantirish hisoblanadi. Shuningdek, BTT ning asosiy tamoyillari sifatida quyidagilar e'tiborga olinadi:

1. Jamiyatning qadriyaviy yo'nalishlari – adolat, kelajak avlodlar oldidagi javobgarlik etikasi (kelgusi avlodlar manfaatlarini hisobga olgan holda);
2. Fanlararo yondoshuv – ijtimoiy, iqtisodiy va ekologik maqsadlarning o'zaro bog'liqligi (11-shakl).

Bundan tashqari, mahalla, bog'cha, umumiy o'rta ta'lim maktablari, o'rta maxsus, kasb-hunar ta'lim tizimi, oliy o'quv yurtlari, tashkilotlar va muassasalar, fermer xo'jaligi, madaniyat va istirohat bog'lari, teatr va kino zallari, ishlab chiqarish korxonalari ekologik ta'lim ob'ektlariga kiradi.



?

Savol va topshiriqlar

1. Ekologik bilim nima?
2. Ekologik madaniyatni tushuntiring?
3. Ekologik ta'lim va tarbiyani tushuntiring?
4. Barqaror taraqqiyot ta'limini izohlang?

CHAPTER I. THE GENERAL DATA ABOUT “ECOLOGY” SCIENCE

“Ecology” science and its tasks

So, *ecology* is just the study of the inclusive nature society dealing with interactions of organisms with other organisms and with the physical environment. Specifically speaking, ecology talks about the processes that determines the distribution and abundance of organisms and the interrelationships among them. In addition, transport and transformation of energy and matter in the biosphere is also an active topic of ecology.

The term *oekologie* (*ecology*) was coined in 1866 by the German biologist, Ernst Haeckel from the Greek *oikos* meaning "house" or "dwelling", and *logos* meaning "science" or "study". Thus, ecology is the "study of the household of nature". Haeckel intended it to encompass the study of an animal in relation to both the physical environment and other plants and animals with which it interacted.

Ecologists seek to explain:

- Life processes, interactions and adaptations
- The movement of materials and energy through living communities
- The successional development of ecosystems
- The abundance and distribution of organisms and biodiversity in the context of the environment.

Ecology is a human science as well. There are many practical applications of ecology in conservation biology, wetland management, natural resource management (agroecology, agriculture, forestry, agroforestry, fisheries), city planning (urban ecology), community health, economics, basic and applied science, and human social interaction (human ecology). For example, the *Circles of Sustainability* approach treats ecology as more than the environment 'out there'. It is not treated as separate from humans. Organisms (including humans) and resources compose ecosystems which, in turn, maintain biophysical feedback mechanisms that moderate processes acting on living (biotic) and non-living (abiotic) components of the planet. Ecosystems sustain life-supporting functions and produce natural capital like biomass production (food, fuel, fiber and medicine), the regulation of climate, global biogeochemical cycles, water filtration, soil formation, erosion

control, flood protection and many other natural features of scientific, historical, economic, or intrinsic value.

Aims

- Identify the components of an ecosystem and demonstrate how they interact
- Discuss the basis of the Theory of Evolution and those elements of science which influenced the theory
- Discuss the existence of animals in the ecosystem.
- Discuss the presence of plant life in a range of ecological situations.
- Discuss the ecological features of mountains, rivers and deserts.
- Discuss the ecological features of shallow water regions and coral seas.
- Discuss the ecological implications of human activities on the environment.

Scales of Ecology

Organism	Organ	Tissue	Cell	Organelle	Molecule	Atom
Population	Group of interacting and interbreeding organism of the same species.					
Community	Different populations(groups of different species) living together interacting as competitors, predator and prey, or symbiotically.					
Ecosystem	Organisms and their physical and chemical environments together in a particular area. "The smallest units that can sustain life in isolation from all but atmospheric surroundings."					
Biosphere	Thin film on the surface of the Earth in which all life exists, the union of every ecosystems on earth. This is a highly ordered system, held together by the energy of the sun.					

Adapted from <http://ocw.mit.edu/OcwWeb/Biology>

History of ecology

One of the first ecologists may have been Aristotle or perhaps his student, Theophrastus, both of whom had interest in many species of animals. Theophrastus described interrelationships between animals and between animals and their environment as early as the 4th century BC (Ramalay, 1940). Aristotle was an early influence on the philosophical development of ecology. He and his student Theophrastus made extensive observations on plant and animal migrations, biogeography, physiology, and on their behaviour, giving an early analogue to the modern concept of an ecological niche.

Ecological concepts such as food chains, population regulation, and productivity were first developed in the 1700s, through the published works of microscopist Antoni van Leeuwenhoek (1632–1723) and botanist Richard Bradley (1688–1732). Biogeographer Alexander von Humboldt (1769–1859) was an early pioneer in ecological thinking and was among the first to recognize ecological gradients, where species are replaced or altered in form along environmental gradients, such as a cline forming along a rise in elevation. Natural historians, such as Humboldt, James Hutton and Jean-Baptiste Lamarck (among others) laid the foundations of the modern ecological sciences. The term "ecology" (German: Oekologie, Ökologie) is of a more recent origin and was first coined by the German biologist Ernst Haeckel in his book *Generelle Morphologie der Organismen* (1866). Haeckel was a zoologist, artist, writer, and later in life a professor of comparative anatomy.

Ernst Haeckel and Eugenius Warming, two founders of ecology. Opinions differ on who was the founder of modern ecological theory. Some mark Haeckel's definition as the beginning; others say it was Eugenius Warming with the writing of Oecology of Plants: An Introduction to the Study of Plant Communities (1895), or Carl Linnaeus' principles on the economy of nature that matured in the early 18th century. Linnaeus founded an early branch of ecology that he called the economy of nature. His works influenced Charles Darwin, who adopted Linnaeus' phrase on the *economy or polity of nature* in *The Origin of Species*. Linnaeus was the first to frame the balance of nature as a testable hypothesis. Haeckel, who admired Darwin's work, defined ecology in reference to the economy of nature, which has led some to question whether ecology and the economy of nature are synonymous.

The layout of the first ecological experiment, carried out in a grass garden at Woburn Abbey in 1816, was noted by Charles Darwin in *The Origin of Species*. The experiment studied the performance of different mixtures of species planted in different kinds of soils.

While Charles Darwin is mainly noted for his treatise on evolution, he was one of the founders of soil ecology, and he made note of the first ecological experiment in *The Origin of Species*.

Much of the ecological research on land in the late 19th and early 20th centuries was carried out independently by botanists and zoologists, reflected in the publication of the first ecological summaries: on plant ecology (more precisely, ecological geography) by the Danish botanist J. Warming (1895) and the German scientist A. Schimper (1898) and on animal ecology by the German zoologist R. Hesse (1912) and the American scientist C. Adams (1913). At the beginning of the 20th century, attention was focused on plant communities. Phytosociology (later called phytocoenology), which studies the organizational regularities of plant communities (I. K. Pachoskii, S. N. Korzhinskii, P. N. Krylov), emerged in Russia. The American botanist F. Clements, who studied succession, attempted to draw analogies between the structure and development of the organism and the community. Among the milestones in the study of plant communities were G. F. Morozov's *A Study of the Forest* (1912) and V. N. Sukachev's *Introduction to the Study of Plant Communities* (1915).

Animal ecologists also became increasingly interested in the study of communities. Consequently, the American scientist V. Shelford, who contributed much to various areas of ecology, defined ecology as the science of communities, relegating autecology entirely to physiology. Theoretical ecology was greatly influenced by C. Elton's *Animal Ecology* (1927), in which the problem of studying the organization (structure) of communities was formulated, the regularities of the relations between the numbers of organisms at different trophic levels (pyramid of numbers) were described, the concept of the ecological niche, proposed earlier by the

In the 1920's and 1930's, the methods of mathematical statistics (including those used earlier in demography) and modeling began to be used in ecology. The Italian researcher V. Volterra (1926) and the American scientist A. Lotka (1925) developed mathematical models of the growth of individual populations and of the dynamics of populations interrelated by competition and predation. Russian scientist L. G.

Ramenskii developed the concept of the continuum of the plant cover and introduced the concept of the ecological individuality of a species and the concept of consortium . Russian scientist V. I. Vernadskii established the study of the biosphere in the 1920's and 1930's BIOSPHERE. His ideas greatly influenced ecological thought in the world, generating particular interest in the 1950's and 1960's, in great measure in connection with the increased threat of global disruption of the biosphere as a result of man's activities.

The experimental work of G. F. Gauze (Gause) on protozoans and microorganisms became internationally known. Gauze formulated the principle of competitive exclusion, according to which two species occupying the same ecological niche cannot exist in the same place for an unlimited period of time.

Of great importance in Central Asia in the dissemination of ecological ideas and the training of ecological researchers were D. N. Kashkarov's compendiums *The Environment and the Community* (1933) and *The Fundamentals of Animal Ecology* (1938). As ecology developed, its content and definition gradually changed. Thus, in the 1930's ecology emphasized the study of the adaptation of organisms to their environment. The study of communities of organisms was sometimes considered to be the subject of an independent science—biocenology. Using extensive material on the population dynamics of vertebrates, S. A. Severtsov tied in (1941) new sociological ideas with concepts of the theory of evolution, defining ecology as the science of the mechanisms of the struggle for survival.

Former USSR plant ecologists are continuing the experimental course set by V. N. Sukachev in phytocoenology, whose main task is the study of the mechanisms of intraspecific and interspecific competition.

In the 1930's, 1940's, and 1950's, animal ecologists in the former USSR conducted field studies: they analyzed fluctuations in the numbers of harmful rodents and game mammals (B. S. Vinogradov, N. P. Naumov, O. I. Semenov-Tian-Shanskii, S. P. Naumov, A. N. Formozov, D.N.Kashkarov), studied the effects of snow cover on animals (A. N. Formozov, A. A. Nasimovich, V. P. Teplov), and investigated soil invertebrates (M. S. Giliarov).

Timeline of ecologists

A list of founders, innovators and their significant contributions to ecology

Notable figure	Lifespan	Major contribution & citation
<u>Antonie van Leeuwenhoek</u>	1632– 1723	First to develop concept of food chains
<u>Carl Linnaeus</u>	1707– 1778	Influential naturalist, inventor of science on the economy of nature
<u>Alexander Humboldt</u>	1769– 1859	First to describe ecological gradient of latitudinal biodiversity increase toward the tropics in 1807
<u>Charles Darwin</u>	1809– 1882	Founder of the hypothesis of evolution by means of natural selection, founder of ecological studies of soils
<u>Elizabeth Catherine Thomas Carne</u>	1817– 1873	Geologist, mineralogist and philosopher who observed rural vs urban living, spatially and culturally, finding in country living the best attack on suffocating class divides, healthier living, and best access to natural education.
<u>Herbert Spencer</u>	1820– 1903	Early founder of social ecology, coined the phrase ‘survival of the fittest’
<u>Karl Möbius</u>	1825– 1908	First to develop concept of ecological community, biocenosis, or living community
<u>Ernst Haeckel</u>	1834– 1919	Invented the term ecology, popularized research links between ecology and evolution
<u>Victor Hensen</u>	1835– 1924	Invented term plankton, developed quantitative and statistical measures of productivity in the seas
<u>Eugenius Warming</u>	1841– 1924	Early founder of Ecological Plant Geography
<u>Ellen Swallow Richards</u>	1842– 1911	Pioneer and educator who linked urban ecology to human health
<u>Stephen Forbes</u>	1844– 1930	Early founder of entomology and ecological concepts in 1887
<u>Vito Volterra</u>	1860– 1940	Independently pioneered mathematical populations models around the same time as Alfred J. Lotka.

<u>Vladimir Vernadsky</u>	1869– 1939	Founded the biosphere concept
<u>Henry C. Cowles</u>	1869– 1939	Pioneering studies and conceptual development in studies of ecological succession
<u>Jan Christiaan Smuts</u>	1870– 1950	Coined the term holism in a 1926 book <i>Holism and Evolution</i> .
<u>Arthur G. Tansley</u>	1871– 1955	First to coin the term ecosystem in 1936 and notable researcher
<u>Charles Christopher Adams</u>	1873– 1955	Animal ecologist, biogeographer, author of first American book on animal ecology in 1913, founded ecological energetics
<u>Friedrich Ratzel</u>	1844– 1904	German geographer who first coined the term biogeography in 1891.
<u>Frederic Clements</u>	1874– 1945	Authored the first influential American ecology book in 1905
<u>Victor Ernest Shelford</u>	1877– 1968	Founded physiological ecology, pioneered <u>food-web</u> and biome concepts, founded The Nature Conservancy
<u>Alfred J. Lotka</u>	1880– 1949	First to pioneer mathematical populations models explaining trophic (predator-prey) interactions using logistic equation
<u>Henry Gleason</u>	1882– 1975	Early ecology pioneer, quantitative theorist, author, and founder of the individualistic concept of ecology
<u>Charles S. Elton</u>	1900– 1991	‘Father’ of animal ecology, pioneered food-web & niche concepts and authored influential <i>Animal Ecology</i> text
<u>G. Evelyn Hutchinson</u>	1903– 1991	Limnologist and conceptually advanced the niche concept
<u>Eugene P. Odum</u>	1913– 2002	Co-founder of ecosystem ecology and ecological thermodynamic concepts
<u>Howard T. Odum</u>	1924– 2002	Co-founder of ecosystem ecology and ecological thermodynamic concepts
<u>Robert MacArthur</u>	1930– 1972	Co-founder on Theory of Island Biogeography and innovator of ecological statistical methods

CHAPTER II. THE ATTITUDE AMONG THE NATURE AND SOCIALITY

Ecological problems

We can mean the ecological problems:

- The greenhouse effect.
- Global warming: difference between greenhouse effect and global warming, climate change, a growing awareness, carbon dioxide.
- International efforts to combat climate change: IPCC, UNFCCC, Kyoto protocol, COP15 and The World Watch Institute.
- The actual and potential effects: global temperature rise, sea level rise, impacts on weather systems.
- Greenhouse gases (GHG): water vapour, methane, nitrous oxide and fluorocarbons.
- Ozone: the ozone layer, the causes of ozone depletion, aerosols, refrigeration and air conditioning, foam and phasing out CFCs.
- The effects of ozone depletion: skin cancers, immune system response, impacts on crops and forests and impacts on Marine life.
- Poisons: poisons in the home and other household poisons.
- Poisons on the farm: pesticides, characteristics of pesticides and summary of pesticides.
- Environmental and health impacts of pesticides: soil, water air vegetation, wildlife, effects of chemicals on humans and animals, acute poisoning, chronic poisoning and different types of effects
- Waste material: rubbish dumps or tips, recycling, plastics, gas from landfills and domestic waste.

The influence of scientific and technical revolution to environment

Scientific and technical revolution - radical qualitative transformation of productive forces on the basis of transformation of a science into the leading factor of manufacture. Revolution gives mankind new inventions or opening which are facilitated to the person by a life. She covers all branches and mankind spheres. Because of it the number of employees raises. The population in cities thereby increases. As the production efficiency raises. Which gives to more production.

Gives new manufacture. As by means of it we master space. Which gives a lot of new minitechnologies. Well and in the end would add. I personally for scientific and technical progress. Because without it we would not exist. But remained to live in caves. The fundamental qualitative transformation of productive forces, based on the conversion of science into a leading factor in the development of social production. In the course of the scientific and technological revolution, whose origin dates to the mid-20th century, the process of the conversion of science into a direct productive force is developing vigorously and is nearing completion. The scientific and technological revolution is changing the entire face of social production, as well as the conditions, nature, and content of labor, the composition of productive forces, the social division of labor, and the sectorial and occupational structure of society. It is also leading to a rapid increase in labor productivity, exerting an impact on all aspects of society (including culture, daily life, human psychology, and the interrelation of society and nature), and leading to a sharp acceleration of scientific and technological progress. There was also a revolutionary advance in technology, mainly as a result of the use of electricity in industry and transportation. Radio was invented and became widespread. Aviation emerged. In the 1940's science solved the problem of splitting the atomic nucleus. Mankind mastered atomic energy. The rise of cybernetics was of great importance. Research on the development of atomic reactors and the atomic bomb forced capitalist states to organize for the first time a coordinated interaction of science and industry within the framework of a large-scale national scientific and technical plan. This provided experience for the implementation of subsequent national scientific and technical research programs.

However, the psychological impact of the use of atomic energy was perhaps of still greater significance: mankind became convinced of the tremendous transformational capabilities of science and of its practical application. There was a marked increase in allocations for science and in the number of research institutions. Scientific activity became a large-scale endeavor. State agencies for the planning and management of scientific activity were established in most countries in the late 1950's under the influence of the advances made by the former USSR in the study of outer space, and also of former Soviet experience in the organization and planning of science. Direct contacts among scientific and technical development projects were strengthened, and the use of scientific achievements in industry was accelerated. Electronic

computers, which have become a symbol of the scientific and technological revolution, were developed in the 1950's and became widely used in research and industry, and later in management. The appearance of computers heralded the start of the gradual transfer of human logical functions to the machine and, in the long term, the transition to integrated automation of production and management. The electronic computer is a fundamentally new type of technology that alters man's position and role in the production process.

In the 1940's and 1950's there were fundamental shifts in the structure of most sciences and in scientific activity as a result of major scientific and technical discoveries. The interaction of science with technology and production increased. Thus, in the 1940's and 1950's, mankind entered the period of the scientific and technological revolution. At its current stage of development, the scientific and technological revolution is characterized by the following ten main features.

- 1) The conversion of science into a direct productive force through a combination of the revolutions in science, technology, and industry; the intensification of the interaction among these three spheres; and the reduction of the length of time between the birth of a new scientific idea and its practical implementation.

- 2) A new stage in the social division of labor, associated with the conversion of science into the leading area of economic and social activity—an area that is becoming popular in nature.

- 3) The qualitative transformation of all elements of productive forces (the object of labor, the production tools, and the worker himself), the increasing intensification of the entire production process as a result of scientific organization and production engineering, and the reduction of industry's specific consumption of materials, capital, and labor: the new knowledge acquired by society in a way "replaces" outlays for raw materials, equipment, and manpower, repaying many times over the expenditures for scientific research and technical development.

- 4) The change in the nature and content of labor and the growth of the role of creative elements; the conversion of the production process "from the simple process of labor into a scientific process" (K. Marx and F. Engels, *Soch.*, 2nd ed., vol. 46, part 2, p. 208).

- 5) The emergence, on this basis, of the material and technical prerequisites for surmounting the contrast and significant differences

between mental and physical labor, between urban and rural areas, and between the nonproduction and production sectors.

6) The development of new, potentially boundless energy sources and of synthetic materials with prescribed properties.

7) The extremely large increase in the social and economic significance of information service as a means of providing scientific management and control of social production and the corresponding development of the mass media.

8) The growth of the level of general and specialized education and culture of the workers; the increase in free time.

9) The growth in the interaction of the sciences, the comprehensive study of complex problems, and the role of the social sciences and ideological struggle.

10) The sharp acceleration of social progress, further internationalization of all human activity over the entire planet, the rise of "ecological problems," and the associated necessity of scientific regulation of the society-nature system.

In addition to the main features of the scientific and technological revolution, its main scientific and technological trends may be distinguished. Among them are integrated automation of production and of control and management, the discovery and use of new types of energy, and the development and use of new structural materials. However, the essence of the scientific and technological revolution reduces neither to its characteristic features nor, much less, to even the most important scientific discoveries or trends of scientific and technological progress. The scientific and technological revolution does not consist merely in the use of new types of energy and materials, electronic computers, or even integrated automation of production and management. It consists, as well, in the restructuring of the entire technical base and the entire industrial method of production, beginning with the use of materials and energy processes and concluding with the system of machines, the forms of organization and management, and man's relation to the production process.

Technological revolution is (in general meaning) a relatively short period in history when one technology (or better a set of technologies) is replaced by another technology (or by the set of technologies). As Nick Bostrom wrote: "*We might define a technological revolution as a dramatic change brought about relatively quickly by the introduction of some new technology.*" ^[1] It is an era of an

accelerated technological progress characterized not only by new innovations but also their application and diffusion.

A difference between **technological revolution** and technological change is not clearly defined. The **technological change** we could see as an introduction of an individual (single) new technology, while the **technological revolution** as a period in which *more* new technologies are adopted at the almost same time. These new technologies or technological changes are usually interconnected - as 3rd Kranzberg's law of technology says: "*Technology comes in packages, big and small.*"

A Watt steam engine. The steam engine, fuelled primarily by coal, propelled the Industrial Revolution in Great Britain and the world.

IBM Personal Computer XT in 1988 - The PC was an invention that dramatically changed not only a professional but also personal life.

A new technological revolution should increase a productivity of work, efficiency, etc. It may involve not only material changes but also changes in management, learning, social interactions, financing, methods of research etc. It is not limited strictly to technical aspects. Technological revolution so rewrites the material conditions of human existence and also reshape culture, society and even human nature. It can play a role of a trigger of a chain of various and unpredictable changes.

"What distinguishes a technological revolution from a random collection of technology systems and justifies conceptualizing it as a revolution are two basic features:

- 1. The strong interconnectedness and interdependence of the participating systems in their technologies and markets.*
- 2. The capacity to transform profoundly the rest of the economy (and eventually society)."*

The consequences of a technological revolution are not exclusively positive - for example, it can have negative environmental impact and cause a temporal unemployment (so called technological unemployment).

The concept of technological revolution is based on the idea (not unquestioned) that technological progress is not linear but undulatory. Technological revolution can be:

- **sectoral** (more technological changes in one sector, e.g. Green revolution, Commercial revolution)
- **universal** (interconnected radical changes in more sectors, the universal technological revolution can be seen as a complex of

several parallel sectoral technological revolutions, e.g. Second industrial revolution, Renaissance technological revolution etc.)

We can identify several universal technological revolutions which occurred during the modern era in Western culture:

- 1.(1600–1740) Financial-agricultural revolution
- 2.(1780–1840) Industrial revolution
- 3.(1880–1920) Technical revolution (or Second Industrial Revolution)
- 4.(1940–1970) Scientific-technical revolution
- 5.(1985–2000) Information and telecommunications revolution.

Attempts to find comparable periods of well defined technological revolutions in the pre-modern era are highly speculative. Probably one of the most systematic attempts to suggest a timeline of technological revolutions in pre-modern Europe was done by Daniel Šmihula:

- A. (1900-1100 BC) Indo-European technological revolution
- B. (700- 200 BC) Celtic and Greek technological revolution
- C. (300- 700 AD) Germano-Slavic technological revolution
- D. (930-1200 AD) Medieval technological revolution
- E. (1340-1470 AD) Renaissance technological revolution

Technological revolution can cause the production-possibility frontier to shift outward. and initiate economic growth.

- The Upper Paleolithic Revolution: The emergence of "high culture", new technologies and regionally distinct cultures (50,000 - 40,000 years ago).
- The Neolithic Revolution (perhaps 13000 years ago), which formed the basis for human civilization to develop.
- The Renaissance technological revolution: The set of inventions during the Renaissance period, roughly the 14th through the 16th century.
- The Commercial Revolution: A period of European economic expansion, colonialism, and mercantilism which lasted from approximately the 16th century until the early 18th century.
- The Price revolution: A series of economic events from the second half of the 15th century to the first half of the 17th, the price revolution refers most specifically to the high rate of inflation that characterized the period across Western Europe.
- The Scientific revolution: A fundamental transformation in scientific ideas around the 16th century.

- The British Agricultural Revolution (18th century), which spurred urbanisation and consequently helped launch the Industrial Revolution.
- The Industrial Revolution: The major shift of technological, socioeconomic and cultural conditions in the late 18th century and early 19th century that began in Britain and spread throughout the world.
- The Market Revolution: A drastic change in the manual labor system originating in the South of the United States (and soon moving to the North) and later spreading to the entire world (about 1800–1900).
- The Second Industrial Revolution (1871–1914).
- The Green Revolution (1945-1975): The use of industrial fertilizers and new crops greatly increased the world's agricultural output.
- The Digital Revolution: The sweeping changes brought about by computing and communication technology, starting from circa 1950 with the creation of the first general-purpose electronic computers.
- The Information revolution: The massive economic, social and technological changes resulting from the Digital revolution (after 1960).

CHAPTER III. SCIENTIFIC-THEORETICAL BASES OF NATURE PROTECTION

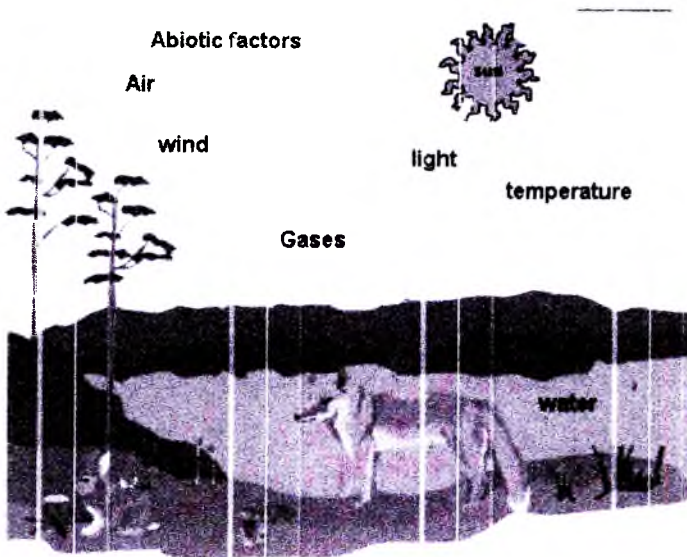
Abiotic factors

Abiotic factors may be grouped into the following main categories:

- climatic factors - include sunlight, humidity, temperature, atmosphere, *etc.*
- edaphic factors - include the nature and type of the soil, geology of the land, *etc.*
- social factors - include land use, water resources, *etc.*

Abiotic components are and ecological factor that acts of living components during any part of their life. Abiotic factors are the factors that are either physical or chemical factors that are the characteristic of the environment being studied. Many ecological studies have been done about the importance of the major abiotic factors which control the physical and biological components in an ecosystem at various ranges of time and space (Figure 1).

Figure 1



Abiotic factors are the non-living components of a habitat. The abiotic factors in an ecosystem are grouped into soil (edaphic), air, topography, meteorology, availability of water and quality of water. The meteorological factors are temperature, wind, sun, humidity and precipitation. The activities and growth of plants and animals are a result of several of these abiotic factors.

List of abiotic factors

The abiotic factors play a major role in the environment. The list of abiotic factors are: clouds, weather, latitude, temperature, oxygen, salinity, soil (edaphic factors), air, water, sunlight, humidity, topography, pH, atmospheric gases.

Biotic components usually include:

1. Producers, i.e. autotrophs: e.g. plants. they convert the energy [from photosynthesis (the transfer of sunlight, water, and carbon dioxide into energy), or other sources such as hydrothermal vents] into food.

2. Consumers, i.e. heterotrophs: e.g. animals. they depend upon producers (occasionally other consumers) for food.

3. Decomposers, i.e. detritivores: e.g. fungi and bacteria. they break down chemicals from producers and consumers (usually dead) into simpler form which can be reused.

27 Laws of ecology

Twenty-seven basic propositions may be said to cover ecological formulae and comprise the body of the so-called Laws of Ecology. The propositions have taken shape over a number of years, and have been collated by Pierre Dansereau, head of the Department of Ecology at the New York Botanical Garden and Adjunct Professor of Botany at Columbia University. Mr. Dansereau is credited with the authorship of several of the propositions and with the reformulation of others. Mr. Dansereau's compendium follows:

A. Physiology of Ecotopic Fitness (1-9)

1. Law of the Inoptimum. No species encounters in any given habitat the optimum conditions for all of its functions.

2. Law of Aphasy. Organic evolution is slower than environmental change on the average, and hence migration occurs.
 3. Law of Tolerance. A species is confined, ecologically and geographically, by the extremes of environmental adversities that it can withstand.
 4. Law of Valence. In each part of its area, a given species shows greater or lesser amplitude in ranging through various habitats (or communities); this is conditioned by its requirements and tolerances being satisfied or nearly overcome.
 5. Law of Competition-Cooperation. Organisms of one or more species occupying the same site over a given period of time use (and frequently reuse) the same resources through various sharing processes which allow a greater portion to the most efficient.
 6. Law of the Continuum. The gamut of ecological niches, in a regional unit, permits a gradual shift in the qualitative and quantitative composition and structure of communities.
 7. Law of Cornering. The environmental gradients upon which species and communities are ordained either steepen or smoothen at various times and places, thereby reducing utterly or broadcasting greatly that part of the ecological spectrum which offers the best opportunity to organisms of adequate valence.
 8. Law of Persistence. Many species, especially dominants of a community, are capable of surviving and maintaining their spatial position after their habitat and even the climate itself have ceased to favor full vitality.
 9. Law of Evolutionary Opportunity. The present ecological success of a species is compounded of its geographical and ecological breadth, its population structure, and the nature of its harboring communities.
- B. Strategy of Community Adjustment (10-14)**
10. Law of Ecesis. The resources of an unoccupied environment will first be exploited by organisms with high tolerance and generally with low requirements.
 11. Law of Succession. The same site will not be indefinitely held by the same plant community, because the physiographic agents and the plants themselves induce changes in the whole environment, and these allow other plants heretofore unable to invade, but now more efficient, to displace the present occupants.
 12. Law of Regional Climax. The processes of succession go through a shift of controls but are not indefinite, for they tend to an equilibrium

that allows no further relay; the climactic-topographic-edaphic-biological balance of forces results in an ultimate pattern which shifts from region to region.

13. Law of Factorial Control. Although living beings react holocenotically (to all factors of the environment in their peculiar conjunction), there frequently occurs a siscrepan factor which has controlling power through its excess or deficiency.

14. Law of Association Segregation. Associations of reduced composition and simplified structure have arisen during physiographic or climatic change and migration through the elimination of some species and the loss of ecological status of others.

C. Regional Climatic Response (15-20)

15. Law of Geocological Distribution. The specific topographical distribution (microdistribution) of an ecotypic plant species or of a plant community is a parallel function of its general geographical distribution (macrodistribution), since both are determined by the same ecological amplitudes and ultimately by uniform physiological requirements.

16. Law of Climatic Stress. It is at the level of exchange between the organism and the environment (microbiosphere) that the stress is felt which eventually cannot be overcome and which will establish a geographic boundary.

17. Law of Biological Spectra. Life-form distribution is a characteristic of regional floras which can be correlated to climatic conditions of the present as well as of the past.

18. Law of Vegetation Regime. Under a similar climate, in different parts of the world, a similar structural-physiognomic-functional response can be induced in the vegetation, irrespective of floristic affinities and/or historical connections.

19. Law of Zonal Equivalence. Where climatic gradients are essentially similar, the latitudinal and altitudinal zonation and cliseral shifts of plant formations also tend to be; where floristic history is essentially identical, plant communities will also be similar.

20. Law of Irreversibility. Some resources (mineral, plant, or animal) do not renew themselves, because they are the result of a process (physical or biological) which has ceased to function in a particular habitat or landscape at the present time.

D. Geographic Distribution (21-27)

21. Law of Specific Integrity. Since the lower taxa (species and subordinate units) cannot be polyphyletic, their presence in widely

separated areas can be explained only by former continuity or by migration.

22. Law of Phylogenetic Trends. The relative geographical positions, within species (but more often genera and families), of primitive and advanced phylogenetic features are good indicators of the trends of migration.

23. Law of Migration. Geographical migration is determined by population pressure and/or environmental change.

24. Law of Differential Evolution. Geographic and ecological barriers favor independent evolution, but the divergence of vicariant pairs is not necessarily proportionate to the gravity of the barrier or the duration of the isolation.

25. Law of Availability. The geographic distribution of plants and animals is limited in the first instance by their place and time of origin.

26. Law of Geological Alternation. Since the short revolutionary periods have a strong selective force upon the biota, highly differentiated life forms are more likely to develop during those times than during equable normal periods.

27. Law of Domestication. Plants and animals whose selection has been more or less dominated by man are rarely able to survive without his continued protection.

Glossary

Biotic factor - Any factor that is living and in a biome (animal or plants).

Abiotic factor- Anything not living that is present in a biome (Does not include dead animals or plants). (Example: air, water, sunlight, soil).

Producer -An organism that produces it's own food through photosynthesis (plants).

Consumer - There are two types, Primary and Secondary. Primary-eats plants secondary eats meat.

Decomposers - An organism that breaks down dead animals and plants and provides nutrients to the soil (worm).

Food web - A diagram explaining how energy from food or prey is transferred through animals and plants.

Biome - Large areas of land that is similar but not necessarily connected. Bioms that the tropical rainforests are in South America but also in other continents.

CHAPTER IV. POPULATION AND ECOSYSTEM ECOLOGY

Population ecology

Population ecology studies the dynamics of specie populations and how these populations interact with the wider environment. A population consists of individuals of the same species that live, interact and migrate through the same niche and habitat.

A primary law of population ecology is the Malthusian growth model which states, "a population will grow (or decline) exponentially as long as the environment experienced by all individuals in the population remains constant." Simplified population models usually start with four variables: death, birth, immigration, and emigration.

Population growth

A population is a group of individuals of the same species living in the same geographic area. The study of factors that affect growth, stability, and decline of populations is population dynamics. All populations undergo three distinct phases of their life cycle:

1. growth
2. stability
3. decline

Population growth occurs when available resources exceed the number of individuals able to exploit them. Reproduction is rapid, and death rates are low, producing a net increase in the population size.

Population stability is often preceded by a "crash" since the growing population eventually outstrips its available resources. Stability is usually the longest phase of a population's life cycle.

Decline is the decrease in the number of individuals in a population, and eventually leads to population extinction.

History of ecosystem

The term ecosystem first appeared in a 1935 publication by the British ecologist Arthur Tansley. However, the term had been coined already in 1930 by Tansley's colleague Roy Clapham, who was asked if he could think of a suitable word to denote the physical and biological components of an environment considered in relation to each other as a unit. Tansley expanded on the term in his later work, adding the ecotope concept to define the spatial context of ecosystems (Tansley, 1939).

Modern usage of the term derives from the work of Raymond Lindeman in his classic study of a Minnesota lake (Lindeman, 1942). Lindeman's central concepts were that of *functional organisation* and *ecological energy efficiency* ratios. This approach is connected to ecological energetics and might also be thought of as environmental rationalism. It was subsequently applied by Howard T. Odum, sometimes called the "father" of ecosystems ecology, in founding the transdiscipline known as systems ecology.

Ecosystem ecology

These ecosystems, as we may call them, are of the most various kinds and sizes. They form one category of the multitudinous physical systems of the universe, which range from the universe as a whole down to the atom.

Ecosystems are habitats within biomes that form an integrated whole and a dynamically responsive system having both physical and biological complexes. The underlying concept can be traced back to 1864 in the published work of George Perkins Marsh ("Man and Nature"). Within an ecosystem, organisms are linked to the physical and biological components of their environment to which they are adapted. Ecosystems are complex adaptive systems where the interaction of life processes form self-organizing patterns across different scales of time and space. Ecosystems are broadly categorized as terrestrial, freshwater, atmospheric, or marine.

Basic functional components

We can recognize four functional components of an ecosystem: 1) *abiotic factors*, 2) *producers*, 3) *consumers*, and 4) *decomposers*. The latter three are living components, what Odum (1959) termed the three "functional kingdoms of nature", so important and universal is their presence in ecosystems

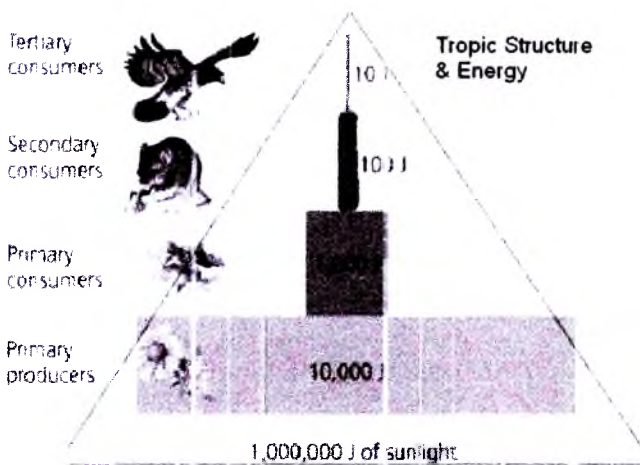
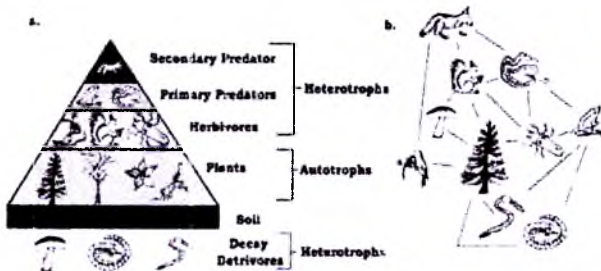
Energy flow in ecosystem and biological productivity. Dynamics of ecosystem (Food chains, ecological pyramid and succession)

Food webs

A food web is the archetypal ecological network. Plants capture solar energy and use it to synthesize simple sugars during photosynthesis. As plants grow, they accumulate nutrients and are eaten by grazing herbivores, and the energy is transferred through a chain of organisms by consumption. The simplified linear feeding pathways that move from a basal trophic species to a top consumer is called the food chain (Figure 2).

Figure 2

A trophic pyramid



A trophic pyramid (a) and a food-web (b) illustrating ecological relationships among creatures that are typical of a northern Boreal terrestrial ecosystem. The trophic pyramid roughly represents the biomass (usually measured as total dry-weight) at each level. Plants generally have the greatest biomass. Names of trophic categories are shown to the right of the pyramid. Some ecosystems, such as many wetlands, do not organize as a strict pyramid, because aquatic plants are not as productive as long-lived terrestrial plants such as trees. Ecological trophic pyramids are typically one of three kinds: 1) pyramid of numbers, 2) pyramid of biomass, or 3) pyramid of energy.

A trophic level (from Greek *troph*, τροφή, trophē, meaning "food" or "feeding") is "a group of organisms acquiring a considerable majority of its energy from the adjacent level nearer the abiotic source."

CHAPTER V. BIOSPHERE

Biosphere

The **biosphere** is the part of the Earth, including air, land, surface rocks, and water, within which life occurs, and which biotic processes in turn alter or transform. From the broadest biophysiological point of view, the biosphere is the global ecological system integrating all living beings and their relationships, including their interaction with the elements of the lithosphere, hydrosphere, and atmosphere. This biosphere is postulated to have evolved, beginning through a process of biogenesis or biopoesis, at least some 3.5 billion years ago.

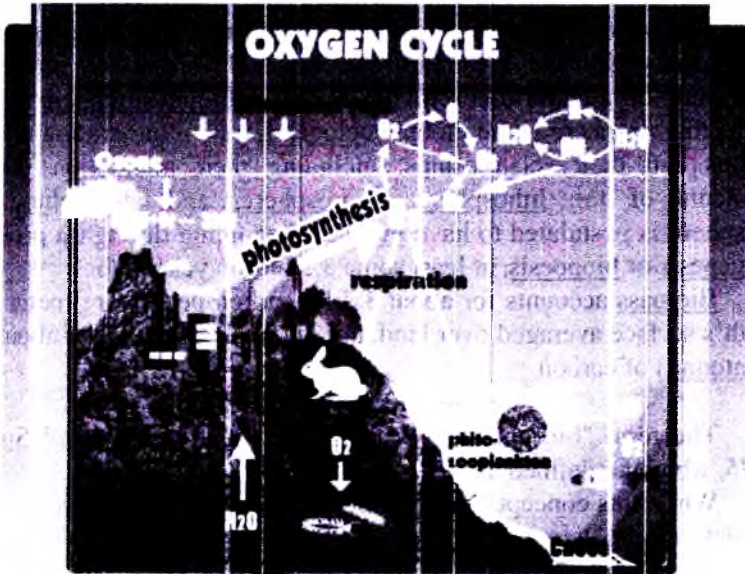
Biomass accounts for about 3.7 kg carbon per square meter of the earth's surface averaged over land and sea, making a total of about 1900 gigatonnes of carbon.

Origin and use of the term

The term "biosphere" was coined by geologist Eduard Suess in 1875, which he defined as:

While this concept has a geological origin, it is an indication of the impact of both Darwin and Mauvy on the earth sciences. The biosphere's ecological context comes from the 1920s, preceding the 1935 introduction of the term "ecosystem" by Sir Arthur Tansley. Vernadsky defined ecology as the science of the biosphere. It is an interdisciplinary concept for integrating astronomy, geophysics, meteorology, biogeography, evolution, geology, geochemistry, hydrology and, generally speaking, all life and earth sciences.

The oxygen cycle



The carbon cycle

All living things are made of carbon. Carbon is also a part of the ocean, air, and even rocks. Because the Earth is a dynamic place, carbon does not stay still. It is on the move!

In the atmosphere, carbon is attached to some oxygen in a gas called carbon dioxide. Plants use carbon dioxide and sunlight to make their own food and grow. The carbon becomes part of the plant. Plants that die and are buried may turn into fossil fuels made of carbon like coal and oil over millions of years. When humans burn fossil fuels, most of the carbon quickly enters the atmosphere as carbon dioxide.

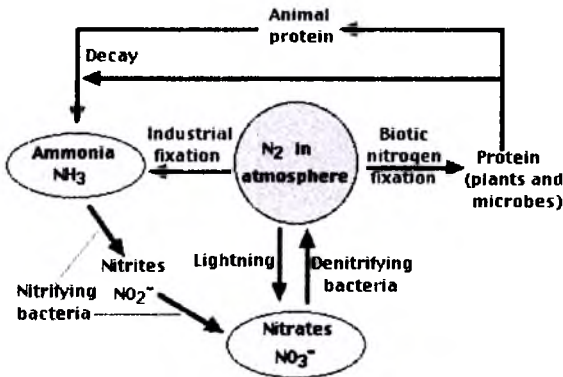
Carbon dioxide is a greenhouse gas and traps heat in the atmosphere. Without it and other greenhouse gases, Earth would be a frozen world. But humans have burned so much fuel that there is about 30% more carbon dioxide in the air today than there was about 150 years ago, and Earth is becoming a warmer place. In fact, ice cores show

us that there is now more carbon dioxide in the atmosphere than there has been in the last 420,000 years.

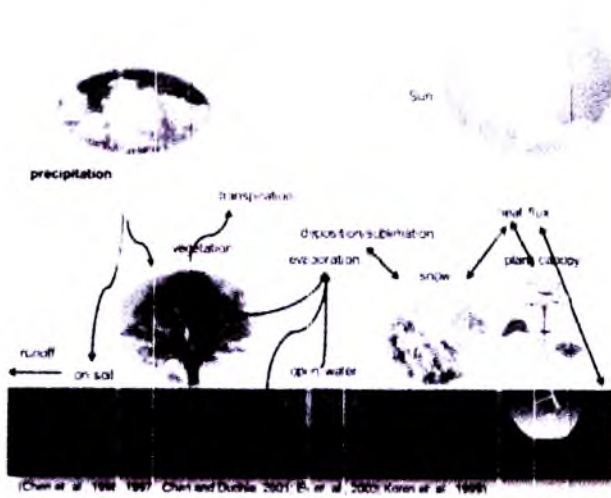
The Nitrogen Cycle

- All life requires nitrogen-compounds, e.g., proteins and nucleic acids.
- Air, which is 79% nitrogen gas (N_2), is the major reservoir of nitrogen.
- But most organisms cannot use nitrogen in this form.
- Plants must secure their nitrogen in "fixed" form, i.e., incorporated in compounds such as:
 - nitrate ions (NO_3^-)
 - ammonium ions (NH_4^+)
 - urea ($(NH_2)_2CO$)
- Animals secure their nitrogen (and all other) compounds from plants (or animals that have fed on plants) (figure 3).

Figure 3



The water cycle



CHAPTER VI. NATURAL RESOURCES AND RATIONAL USE

Natural resource

Natural resource is any naturally occurring substance or feature of the environment (physical or biological) that, while not created by human effort, can be exploited by humans to satisfy their needs or wants. There are different schools of thought on whether economic value is a necessary condition for something to be classified as a natural resource, a distinction that can have legal.

Atlantic salmon, *Salmo salar*, a renewable, biotic natural resource ramifications. Examples of natural resources include fossil fuels (crude oil, coal, etc.), minerals (diamonds, copper, etc.), salmon, and timber. Trees in a park that provide aesthetic beauty can be considered natural resources among those who do not limit the term to the presence of economic product value.

Examples of resources supplied by nature:

- Fossil fuels (petroleum, natural gas, coal)
- Minerals (diamonds, gold, copper, silver)
- Natural vegetation, forests, timber
- Animals (salmon, whales, deer, etc.)
- Air, wind
- Water, water power, wetlands, watercourses, lakes
- Sunlight
- Soil, topsoil

Waste problems

What is Our Greatest Environmental Problem???

- **Disease**
- **Overpopulation**
- **Water Shortages**
- **Climate Changes**
- **Biodiversity Loss**
- **Poverty**
- **Malnutrition**
- **Waste**

THE PROBLEMS WITH WASTE

"Recycling. Ho hum. Everybody does it, but what difference does it make? That was my original reaction ... How wrong I was! ...Recycling has morphed into a new concept called "Zero Waste" and suddenly...'recycling' is posing a fundamental challenge to 'business as usual.' Zero Waste has the potential to motivate people to change their lifestyles, demand new products, and insist that corporations and governments behave in new ways. This is a very exciting development."

- Peter Montague, director of the Environmental Research Foundation

Reduce, Reuse and Recycle
Saving Nonrenewable resources

Reduce: Use less resource

Reuse: To use the resource more than once to conserve.

Recycle: collecting resource, processing it into new products

Recycled with

Milk & Juice Cartons

Plastic Bottles

Aluminium & Steel Cans

Glass Containers

CHAPTER VII. ATMOSPHERE AND ITS PROTECTION

Atmosphere ecology Effects on the ozone layer

The ozone layer helps to protect life on earth from the sun's ultraviolet rays, but human activities have contributed to the accelerated depletion of this protective shield. Substances that contribute to ozone depletion usually have high concentrations of chlorine or bromine atoms and include chlorofluorocarbons, or CFCs, halons, methyl bromide, carbon tetrachloride and methyl chloroform. Vehicle emissions contain few chlorine- or bromine-heavy substances, and therefore have little effect on ozone depletion. Even though they are not good for human health, hydrocarbons are recognized by the EPA as having no ozone depletion potential.

Cars and air pollution

The principal air-quality pollutant emissions from petrol, diesel and alternative fuel engines are carbon monoxide, oxides of nitrogen, un-burnt hydrocarbons and particulate matter. It is emissions of these pollutants that are regulated by the Euro emissions standards. Modern cars, if kept in good condition, produce only quite small quantities of the air quality pollutants, but the emissions from large numbers of cars add to a significant air quality problem. Carbon monoxide, oxides of nitrogen, and un-burnt hydrocarbons are gases, and are generally invisible. Particulate matter is usually invisible although under certain operating conditions diesel engines will produce visible particles, appearing as smoke. Petrol engines will also produce visible particles if they are burning engine oil or running "rich", for example, following a cold start. Fine particles can also be produced by tyre and brake wear. Unlike emissions of CO₂, emissions of the air quality pollutants are not directly linked to fuel consumption.

Radiation Poisoning?

Radiation takes place when the atomic nucleus of an unstable atom decays and starts releasing ionizing particles, known as ionizing radiation. When these particles come into contact with organic material,

such as human tissue, they will damage them if levels are high enough, causing burns and **cancer**. Ionizing radiation can be fatal for humans.

REM (roentgen equivalent in man) - this is a unit we use to measure radiation dosage. We use this measurement to determine what levels of radiation are safe or dangerous for human tissue. It is the product of the absorbed dose in rads and a weighting factor (W_r), which accounts for how effective the radiation is in causing biological damage.

A sudden, short dose of up to 50 rem will probably cause no problems, except for some blood changes. From 50 to 200 rem there may be illness, but fatalities are highly unlikely. A dose of between 200 and 1,000 will most likely cause serious illness - the nearer the 1,000 it is, the poorer the outlook for the human will be. Any dose over 1,000 will typically cause death.

Experts say that approximately 50% of humans exposed to 450 rems will die, and 800 rems will kill virtually anyone. Death is inevitable and will occur from between two days to a couple of weeks.

CHAPTER VIII. WATER RESOURCE AND ITS PROTECTION

Water resource ABOUT *WATER STRESS*

Water stress (the degree of water provision) is found by the percent of amount of yearly used water to total amount of water.

Water stress has four degree (by the materials of UNESKO):

Low water stress – The Countries which use 10% of water, and have no inconvenience with water resources (Southern American Countries, Scandinavia, Canada, Russian, Australia and etc.).

Medium water stress- water usage degree is 10-20 %. They must do convenience to use water steadily (The USA, Mexico, Algeria, Germany, India, Kazakhstan, Turkmen and etc).

High water stress- they use more than 40% of water, they have shortage of water and they should not waste water (Pakistan, Iran, Near Eastern Countries, Libya, and Egypt).

THE WATER USAGE IN UZBEKISTAN

Total water usage is 62-65 km³ in Uzbekistan, and its 36 km³ is taken from the Amu Darya and the Syr Darya. More than 2 million hectare land is irrigated with Amu Darya' s water. The part of the water resources which is formed in Uzbekistan, according to Amu Darya' s basin is 6%, according to Syr Darya' s basin is 16%, and is about 8 % of total stead according to the whole Republic. And only Chirchik and Ohangaran rivers belong to Uzbekistan.

POLLUTION OF WATER AND SAVING IT

The most harmful soiling sources of water are industrial and daily house holding dirty water. Dirtiness of water is the position that there are strange elements which increase the quality of water. There are dangerous acids for lively organisms in industrial polluted water, they are: phenol, hydrogen sulphate, ammonia, copper, quick silver, cyanide, chromium and other poisonous elements, they and industrial polluted water join river, lake and reservoirs and pollute them. There are some types of polluting elements: mineral, organic, bacterial and biological. **Mineral pollutants** are usually sand, mud, various mineral salts, acid and alkaline solutions.

Organic pollutants consist of remainders of plants and animals, and physiological pollution of human and animals. Bacterial and biological pollution are mainly in daily dirty water. Railway, aviation means of transportation and auto repair shops also pollute water resources.

And radioactive waste materials from atom electricity stations also pollute rivers. They gather in organisms of plankton and fish, then they will pass to other organisms. Daily dirty water pollutes lake and rivers with dangerous bacterium and gelmint.

There are three kinds of cleaning dirty water:

- 1) mechanical,
- 2) physical-chemical,
- 3) biological.

Mechanic cleaning is filtering, keeping in one position, separating hard bodies.

In *physical-chemical cleaning* oxidative and bad oxidative elements in dirty water are broken. In this situation electric ways are often used. Chlorine is also useful.

Biological cleaning is also very important way of cleaning dirty water. We can use this way for natural and artificial water basins. Biological cleaning is hold in filtering places or irrigating channels in natural basins. The aim of biological filtering is that when water is cleaned in dirty water places, it flows through several layers of soil, and its not melted compounds and colloids will gather in one place , after some time they will make a thin microbiological layer in the soil. This thin layer holds the organic matters and oxidizes them and makes mineral compounds from them.

Artificial biological cleaning is held with the help of biological filters and aerotencts in specially built structures.

Aerotencts are big reservoirs built from iron concrete. In this reservoirs water will be cleaned from dregs which consist of bacterium and tiny creatures.

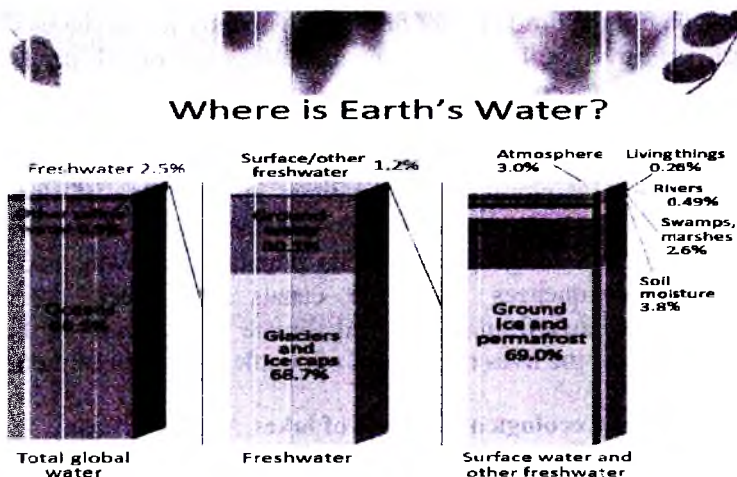
In Uzbekistan the law was accepted on 6 May, 1993, it was called "Water and its usage".

Water resources

Water resources are sources of water that are useful or potentially useful. Uses of water include agricultural, industrial, household.

recreational and environmental activities. Virtually all of these human uses require fresh water. 97% of the water on the Earth is salt water. However, only three percent is fresh water; slightly over two thirds of this is frozen in glaciers and polar ice caps. The remaining unfrozen freshwater is found mainly as groundwater, with only a small fraction present above ground or in the air. Fresh water is a renewable resource, yet the world's supply of clean, fresh water is steadily decreasing (picture 3).

Picture 3



Source: Igor Shiklomanov's chapter "World fresh water resources" in Peter H. Gleick (editor), 1998, *Water In Crisis. A Guide to the World's Fresh Water Resources*.

NOTE: Numbers are rounded, so percent summations may not add to 100.

The fresh water which exist in Uzbekistan, about its 92% is used in agriculture, 6% is used in industry, 0,5% is used in municipal household, and its 1,5% is separated. Nowadays, there is shortage of fresh water in more than 50 countries of the world. In Belgium, England, French, Germany, Holland, Danish, Mexico, Japan and some countries of Africa (The Republic of Southern Africa, Jazeera), and in Near East's some countries also have the shortage of fresh water. In statistics, in cities and population points in developed countries, expenditure of water is 150 litres to each person in a day, in Russia it is 250 litres. Each person uses 300 litre of water for daily household in a day in Tashkent. Especially,

more water is used in agriculture and in branches of industry than other fields.

The Aral Sea

Aral Sea is a closed water basin; it is situated in northern-western part of Central Asia. According to its area Aral Sea is the second sea (after Kaspıy) among the countries of The Friendship of Independent Countries, and the fourth in the world (after Kaspıy, the Upper lake in USA, and the Victoria lake in Africa). Its main water sources are the Amu Darya and the Syr Darya.

Up until the third quarter of the 20th century it was the world's fourth largest saline lake, and contained 10 grams of salt per liter. The former Soviet government decided in the 1960s to divert those rivers so that they could irrigate the desert region surrounding the Sea in order to favor agriculture rather than supply the Aral Sea basin. The reason why we decided to explore the implications up to today of this human alteration of the environment is precisely that certain characteristics of the region, from its geography to its population growth, account for dramatic consequences since the canals have been dug. Those consequences range from unexpected climate feedbacks to public health issues, affecting the lives of millions of people in and out of the region.

The ecological position of lakes Aydar-Arnasay

Chardara – Arnasay lakes took shape in 1969, the year that there were disastrous much water because of throwing 21,8 km³ water from Chardara in Kazakhstan. After some years as a result of regular coming of water lakes took shape there, Aydarsay, Arnasay and Tuzkon lakes' total volume is 22 km³ and their arena is about 2500 km².

From 1993 Kirgizia Republic began using energetic way of Toktogul reservoir in order to use irrigating way. In those years fols happened one after another and in 1994 more than 9 km³ water was thrown to Arnasay. And summer pastures, health resorts, fishing places became under the water. Extraordinary positions happened three times in this place (1998, 2003, 2005 years). Then it took a lot of money to correct their disasters. From 2006 they stopped to throwing water from Chardara to Arnasay. If we don't use Chordana's water with care, for example we waste much water to Syr Darya for irrigating more than

yearly plan, if we don't send 4-4,5 km³ water for Aydar – Arnasay's steaming , it can make harmful situation for Navoi region's northern parts and Kazakhstan's Southern part. We should keep Aydar – Arnasay lakes' 245 m position. It helps to live normally to plants and animals. As a conclusion we can say that if we won't pay attention the water throwings to Aydar-Arnasay, then there can be ecologic problems. Today we are trying to join these lakes the list of the conversion "Ramsar" as a place that has international value of keeping it for birds which live near water and swim in it. The Government of Uzbekistan accepted an instruction for 2008-2015 years about Aydar – Arnasoy lakes.

CHAPTER IX. SOIL RESOURCE AND ITS PROTECTION

Soil

Soil is the mixture of minerals, organic matter, gases, liquids, and the myriad of organisms that together support plant life. It is a natural body that exists as part of the pedosphere and which performs four important functions: it is a medium for plant growth; it is a means of water storage, supply and purification; it is a modifier of the atmosphere; and it is a habitat for organisms that take part in decomposition of organic matter and the creation of a habitat for new organisms.

Soil is considered to be the "skin of the earth" with interfaces between the lithosphere, hydrosphere, atmosphere, and biosphere. Soil consists of a solid phase (minerals and organic matter) as well as a porous phase that holds gases and water. Accordingly, soils are often treated as a three-state system.

Soil contamination or soil pollution is caused by the presence of xenobiotic (human-made) chemicals or other alteration in the natural soil environment. It is typically caused by industrial activity, agricultural chemicals, or improper disposal of waste. The most common chemicals involved are petroleum hydrocarbons, polynuclear aromatic hydrocarbons (such as naphthalene and benzo(a)pyrene), solvents, pesticides, lead, and other heavy metals. Contamination is correlated with the degree of industrialization and intensity of chemical usage. The concern over soil contamination stems primarily from health risks, from direct contact with the contaminated soil, vapors from the contaminants, and from secondary contamination of water supplies within and underlying the soil.

In North America and Western Europe that the extent of contaminated land is best known, with many of countries in these areas having a legal framework to identify and deal with this environmental problem. Developing countries tend to be less tightly regulated despite some of them having undergone significant industrialization.

Pesticides and herbicides

A pesticide is a substance or mixture of substances used to kill a pest. A pesticide may be a chemical substance, biological agent (such as a virus or bacteria), antimicrobial, disinfectant or device used against any pest. Pests include insects, plant pathogens, weeds, mollusks, birds, mammals, fish, nematodes (roundworms) and microbes that compete

with humans for food, destroy property, spread or are a vector for disease or cause a nuisance. Although there are benefits to the use of pesticides, there are also drawbacks, such as potential toxicity to humans and other organisms.

Herbicides are used to kill weeds, especially on pavements and railways. They are similar to auxins and most are biodegradable by soil bacteria. However, one group derived from trinitrotoluene (2:4 D and 2:4:5 T) have the impurity dioxin, which is very toxic and causes fatality even in low concentrations. Another herbicide is Paraquat. It is highly toxic but it rapidly degrades in soil due to the action of bacteria and does not kill soil fauna.¹

Insecticides are used to rid farms of pests which damage crops. The insects damage not only standing crops but also stored ones and in the tropics it is reckoned that one third of the total production is lost during food storage. As with fungicides, the first insecticides used in the nineteenth century were inorganic e.g. Paris Green and other compounds of arsenic. Nicotine has also been used since the late eighteenth century.

CHAPTER X. PLANT RESOURCES ANT THEIR PROTECTION

Plant world

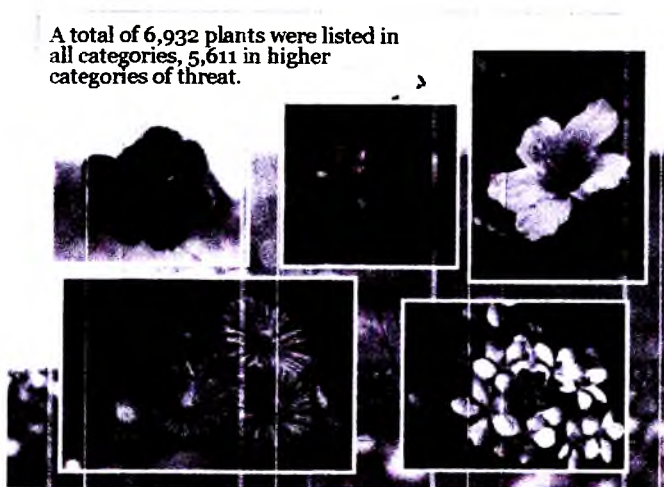
Vegetation helps sustain life. We eat many plants, herbs and so forth in our daily diet. But, we must remember to be choosy. Some plants, trees or shrubs are potential killers of man. Some part of the ornamental plants or flowers in your yard may contain deadly poison. Many poisonous plants are so common and seemingly innocuous you do not suspect their toxic qualities.

For example, who would expect that the beautiful oleander bush-grown indoors and outdoors all over the country-contains a deadly heart stimulant, similar to the drug digitalis?

What is the Red Data Book?

The Red Data Book is the state document established for documenting rare and endangered species of animals, plants and fungi as well as some local sub-species that exist within the territory of the state or country (picture 4).

Picture 4



CHAPTER XI. ANIMAL WORLD AND ITS PROTECTION

Animal world

Etymology

The word "animal" comes from the Latin word *animalis*, meaning "having breath". In everyday non-scientific usage the word excludes humans – that is, "animal" is often used to refer only to non-human members of the kingdom Animalia; often, only closer relatives of humans such as mammals, or mammals and other vertebrates, are meant.¹ The biological definition of the word refers to all members of the kingdom Animalia, encompassing creatures as diverse as sponges, jellyfish, insects, and humans.

Endangered Species To help prevent extinctions, it is important to identify species that could soon disappear. A species in danger of becoming extinct is classified as an **endangered species**. The African black rhinoceros, shown in **Figure 7**, is endangered.

Rhinoceroses are plant eaters. They use their horns to battle each other for territory and to protect themselves against lions and other predators. For centuries, humans have considered rhinoceros horn to be a rare treasure. It is so valuable that poachers continue to hunt and kill these animals, even though selling rhinoceros horn is against international law. In 1970, there were about 100,000 black rhinoceroses in Africa. By the year 2000, fewer than 3,000 were left.

Threatened Species If a species is likely to become endangered in the near future, it is classified as a **threatened species**. The Australian koala, shown in **Figure 8**, is threatened. People once hunted koalas for their fur. In the 1930s, people realized the koala was in danger. Laws were passed that prohibited the killing of koalas, and the koala populations began to recover. Koalas rely on certain species of Australian eucalyptus trees for food and shelter. After the 1930s laws were passed, Australia's human population grew and the koala's habitat began to disappear. By the year 2000, nearly two-thirds of the koala's habitat had been lost to logging, agriculture, cities, and roads.¹

¹Peter Rillero, Dinah Zike Ecology, 2005. P.132, 143.

CHAPTER XII. PROTECTED AREAS AND BIODIVERSITY

Protected areas

Protected areas or **conservation areas** are locations which receive protection because of their recognized natural, ecological and/or cultural values. There are several kinds of protected areas, which vary by level of protection depending on the enabling laws of each country or the regulations of the international organisations involved. The term "protected area" also includes Marine Protected Areas, the boundaries of which will include some area of ocean, and Transboundary Protected Areas that overlap multiple countries which remove the borders inside the area for conservation and economic purposes. There are over 161,000 protected areas in the world (as of October 2010) with more added daily, representing between 10 and 15 percent of the world's land surface area. By contrast, only 1.17% of the world's oceans is included in the world's ~6,800 Marine Protected Areas.

Situated in the heart of Central Asia, the Republic of Uzbekistan has a well developed park infrastructure. With dramatic intersections of river, mountain, and desert ecosystems it boasts a varied landscape and rich biodiversity. Fauna : Some 40 species mammal, 430 species of birdlife, 60 species of reptiles and 74 fish species are found in Uzbekistan. Flora: 68 main species of trees, 320 of shrubs, and over 3000 types of grass are also found in the Republic. There are four main categories of protected natural areas in Uzbekistan:

What is the Biodiversity?

Biodiversity is the degree of variation of life. This can refer to genetic variation, species variation, or ecosystem variation within an area, biome, or planet. Terrestrial biodiversity tends to be highest near the equator, which seems to be the result of the warm climate and high primary productivity. Marine biodiversity tends to be highest along coasts in the Western Pacific, where sea surface temperature is highest and in mid-latitudinal band in all oceans. Biodiversity generally tends to cluster in hotspots, and has been increasing through time but will be likely to slow in the future.

The earliest evidences for life on Earth are graphite found to be biogenic in 3.7 billion-year-old metasedimentary rocks discovered in Western Greenland and microbial mat fossils found in 3.48 billion-year-

old sandstone discovered in Western Australia. Since life began on Earth, five major mass extinctions and several minor events have led to large and sudden drops in biodiversity. The Phanerozoic eon (the last 540 million years) marked a rapid growth in biodiversity via the Cambrian explosion—a period during which the majority of multicellular phyla first appeared. The next 400 million years included repeated, massive biodiversity losses classified as mass extinction events. In the Carboniferous, rainforest collapse led to a great loss of plant and animal life. The Permian–Triassic extinction event, 251 million years ago, was the worst; vertebrate recovery took 30 million years. The most recent, the Cretaceous–Paleogene extinction event, occurred 65 million years ago and has often attracted more attention than others because it resulted in the extinction of the dinosaurs.

The period since the emergence of humans has displayed an ongoing biodiversity reduction and an accompanying loss of genetic diversity. Named the Holocene extinction, the reduction is caused primarily by human impacts, particularly habitat destruction. Conversely, biodiversity impacts human health in a number of ways, both positively and negatively.

The United Nations designated 2011–2020 as the United Nations Decade on Biodiversity.

The term biological diversity was used first by wildlife scientist and conservationist Raymond F. Dasmann in the 1968 lay book *A Different Kind of Country* advocating conservation. The term was widely adopted only after more than a decade, when in the 1980s it came into common usage in science and environmental policy. Thomas Lovejoy, in the foreword to the book *Conservation Biology*, introduced the term to the scientific community. Until then the term "natural diversity" was common, introduced by The Science Division of The Nature Conservancy in an important 1975 study, "The Preservation of Natural Diversity." By the early 1980s TNC's Science program and its head, Robert E. Jenkins, Lovejoy and other leading conservation scientists at the time in America advocated the use of the term "biological diversity".

The term's contracted form *biodiversity* may have been coined by W.G. Rosen in 1985 while planning the 1986 *National Forum on Biological Diversity* organized by the National Research Council

(NRC). It first appeared in a publication in 1988 when sociobiologist E. O. Wilson used it as the title of the proceedings of that forum.

Since this period the term has achieved widespread use among biologists, environmentalists, political leaders, and concerned citizens.

A "Biodiversity" is most commonly used to replace the more clearly defined and long established terms, species diversity and species richness. Biologists most often define biodiversity as the "totality of genes, species, and ecosystems of a region". An advantage of this definition is that it seems to describe most circumstances and presents a unified view of the traditional three levels at which biological variety has been identified:

1. **Species diversity** (the sheer variety of living things, from microscopic bacteria and fungi to towering redwoods and enormous blue whales)
2. **Ecosystem diversity** (tropical rainforests, deserts, swamps, tundra, and everything in between)
3. **Genetic diversity** (the variety of genes within a single species, which give rise to the variations that cause species to evolve and adapt over time).

In 2003 Professor Anthony Campbell at Cardiff University, UK and the Darwin Centre, Pembrokeshire, defined a fourth level: Molecular Diversity.

The 1992 United Nations Earth Summit defined "biological diversity" as "the variability among living organisms from all sources, including, 'inter alia', terrestrial, marine, and other aquatic ecosystems, and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems".

Diversity consistently measures higher in the tropics and in other localized regions such as the Cape Floristic Region and lower in polar regions generally. Rain forests that have had wet climates for a long time, such as Yasuni National Park in Ecuador, have particularly high biodiversity.

Terrestrial biodiversity is up to 25 times greater than ocean biodiversity. Although a recent discovered method put the total number of species on Earth at 8.7 million of which 2.1 million were estimated to live in the ocean, however this estimate seems to under-represent diversity of microorganisms.

CHAPTER XIII. DESERTIFICATION

Desertification problem

Desertification is a type of land degradation in which a relatively dry land region becomes increasingly arid, typically losing its bodies of water as well as vegetation and wildlife. It is caused by a variety of factors, such as climate change and human activities. Desertification is a significant global ecological and environmental problem. Desertification is recognized as a major threat to biodiversity. Some countries have developed Biodiversity Action Plans to counter its effects, particularly in relation to the protection of endangered flora and fauna.

Reforestation gets at one of the root causes of desertification and is not just a treatment of the symptoms. Environmental organizations work in places where deforestation and desertification are contributing to extreme poverty. There they focus primarily on educating the local population about the dangers of deforestation and sometimes employ them to grow seedlings, which they transfer to severely deforested areas during the rainy season.

CHAPTER XIV. SUSTAINABLE DEVELOPMENT

The tasks of Sustainable development

Sustainable development is a road-map, an action plan, for achieving sustainability in any activity that uses resources and where immediate and intergenerational replication is demanded. As such, sustainable development is the organizing principle for sustaining finite resources necessary to provide for the needs of future generations of life on the planet. It is a process that envisions a desirable future state for human societies in which living conditions and resource-use continue to meet human needs without undermining the "integrity, stability and beauty" of natural biotic systems.

The term *sustainable development* rose to significance after it was used by the Brundtland Commission in its 1987 report Our Common Future. In the report, the commission coined what has become the most often-quoted definition of sustainable development: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." The United Nations Millennium Declaration identified principles and treaties on sustainable development, including economic development, social development and environmental protection.

The ecological sustainability of human settlements is part of the relationship between humans and their natural, social and built environments. Also termed human ecology, this broadens the focus of sustainable development to include the domain of human health. Fundamental human needs such as the availability and quality of air, water, food and shelter are also the ecological foundations for sustainable development; addressing public health risk through investments in ecosystem services can be a powerful and transformative force for sustainable development which, in this sense, extends to all species.

CHAPTER XV. NOISE PROBLEM

The influence of noise to environment

Noise

Picture 5

Loudness of sound

⇒ *The level of sound.*

- measuring unit: **decibel**

↓
written as dB

- The higher the decibel, the louder is the sound.
- Can be measured with a decibel meter

LIVING SCIENCE Second Edition
OXFORD

1
0.2
0.5
0.4
0.5
0.6
0.7
0.9
0.9
0.10
Sunar

Picture 6

- The following photos show two different kinds of decibel meters:**



Picture 7

Effects of noise pollution

- **causes mental stress**
- **increases the heartbeat rate and blood pressure**
- **disturbs our sleep**
- **makes us difficult to concentrate, so accidents happen more easily**
- **annoying, makes us become bad tempered more often**



CHAPTER XVI. THE PROSPECTS OF ECOTOURISM AND AGROTOURISM OF UZBEISTAN

About Ecotourism

Ecotourism is a late 20th-century neologism compounded from eco- and tourism. According to the Oxford English Dictionary, *ecotour* was first recorded in 1973 and *ecotourism*, "probably after *ecotour*", in 1982.

- **ecotour**, *n.* ... A tour of or visit to an area of ecological interest, usually with an educational element; (in later use also) a similar tour or visit designed to have as little detrimental effect on the ecology as possible or undertaken with the specific aim of helping conservation efforts.
- **ecotourism**, *n.* ... Tourism to areas of ecological interest (typically exotic and often threatened natural environments), esp. to support conservation efforts and observe wildlife; spec. access to an endangered environment controlled so as to have the least possible adverse effect.

One source claims the terms were used earlier. Claus-Dieter (Nick) Hetzer, an academic and adventurer from Forum International in Berkeley, CA, supposedly coined *ecotourism* in 1965 and ran the first *ecotours* in the Yucatán during the early 1970s.

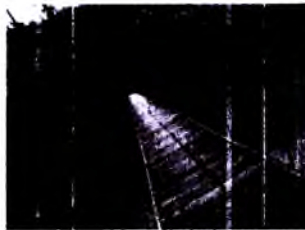
Ecotourism is a form of tourism involving visiting fragile, pristine, and relatively undisturbed natural areas, intended as a low-impact and often small scale alternative to standard commercial (mass) tourism. Its purpose may be to educate the traveler, to provide funds for ecological conservation, to directly benefit the economic development and political empowerment of local communities, or to foster respect for different cultures and for human rights. Since the 1980s ecotourism has been considered a critical endeavor by environmentalists, so that future generations may experience destinations relatively untouched by human intervention. Several university programs use this description as the working definition of ecotourism.

Generally, ecotourism deals with living parts of the natural environments. Ecotourism focuses on socially responsible travel, personal growth, and environmental sustainability. Ecotourism typically involves travel to destinations where flora, fauna, and cultural

heritage are the primary attractions. Ecotourism is intended to offer tourists insight into the impact of human beings on the environment, and to foster a greater appreciation of our natural habitats.

Responsible ecotourism programs include those that minimize the negative aspects of conventional tourism on the environment and enhance the cultural integrity of local people. Therefore, in addition to evaluating environmental and cultural factors, an integral part of ecotourism is the promotion of recycling, energy efficiency, water conservation, and creation of economic opportunities for local communities. For these reasons, ecotourism often appeals to advocates of environmental and social responsibility.

The term 'ecotourism', like 'sustainable tourism', is considered by many to be an oxymoron. Tourism in general depends upon and increases air transportation, contributing significantly to greenhouse gas emissions from combustion placed high into the stratosphere where they immediately contribute to the heat trapping phenomenon behind global warming and climate change. Additionally, "the overall effect of sustainable tourism is negative, where, like ecotourism, philanthropic aspirations mask hard-nosed immediate self-interest."



A hanging bridge in Eco-tourism area of Thenmala, Kollam in India



Fernando de Noronha in Brazil

About agro tourism

Agro tourism or **Agro tourism**, as it is defined most broadly, involves any agriculturally based operation or activity that brings visitors to a farm or ranch. Agro tourism has different definitions in different parts of the world, and sometimes refers specifically to farm stays, as in Italy. Elsewhere, agro tourism includes a wide variety of activities, including buying produce direct from a farm stand, navigating a corn maze, picking fruit, feeding animals, or staying at a B&B on a farm.

Agro tourism is a form of niche tourism that is considered a growth industry in many parts of the world, including Australia, Canada, the United States, and the Philippines. Other terms associated with agro tourism are "agrotainment", "value added products", "farm direct marketing" and "sustainable agriculture".

CHAPTER XVII. THE CONTRARY ENERGY SOURCES

Solar energy or solar panel

Solar panel refers either to a photovoltaic module, a solar thermal energy panel, or to a set of solar photovoltaic (PV) modules electrically connected and mounted on a supporting structure. A PV module is a packaged, connected assembly of solar cells. Solar panels can be used as a component of a larger photovoltaic system to generate and supply electricity in commercial and residential applications. Each module is rated by its DC output power under standard test conditions (STC), and typically ranges from 100 to 320 watts. The efficiency of a module determines the area of a module given the same rated output - an 8% efficient 230 watt module will have twice the area of a 16% efficient 230 watt module. A single solar module can produce only a limited amount of power; most installations contain multiple modules. A photovoltaic system typically includes a panel or an array of solar modules, an inverter, and sometimes a battery and/or solar tracker and interconnection wiring.

CHAPTER XVII. ECOLOGICAL SAFETY

We can name following ecological problems:

- The greenhouse effect.
- Global warming: difference between greenhouse effect and global warming, climate change, a growing awareness, carbon dioxide.
- International efforts to combat climate change: IPCC, UNFCCC, Kyoto protocol, COP15 and The World Watch Institute.
- The actual and potential effects: global temperature rise, sea level rise, impacts on weather systems.
- Greenhouse gases (GHG): water vapour, methane, nitrous oxide and fluorocarbons.
- Ozone: the ozone layer, the causes of ozone depletion, aerosols, refrigeration and air conditioning, foam and phasing out CFCs
- The effects of ozone depletion: skin cancers, immune system response, impacts on crops and forests and impacts on Marine life.
- Poisons: poisons in the home and other household poisons.
- Poisons on the farm: pesticides, characteristics of pesticides and summary of pesticides.
- Environmental and health impacts of pesticides: soil, water air vegetation, wildlife, effects of chemicals on humans and animals, acute poisoning, chronic poisoning and different types of effects
- Waste material: rubbish dumps or tips, recycling, plastics, gas from landfills and domestic waste.

CHAPTER XIX. ECOLOGICAL EDUCATION AND CULTURE. EDUCATION OF SUSTAINABLE DEVELOPMENT

Ecological culture

Ecological culture is a high level of perception by people of nature and environment, estimation of their real position in the Universe, deep comprehension of vital necessity to preserve this environment for all mankind. This direction assumes change of values system, correction of outlook, formation of new ecological culture of high level that becomes the reliable guarantor of a survival of a society in conditions of ecological crisis.

An active participation in realization of programs on formation of ecological culture of youth is a priority of work of civil society structures that assumes a purposeful activity in a number of directions: ensuring of development of an ecological component in the general educational and the higher school, development of an informal education system and ecological-educational activity, support of ecological works in all directions of youth movement as from the state's, business's side, and from public organizations' side, including libraries.

O'ZBEKCHA - INGLIZCHA EKOLOGIK IZOHLI LUG'AT

Abiotik muhit [yun. “a”-inkor ma`nosi, “*bios*”-hayot] – 1) tirik organizmlarni o`rab turgan notirik jismlardan iborat muhiti; 2) tirik organizmlarning faoliyati bilan bog`liq bo`lmagan tabiat hodisalari.

Abiotic environment [greek “a”-particle with negative meaning, “*bios*”-life] – not alive physical surrounding of living organisms; 2) natural phenomena irrelevant with activity of living organisms.

Adaptatsiya (moslashish) [lot. “*adaptatio*”- moslashish, ko`nikish] – tirik organizmlarning muhitning konkret sharoitida barqaror yashab ketishini ta`minlaydigan morfofiziologik, populyatsiyaviy va boshqa xususiyatlarining yig`indisi. Umumiy A. (keng ko`lamdagi muhit sharoitlariga ko`nikish) hamda xususiy A. (muhitning lokal, yoki o`ziga xos xususiyatli sharoitlariga ko`nikish) farqlanadi.

Adapting [latin “*adaptatio*”-adaptation, adjustment] – the whole complex of morphophysiological, reproductive and other properties of living organisms providing and possibility of sustainable survival in concrete environmental conditions. General A. (adaptation to wide range of environmental conditions) and local A. (adaptation to local or particular environments) are distinguished.

Aklimatizatsiya – atrof-muhitdagi o`zgarishlarga nisbatan organizmning fiziologik va xulqiy moslashishi.

Acclimatization – physiological and behavioral adaptation of an organism to any changes in its environment.

Antropogen omil – inson va uning faoliyati tomonidan organizmlarga, biogeotsenoz, landshaft, biosferaga ko`rsatiladigan ta`sir.

Anthropogenous factor – impact of the humans and their activity on organisms, biogeocenosis, landscape, biosphere.

Antropogen stress – inson faoliyati tufayli energiya yoki moddaning ko`payib ketib, ekotizim funksiyalarining susayishiga sabab bo`ladigan vaziyat; o`tkir yoki surunkali bo`lishi mumkin (Yu.Odum bo`yicha).

Anthropogenous stress – heightened inflow of energy or matter resulted from human activity causing the suppression of functions of ecosystem; it can be acute or chronic (by Yu.Odum).

Areal [lot. “*area*”-maydon, makon] – o`rganilayotgan ob`ektlar yoki hodisalar tarqalgan hudud yoki akvatoriya (turning A., landshaft tipi A., antropogen ta`sirning A.).

Areal [latin “*area*”-area, space] – territory or water area within which the considered plants phenomena (**A.** of species , **A.** of landscapes, **A.** of anthropogenous impact) are abundant.

Atmosfera [yun. “*atmos*”-bug` va “*sphere*”-shar] – yer va boshqa fazoviy jismlarning gazsimon qobig`i. Yer yuzasida u asosan azot (78,08%), kislorod (20,95%), argon (0,93%), suv bug`i (0,2-2,6%), karbonat anhidrid gazidan (0,03%) tashkil topgan.

Atmosfera [greek. “*atmos*”-steam and “*sphere*”-ball] – gaseous outer cover of the earth and other celestial bodies. At the very earth surface it mainly consists of nitrogen (78,08%), oxygen (20,95%), argon (0,93%), water steam (0,2-2,6%), carbonic acid gas (0,03%).

Atrof (insonni qamragan) muhit – odamlarga va ularning xo`jaligiga birgalikda va bevosita ta`sir etuvchi abiotik, biotik, ijtimoiy muhitlar majmuasi. A.m. tushunchasi atrof tabiiy muhit tushunchasidan bir muncha kengroqdir, chunki u o`z ichiga ijtimoiy hamda texnogen muhitlarni (uylar, korxonalar, yo`llar va sh.o.) ham qamrab olgan tushunchalardir.

Environmental conditions (surrounding humans) – complex of abiotic, biotic and social environmental conditions that are jointly and directly influencing on people and their households. The concept of **E.c.** is broader in comparison with *natural human environment*, as it includes social and technogenic environment (buildings, enterprises, roads, etc.).

Atrof-muhitning ifloslanishi – tavsifi, joylashgan yeri yoki miqdoriga ko`ra atrof-muhit holatiga salbiy ta`sir qilayotgan moddaning atrof-muhitda mavjudligi.

Environmental contamination – presence in the environment of substances the characteristics, location, and quantity of which have undesired impact on the environmental situation.

Axlatxona (chiqindixona) – ifloslanishni nazorat qiladigan maxsus qurilmalarsiz qattiq chiqindilarni tashlash uchun qo`llaniladigan hudud .

Dump – site used for discharging of solid wastes provided with no facilities of the environmental control.

Bakteriologik ifloslanish – ekotizimga unga yot bo`lgan organizmlarning chetdan olib kelinishi va ko`payishi. Mikroorganizmlar bilan ifloslanish bakteriologik yoki mikrobiologik ifloslanish ham deyiladi.

Bacteriological contamination – penetration into ecosystem and generation in large numbers of alien species of organisms in ecosystem. Pollution by micro-organisms is also called bacteriological or

microbiological impurity.

Bardoshlilik – tirik organizmlarning yashayotgan muhitidagi no‘maqbul ta’sirlarga bardosh bera olish xususiyati. Yuksak **B.** turlar omon qolishi garovidir, muhit doimo o‘zgarib borayotgan sharoitda (sh.j.antropogen ta’sir ostida) past **B.** turlarning kamayishi va qirilib ketishiga olib keladi.

Tolerance – capacity of living organisms to suffer from the unfavorable environmental impact . High **T.** is a precondition for survival of species; low **T.** leads to reduction and disappearance species in conditions of constant environmental change (including anthropogenous).

Biogen modda – organizmlar hayotiy faoliyati natijasida vujudga kelgan kimyoviy birikma (lekin aynan shu vaqtning o‘zida ularning jismi tarkibida ham bo‘lmasligi mumkin).

Biogenic matter – a chemical compound formed as a result of living functions of organisms (but it is not necessarily contained in composition of their bodies at present time).

Biogenotsenoz – biogenotsenologiyani asosiy izlanish obekti. **B.**-vitasferaning elementar bioxorologik tarkibiy birligidir va shu manoda fatsiya, elementlar landshaft tushunchalarining sinonimidir, garchi oxirgilaridan farqli o‘laroq, tirik modda tushunchasini ham o‘z ichiga qamrab oladi. **B.** tushunchasi ekotizim tushunchasiga yaqin, ammo keyingisi aniq bioxorologik asosga ega emasdir.

Biogeocenosis – a basic object research on biogeocenology. **B.**-an elementary biochorological structural unit of vitasphere and in this sense is synonymous to concepts of facies and elementary landscape, though unlike the letter ones, it necessarily includes a living matter. The concept of **B.** is close to a concept of ecosystem, but the latter is dispossessed of a strict biochorological base.

Biologik ifloslanish – ekotizimga unga yot bo‘lgan organizm turlarining kiritilishi va ularning ko‘payishi. Mikroorganizmlar bilan ifloslanishga bakteriologik yoki mikribiologik ifloslanish ham deyiladi.

Biological contamination – penetration into ecosystem generation in a large number of species alien to it. Pollution by micro-organism is also called bacteriological or microbiological impurity.

Biologik soat – organizmlarda tabiat hodisalari va fasllarning o‘zgarishi bilan bog‘liq bo‘lgan fiziologik, biyokimyoviy o‘zgarishlar.

Biological clock – physiological, biochemical changes in organisms connected with natural phenomena and seasons.

Biomassa [yun. “*bios*”-hayot, “*massa*”-quyma, palaxsa, parcha] – faol tirik moddaning maydon yoki hajm birligiga nisbatan miqdori; massa birligida ifodalanadi.

Biomass [greek. “*bios*”-life, “*massa*”-ingot, clump, chunk] – quantity of a living and functioning matter expressed in a unit of weight measure with regard to a unit of square or cubic measure.

Biosfera [yun. “*bios*”-hayot, “*sphaira*”-shar] – yer qobigʻidan (sferalaridan) biri boʻlib, uning tarkibi va energetikasi asosan tirik modda faoliyati bilan belgilanadi. E. Zyuss tomonidan 1875- yil kiritilgan bu atama V. I. Vernadskiyning ilmiy izlanishlari natijasida yer sayyorasining butun sirtini anglatadigan boʻldi. **B.** troposfera, litosfera va gidrosferani oʻzichiga qamrab oladi; qalinligi 30-40 km. sin. *Ekosfera*.

Biosphere - [greek. “*bios*”-life, “*sphaira*”-ball] – one of the layers of the Earth shells (sphere) both a composition and energy of which in their significant features are determined by the activity of a living matter. This term introduced by E. Zyuss in 1875, on the results of works by V.I.Vernadsky, became a symbol of all outward area of the planet of earth **B.** includes troposphere, hydrosphere, rock sphere with power of 30-40 km. syn. *Ecosphere*.

Biota [yun. “*biote*”-hayot] – organizmlarning tarqalish mintaqasi umumiyliги tufayli birlashib, tarixan shakllangan turkumi.

Biota [greek “*biote*” - life] - life of fauna and flora of the region.

Biotsenoz [yun. “*bios*”-hayot, “*koinos*”- umumiy] – oʻsimliklar, zamburugʻlar, hayvon va mikroorganizmlarning oʻziga xos tarkibga hamda oʻzaro va atrof-muhit bilan boʻlgan munosabatlarga ega majmuasi. Atama K. Myobius tomonidan 1877-yil kiritilgan. Odatda, **B.** bir *geotsenoz* va bir *geotonga* tegishliligi nazarda tutiladi.

Biocenosis [Greek “*bios*”-life, “*koinos*”- communal] – collection of plants, fungi, animals and micro-organisms being of a particular composition and developed nature of interrelationships between themselves as well as with the environment. This term was introduces by K. Mebius in 1877. As a rule, the belonging of **B.** is understood as to the same biogenocinosis and biotope.

Biotsid – 1) tirik organizmlarni batamom yoʻq qilish yoki ularga ziyon yetkazish xususiyatiga ega modda; 2) keng hududlarda barcha jonivorlarni ongli ravishda yoʻq qilish.

Bioced – 1) a substance being capable to kill or damage living organisms; 2) a deliberate kill of living organisms within considerable

territories.

Birlamchi biologik mahsulot – avtotrof organizmlar biomassasining (fitomassa) muayyan vaqt birligida o‘shishi.

Biological products primary – increase of biomass (phytomass) autotrophic organisms per a unit of time.

Bug‘xona yoki issiqxona effekti [ingl. greenhouse effect] – atmosferada yer yuzasidan uzun to‘lqinli issiqlik nurlanishiga xalaqit beruvchi uglevodorod (karbonat anhidrid, is gazi) va fluor-xlor-uglevodorod birikmalarining asta-sekin ko‘payishi natijasida yerdagi haroratning ko‘tarilishi va iqlimning umumiy issiqlanishi.

Greenhouse or hothouse effect – an increase of temperature and warm of the planet’s climate caused by a contenually growinnq proportion of carbon dioxide and fluorine-chlorine hydrocarbon compounds in *atmosphere* which hinder a long wavelength thermal radiation from the earth surface.

Galofitlar [yun. “*halos*”-tuz, “*phyton*”-o‘simlik] – sho‘r tuproqlarda yashashga moslashgan o‘simliklar (yulg‘un, qora sho‘ra va b.).

Halophytes [greek “*halos*”-salt, “*phyton*”-plant] – plants adapted to inhabitation on the salted grounds (tamarix, soleros, etc.).

Genofond yoki genetik fond [yun. “*genos*”-avlod kelib chiqish, va lot. “*fondus*”- asos] – individlar guruhi genlari to‘plamidagi nasliy axborot. Ba‘zida G. Deb, barcha tirik organizm turlari majmui tushuniladi.

Genefund or genetc fund [greek “*genos*”-breed, origin and latin “*fondus*”-base] – hereditary data embraced in a set of genes of any group of individuals. Sometimes under G.g.f. it is understood total species of living organisms.

Geoaxborot tizimi (GAT) – yer to‘g‘risidagi fanlar majmuasining ma‘lumot va bilimlarini kompyuter orqali aks ettirish vositasi.

Geographic information system (GIS) – means of a computer presentation of a complex of data and knowledge on the sciences about the Earth.

Gerbitsidlar [lot. “*herbo*”-o‘simlik, “*ceadre*”- o‘ldirish] – qar. *Pestitsidlar*.

Herbicides [latin “*herba*”-grass, plant and “*ceadre*”- to kill] – see *Pesticides*.

Global ifloslanish – ifloslanish manbayidan juda uzoq masofada, sayyoraning deyarli barcha nuqtalarida ayon bo‘luvchi atrof tabiiy

muhitning ifloslanishi. Havo muhitiga xos.

Global contamination – the environmental contamination observed far from polluters, practically in any spot of planet.

Gomeostaz [yun. “*homios*”-o‘xshash, bir xil, “*stasis*”-holat, turg‘unlik] – tabiiy tizimning (organizmning) uning asosiy strukturalarining, modda-energetik tarkibining muttasil tiklanib turishi va komponentlarning doimiy funktsional o‘z-o‘zini tartiblash bilan bir me‘yorda tutib turiluvchi ichki dinamik muvozanat holati.

Homeostasis [greek “*homios*”-similar, identical, “*stasis*”-state, immovability] – state of internal dynamic balance of a natural system (organism), maintained by a regulariterating of its basic structures , matter - energy composition and constant functional self-regulation of its components.

Deflatsiya [lot. “*deflation*”-sovurilish] – shamol ko‘chirib yuruvchi mineral parchalari bilan tog‘ jinslari va tuproqning sovurilishi, silliqilanishi va tarashlanishi.

Disinflation [latin “*deflation*”-blowing out, blowing of] – blowing, turning and grinding of rocks and grounds by mineral fragments transferred by a wind, in result of which it occurs erosion and abiotic carrying the matters of the landscapes.

Dominant [lot. “*dominantis*” - ustun keluvchi] – muayyan hamjamoada miqdor jihatidan, odatda, yaqin shakl har holda ekologik piramidaning yoxud o‘simlik tarqalish sathining (yarusining) bir xil turuvchi o‘simliklariga nisbatan ustun keluvchi *tur*.

Dominant [latin “*dominantis*” - dominant] – species quantitatively dominating in a given community, as a rule, in comparison with alike forms or at all events included in one level of ecological pyramid or vegetation *stage*. Compare: *A determinant*.

Drenaj [ing. “*drain*”- quritish] – ortiqcha namlangan yerlarda suvni maxsus zovur va yer osti quvurlari – drenalar yordamida boshqa joyga oqizish yo‘li bilan quritish usuli.

Drain – method of water desaturation from the overwetted soils by removal of surface and underground watters with the help of special ditches and underground tubes-drains.

Zaharli chiqindilar – o‘z tarkibida tirik organizmlarni zaharlovchi moddalarga ega chiqindilar.

Toxic wastes – wastes containing substances that poison an organism.

Introduktsiya [lot. “*introduction*”- kirish] – hayvon va

o'simliklarning tabiiy arealdan tashqarida tarqalishi. Qar. *Iqlimga moslashish*.

Introduction [latin "*introduction*" - introducing] – spreading of animals and plants outside the borders of natural areal. See, Acclimatization.

Ifloslantirish manbasi – 1) ifloslantiruvchi moddani atmosferaga tashlash nuqtasi; 2) ifloslantiruvchi moddani ishlab chiqarayotgan xo'jalik yoki tabiiy obektlar (qar. *ifloslantiruvchi*); 3) kirib kelayotgan ifloslantiruvchi moddani tarqatayotgan hudud.

Source of pollution – 1) a point of the pollutant discharge; 2) economic or natural object manufacturing the pollutant (see *contaminant*); 3) region where a pollutant comes from.

"Yirtqich-o'lja" (tizim) – yirtqich bilan o'ljani o'zaro bog'liqligi, bunda evolutsion tarzda ikkala tomon ham yutadi: yirtqichlar ozuqa manbasiga ega bo'ladi, o'ljaning esa populyatsiyasi sog'lomlashadi. Y. - o'. tizimi - tabiatning o'zini-o'zi tartibga solish shakllaridan biridir.

"Predator-victim"(system) – interrelations between a predator and a victim in result of which both benefit evolutionary: the predators have food, the population of victims are sanitized by predators. A system P.v. is one of the forms of self regulation in wild nature.

Yo'qolib borayotgan tur – yo'q bo'lib ketish xavfi ostida turgan va agar bu tahdidga sabab bo'layotgan omillar bartaraf qilinmasa, saqlab qolinish imkoniyati bo'lmaydigan tur yoki boshqa toksonomik birlik.

Threatened species – species or other taxonomic unit which is under a threat of diminishing or survival of which is impossible unless the threat causing factors are eliminated.

Kantserogenlar [lot. "*cancer*" – rakva, fran. "*genes*" - tug'ilish] – hayvonlar, o'simliklar va odamlar yomon sifatli o'simalarning (shishlarning) paydo bo'lishiga olib keladigan kimyoviy brikmalar yoki fizik agentlar.

Carcenogens [latin "*cancer*" - cancer and greek "*genes*" - born] – chemical compounds or physical agents promoting the origination of malignant neoplasm (swellings) in organisms of animal, plants and man.

Kimyoviy ifloslanish – ekotizimga unga yot bo'lgan ifloslantiruvchi moddalarni fon kontsentratsiyalaridan ziyod miqdorda kiritilishi.

Chemical pollution – penetration into ecosystem of alien to it pollutants in concentrations exceeding the background ones.

Kislota yog'inlari – odatda boshlang'ich manbadan uzoqda

atmosfera'dagi kimyoviy jarayonlar tufayli o'zgargan oltingugurt, azot brikmalari va boshqa moddalarning yerga suyuq yoki quruq holda tushganida ro'y beradigan kompleks kimyoviy va atmosfera holati. Suyuq shakli odatda "kislota yomg'iri" deb nomlanadi va yerga yomg'ir, ko'rinarli to'siqlar yoki tuman ko'rinishida tushadi. Quruq shakllari - kislota gazlari, makrogazlardir.

Acid depositions – a complex chemical and atmospheric phenomenon that occurs when emissions of sulfur and nitrogen compounds and other substances are transformed by chemical processes in the atmosphere, frequently far from the original sources, and then precipitate on the earth in either wet or dry form. The wet forms, popularly called "acid rain" can fall down to earth as rain, snow or fog. Among dry forms there are acidic gases or macroscopic particles.

Kommunal oqoqalar – aholi istiqomat qiladigan joylarda hosil bo'ladigan oqoqalar; umumiy kanalizatsiya mavjud bo'lganda maishiy ishlab chiqarish, yog'in-sochin suvlarini o'z ichiga oladi.

Waste waters municipal – sewage from the inhabited areas; at the presence of communal sewerage system they include domestic, industrial, thawed and rainwaters.

Kompost – 1) organik moddalarning chirishi va mikroorganizmlar faoliyati natijasida (go'ng, torf, qushlar go'ngi, barglar, turli, sh.j. maishiy chiqindilar va hokazo) olinadigan o'g'it.

Compost – fertilizer developed as a result of disintegration of organic matters (dung, peat, birds dung, leaves, various wastes, including domestic ones, etc.) under the influence of micro-organisms activity.

Kuzatuv – keyinchalik faoliyat yuritish uchun asos bo'lgan, odatda tadqiqot ishlari davomida ma'lumot olish, shu jumladan monitoring kuzatuv muayyan zarar ko'rgan atrof-muhitdan namuna olishni o'z ichiga oladi va alohida korxonalar, uyushmalar, mahalliy milliy hukumat organlari tomonidan olib borilishi mumkin.

Supervision – collection of data, mainly in a result of scientific activity, on which all further actions, such as monitoring, can be based. Supervision includes taking samples out of the affected environments. It can be done by separate enterprises by associations, by local or national authorities.

Landshaft – o'zaro ta'sir etuvchi tabiat yoki tabiiy va antropogen komponentlardan, hamda pastroq taksonomik tabaqali majmualardan tashkil topgan tabiiy hududiy majmua.

Landscape – a natural territorial complex composed of interacting natural or natural and anthropogenous components, and also complexes of flower taxonomik rank.

Landshaftning ifloslanishi – u yoki bu moddalar yoki energiya kontsentratsiyasining tabiiy (yoki belgilangan me'yor) darajasidan oshishi, shuningdek, landshaftga unga yot bo'lgan moddalar, organizm va energiya manbalarining antropogen yoki tabiiy (vulqon, moddalarning tabiiy migratsiyasi) omillar tarzida olib kirilishi.

Landscape pollution – increasing of concentration of those or other matters or energy above natural (background or tolerance limits of norms), and also introduction of matters, organisms and power sources, alien to a landscape, as owing to their anthropogenous, so natural (volcanism, natural migration of matters) factors.

Mega(lo)polis [yun. “*megas(megal)*” - katta va “*pollis*” - shahar] – bir qancha shaharlarning o'sishi va keyinchalik bir-biriga tutashib ketishi (aglomeratsiya) natijasida vujudga kelgan o'ta katta shahar.

Mega(lo)polis [greek “*megas (megalu)*” - large and “*pollis*” - city] – a very large city formed as result of growth and further merging (agglomeration) of many cities and settlements .

Mexanik ifloslanish – ekotizimga unga yot bo'lgan va uning tabiiy faoliyatini izdan chiqaruvchi abiotik loyqalarning olib kirilishi.

Mechanical pollution – introduction into ecosystem of abiotic alluviums alien to its nature disturbing its natural functioning.

Milliy bog' – tabiiy sharoitlari sezilarli darajada inson tomonidan o'zgartirilmagan yoki inson faoliyati tarix mobaynida tabiat bilan uyg'unlashgan keng muhofaza etiladigan hudud.

National park – a vast protected territory the natural conditions of which weren't exposed to significant changes under the influence of a human activity or where the human activity is historically harmonized with wild nature.

Moddalarning biologik aylanishi (kichik doira) – kimyoviy elementlarning tuproq va atmosferadan tirik organizmlarga ularning kimyoviy shaklini o'zgartirib kirishi, so'ng tuproq va atmosferaga organizmlarning hayotiy faoliyati jarayonida va keyinchalik o'lganidan keyin qoluvchi qoldiqlar bilan qaytishi, hamda mikroorganizmlar yordamida destruksiya jarayonlari va minerallashishdan keyingi yana tirik organizmlarga qaytishi. **M.b.a.** bunday ta'rifi biogenetik darajaga to'g'ri keladi.

Biological turnover of matters - (small turnover) – an inflow of

chemical elements from soil and *atmosphere* into living organisms with respective alteration of their chemical shape, their returning into soil and *atmosphere* during living functioning of organisms and with their post-mortem oddments and repetitive inflow into living organisms after processes of destruction and mineralization with the help of micro-organisms. Such definition of **B.t** correspond to abiogenosenosis.

Noosfera [yun. "noos" - aql] – aql-idrok sferasi. Iboraning zamonaviy talqini 1931-yilda V. I. Vernadskiy tomonidan biosfera evolyutsiyasining bosqichi, uning taraqqiyotidagi jamiyatning ongli faoliyatining yetakchi rolini ifodalash uchun kiritilgan.

Noosphere [greek "noos" - sense] – sphere of sense. The modern concept introduced by V.I. Vernadskiy in 1931 for identification of the evolution stage of biosphere characterized by a leading of a reasonable conscientious activity of a human society of its development.

Ozon "darchalari" – atmosferaning ozon qatlamida (ozonosferada) ozon miqdorining (50 % gacha) kamayishi. **O.d.** organizmga salbiy ta'sir ko'rsatuvchi ultrabinafsha nurlari darajasining ortishiga sababchi bo'ladi. **O.d.** kelib-chiqishi antropogen ta'sirga bog'liq deb faraz qilinmoqda.

Ozone "holes" – considerable spaces in ozone atmospheric layer (ozonosphere) with noticeably lowered (up to 50%) contents of ozone. **O.h.** causing the heightening of ultraviolet radiation level having an ill effect on organisms. The anthropogenous genesis of **O.h.** is supposed.

Omon (yashab) qolish – u yoki bu avlod organizmlarining yashashi va ekotizimlar faoliyatida qatnashishi uchun saqlab qolinishining o'rtacha ehtimoli.

Survival rate – average probability of conservation of proper generation for life and participation in ecosystems functioning.

Oqava suvlar (oqavalar) – maishiy maqsadlarda yoki ishlab chiqarishda qo'llanilgan va buning natijasida tarkibiga turli aralashmalar qo'shilgan, hamda birlamchi fizik yoki kimyoviy xususiyatlari o'zgargan suvlar; turar joy punktlari, sanoat va qishloq xo'jalik hududlaridan, yog'in sochin, yerlar sug'orish yoki ko'chalarga suv sepush natijasida oqib chiqadigan suvlar ham **O.s.** deyiladi. **O.s.** asosan 3 turga bo'linadi: maishiy (xo'jalik-fekal) oqavalar, ishlab-chiqarish oqavallari, qor erishi va jala (yomg'ir) oqovalari.

Waste waters – waters used for domestic or industrial purposes and obtained the additional admixtures hereat changing an initial chemical composition or physical characteristics; waste is also called the waters

flowing off territory of the inhabited areas, industrial and agricultural plants as result of a deposition of precipitation, irrigation of lands or watering streets; there are distinguished three general categories of waste waters: domestic (households keeping and fecal), industrial (from economic activity), natural (from melted snow and heavy showers rains).

Oqava suvlarni tozalash – ifloslangan oqava suvlarni mexanik, fizik, kimyoviy va biologik va b. usullar yordamida har xil aralashmalardan tozalash.

Treatment of sewage – clearing sewage from various impurities with the help of mechanic, physical, chemical, biochemical and other methods of clearing.

Oqavalarni biologik usulda tozalash – suv tozalashning keng qoʻllaniladigan usullaridan biri: bunda suv sayoz hovuz va b. suv havzalarida organik moddalarni saprobiont mikroorganizmlar yordamida minerallashtirish yoʻli bilan tozalanadi.

Biological treatment of sewage – one of the most applicable methods of water treatment, at which it occurs the mineralization of organic substance by micro-organisms-saprobionts in shallow-water ponds and other reservoirs.

Payhonlanish – tuproqning jipslashishi, oʻsimliklarnig vibratsiya hamda hayvonlar va odamlar tomonidan mexanik shikastlanish jarayoni. P. yaylovdan meʼyoridan koʻp foydalanish hamda yalpi turizm va rekreatsiya zonalarining notoʻgʻri rejalashtirilishi bilan bogʻliq.

Trampling – a process of sealing of soil, tremor as a result of shaking and mechanical damage of vegetation by animals or people. T. is connected with overpasture and also with mass tourism and bad lay-out of the recreational zones.

Pestitsidlar [lot. “pestitis” - maraz va “ceadre” - oʻldirmoq] – oʻsimlik va hayvonlarning kasallik hamda zararkunandalariga, begona oʻtlar, don va don mahsulotlari, yogʻoch, paxta, jun, teri va h.k.larning zararkunandalariga, odamlar va hayvonlar orasida xavfli kasalliklar tarqatuvchilarga qarshi kurashda foydalaniladigan kimyoviy moddalar.

Pesticides [latin “pestitis” - infection and “ceadere” - to kill] – chemical agents used for control over pests and illnesses of plants, weeds, pests of corn products, timber etc., and also for ectozoons of home animals, carriers of dangerous diseases of animals and human beings.

Populatsiya - [fr. “population” - aholi] – maʼlum hududni

egallagan, uzoq muddat davomida (bir necha o'n avlod davomida) o'zidan ko'payishi orqali nasl-nasabini barqaror saqlab qolishga qodir bo'lgan bir turga mansub zotlar yig'indisi; ma'lum hududni egallagan va umumiy genofondga ega bo'lgan bir turga mansub zotlar yig'indisi.

Population [french "*population*" - population] – group of individuals of one species occupying a particular site which is capable during a sufficient period of time (during several decades of birds) maintain the existence through their breeding.

Radiatsiyasiya xavfsizligi – ishlab chiqarish xodimlari va aholini jonlashtiruvchi nurlanishdan asrashga yo'naltirilgan tadbirlar.

Safety radiative – measures on protection of personnel of an enterprise and population from ionizing radiation.

Rekultivatsiya/rekulyatsiya – bo'sh yerlar, ifloslangan sanoat maydonlari va hokazolardan foydalanish, xususan, uy-joy qurilishi bog'lar yaratish, dehqonchilik uchun yaroqli yerlarga aylantirish. Chiqindilar bilan ishlashga nisbatan "retserkulyatsiya" atamasi chiqindilarni utilizatsiyalash sohasida qo'llanadi.

Reclamation – term used to indicate the conversion of the waste plots of land, of the contaminated industrial sites, etc. to land suitable for other purposes, such as housing, parking, for crops etc. In wastes treatment it means to change and extract and or convert to wastes into a useful product; term is used in a recycling technology.

Salbiy ta'sir chegarasidagi konsentratsiya (stchk) – ekologik normative (me'yor); landshaft komponentlardagi ifloslantiruvchi kimyoviy moddaning inson organizmga yoki boshqa retseptorga uzoq muddat mobaynidagi kundalik ta'siri salbiy oqibatlariga olib kelmaydigan maksimal miqdori.

Maximum permissible concentration – ecological norms, maximum permissible concentration of a contaminating chemical agent in components of a landscape which, despite its daily influencing within a long-time, does not have any negative affectings on an organism of a person or other receptor.

Sanitar gigenik me'yorlar – odam salomatligiga zararli ta'sirni kamaytirish maqsadida ishlab chiqilgan eng yuqori va eng past miqdor va yoki sifat ko'rsatkichlari. Ba'zi ifloslantiruvchi (masalan, kontserogen) moddalar uchun sanitary - gigenik me'yorlar ekologik me'yorlarga qaraganda qa'tiyroq bo'lishi mumkin.

Hygiene standards – the maximum or minimum permissible quantitative and/or qualitative indicators established with the aim of

limiting of harmful influences on the man's health. Hygiene standards for some pollutants (such as carcinogenic substances) can be stricter than the environmental standards.

Sanoat chiqindilari – ishlab chiqarish jarayoni natijasida olingan yoki chiqarilgan keraksiz materiallar. Sanoat chiqitlari suyuq chiqitlar, balchiq, qattiq va xavfli chiqindilar singari toifalarga ajratiladi.

Industrial wastes – unwanted materials produced in or expelled from the industrial process or operation and categorized under a variety of headings, such as liquid wastes, sludge, solid wastes, and hazardous wastes.

“Ex situ” saqlash – biologik xilma-xillik komponentlarini ularning tabiiy yashash joylaridan tashqarida saqlab qolish (parvarishxona, zoopark va b.)

Conservation “ex situ” – conservation of reductants of biological diversity out of their natural places of inhabitation (nurseries, zoos etc.).

“In situ” saqlash – biologik xilma - xillik komponentlarini ularning tabiiy yashash joylarida saqlab qolish.

Conservation “in situ” – conservation of reductants of biological diversity in places of their natural inhabitation.

Strategiya – muayyan maqsadga erishish yo'llarini belgilaydigan aql faoliyati va rejalashtirish jarayoni natijasi. Tabiatni muhofaza qilish siyosati bo'yicha ishlab chiqilgan stragegiyada, odatda amalga oshirish bosqichlari batafsil bayon etilmay (ular dasturlarda ko'rsatiladi), strategiyani bajarish yo'llari belgilanadi xolos.

Strategy – it is result of thinking activity and planning which defines the ways of achievement of a certain target. The developed by the policy-makers of the country as a rule does not contain a detailed description of stages for its implementation (they are laid out in programs) but only the ways of approaching to the strategy implementation as a whole.

Stress – kuchli asabiylashish holati – odam organizmida va b. hayvonlarda nomaqbul omillar (stressorlar – past harorat, ochlik, ruhiy va jismoniy jaroxat, nurlanish, atrof - muhitning ifloslanishi va h.k.) ta'siriga javoban fiziologik himoya reaksiyalari majmui.

Stress – a condition of tension – a complex of defensive physiological reactions in organism of a man and other animals as a reply to the impact of unfavorable factors to the impact of unfavourable factors (stresses) – cold, hunger, mental and physical trumas, beaming,

environmental pollution etc.

Suv balansi [fr. "balance"- tarozi] – daryo havzasi, ko'l, butun sayyora yoki b. o'rganilayotgan obyekt uchun ma'lum vaqt oralig'ida (yil, oy) kirib kelgan suv miqdorilarining nisbati.

Water balance [french "balance" - weights] – proportion for any period of time (year, month) of inflow and consumption of water for a river basin, lake, planet as a whole or other investigated unit.

Suv iste'moli – suvdan aholi, sanoat va qishloq xo'jaligi ehtiyojlari uchun uni suv manbalardan ayirib olgan holda foydalanish. Qaytariladigan (olingan suvning yana suv manbasiga qaytishi) va qaytarilmaydigan (bug'lanish, filtratsiya va h.k sarflanadigan) C.I. ajratiladi.

Water consumption – usage of water for the needs of population industry and agriculture with withdrawal of it from water objects. There are distinguished: revocable W.c. (with return of the collected to a source) and irrevocable W.c. – with expenditure of it for vaporization, filtration, etc.

Suv havzasi – suv harakatining sustligi yoki uning butkul harakatsizligi bilan tavsiflanuvchi quruqlikning botiq qismida joylashgan suv obyekti; odatda tabiiy suv havzalarini, ya'ni chuqurlikda tabiiy ravishda yig'ilgan suvlarni (ko'llar, keng manoda dengiz va okeanlar) va sun'iy suv havzalarini - yer yuzidagi sun'iy va tabiiy chuqurliklarda atayin to'plangan suvlarni (suv omborlari, hovuzlar) ajratadilar.

Water pool – a water object in recess of a land characterized by decelerated motion of water or its full absence; among them there are distinguished natural pools for natural accumulation of water in cavities (lakes and in board understanding, seas and oceans) and artificial pools specially created as accumulators of water in artificial or natural recesses of a surface (water storage reservoirs, ponds).

Tabiat yodgorliklari – noyob yoki mazkur o'lkagagina xos ilmiy, madaniy-ma'rifiy yoki estetik jihatdan ahamiyatli bo'lgan tabiat obyekti. Odatda kelib chiqishi tabiiy yoki sun'iy maydoni uncha katta bo'lmagan tabiiy majmualardan yoki alohida obektlardan iborat bo'ladi: juda keksa daraxt, manzarali (noyob) o'simliklar guruhi, ajoyib buloq, sharshara va hokazo.

Monuments of nature – natural objects, unique or representative valuable in scientific, cultural and cognitive or aesthetic relation. Usually they represent special small-sized natural complexes or an

individual object of natural or artificial origin: groves, lakes, waterfalls, ponds, caves, picturesque rocks, ancient, parks, individual trees etc.

Tabiat taqvimi – mavsumiy o'zgarishlar, indikatsiyaviy hodisalar va tabiatdagi ularning kirib kelishi, fenologik kunlari (ma'lum joy, tuman viloyat miqyosida) to'g'risidagi keng tarqalgan fenologik lug'at shakli.

Nature calendar – a spread form of phenological reference books on seasonal dynamics, indicating phenomena and phenodates of their coming in the world of nature (at level of particular terrain, district, province).

Tabiatdagi o'zini-o'zi tartibga solish [yun. "autos" – o'zi va lot. "regulare" – tartiblanish] - tabiatda to'g'ri va aks aloqalarga asoslangan, dinamik barqarorlik yoki landshaftlarning o'zini-o'zi muvofiqlashtirish va o'zini - o'zi rivojlantirishga olib keladigan o'zaro munosabatlar tizimi.

Auto regulation the nature [greek "autos" – self and latin. "regulare" – to put in order to adjust] – a system of interaction in nature based on direct and reverse relations and leading to dynamic balance or to self-arrangement and self-development of a landscape.

Tabiatni muhofaza qilish Jahon strategiyasi – YUNEP ko'magida tabiat va tabiiy resurslarni muhofaza qilish xalqaro ittifoqi (TMXI) tomonidan 1980-yilda ishlab chiqilgan xalqaro hujjat bo'lib, u insoniyatning biosfera, ekotizmlar va turlardan hozirgi avlodga barqaror foyda keltirishi bilan birga, o'z salohiyatini asrab qolish, kelasi avlodlarning ehtiyoj va intilishlariga muvofiq ravishda foydalanishni boshqarishga yo'naltirilgan.

World natural protection policy – an international document issued in 1980 by the international union of nature and natural resources protection under the support of UNEP oriented at the control over usage by the mankind of a biosphere, ecosystems and species so that they could bring a stable profit to the present generation and at the same time could conserve their potential to meet the needs and aspirations of future generations. See also ecologically sustainable development.

Tabiiy landshaft – inson faoliyati ta'siridan xoli bo'lgan va faqatgina tabiiy omillar ta'sirida shakillangan yoki shakillanayotgan landshaft.

Natural landscape - a landscape being formed under the influence of natural factory only without any impact of human activity.

Tabiiy resurs (suv, havo, tuproq va hokazo) sifati – uning tavsiflarining inson ehtiyojlari yoki texnologik talablarga (resursning tozaligi, unda foydali komponentlarning mavjudligi) mos kelish darajasi.

Quality of natural resource (water, air, soil, etc.) – a degree of conformity of its characteristic features to needs of a man or technological requirement (purity of resource, contents of a useful components etc.).

Tabiiy resurslar (boyliklar) [fr. “*ressource*” – vosita, zahira] – inson ehtiyojlarini qondirish uchun xizmat qiladigan tabiat boyliklari, zahiralari, manbalari.

Natural resources [french “*resource*” – means, reserves] – natural means, reserves, sources for satisfaction of any need of a man.

Tanazzul – tizim murakkabligi energetik potensiyali va sig‘imining asta sekin, real vaqt masshtabida deyarli orqaga qaytarib bo‘lmaydigan darajada kamayishi.

Degradation [latin – “*degradation*” – decrease impairment] – a gradual decrease in complexity, energy potential and capacitance of a system, practically irreversible in substantial time scales.

Tashlama – qisqa muddatli (bir marta) yoki ma‘lum vaqt (soat, sutka) davomida har qanday ifloslantiruvchi moddalar yoki uchib chiqayotgan gazlar bilan ortiqcha issiqlikning atrof-muhitga tashlanishishi. Alohida manbadan chiqayotgan T., va shahar, viloyat, davlat yoki umuman yer kurrasi yuzasiga tushayotgan umumiy tashlamalarga ajratiladi.

Discharge – short-sized (for one occasion only) or during a particular time (hour, day) inflow into the environment of any pollutants or surplus heat with end gasses. Distinguished: D. from an isolated source and total D. – to the territory of a city, region, state or world as a whole.

Taqchillik [lot. “*stagnum*” – turib qolish, to‘xtab qolgan suv] – suv xavzalarida suvning turib qolishi natijasida unda kislorodning yetmay qolishi. Iqtisodiyotda T. ishlab chiqarish, savdo rivojlanishining to‘xtab qolishi.

Stagnation [latin “*stagnum*” – standing water] – stagnation causing in a water body a natural deficit of oxygen. S. in economics – a delay in development of production, trade.

Tirik modda – oddiy kimyoviy tarkib, vazn, quvvat miqdorli o‘lchamlarida o‘z aksini topgan, ayni paytdagi mavjud barcha tirik organizmlar to‘plami.

Living matter – a complex of all living organisms existing at present moment, quantitatively represented in an elementary chemical composition, weight, energy.

Toksiklik, zaharlilik – ba’zi bir kimyoviy birikmalarning organizmlarga zararli, hatto o’limga olib kelivchi ta’sir ko’rsatish xususiyati.

Toxicity – noxiousness is a characteristic feature chemical combinations to have parasitic or even lethal impact on organism.

Trofik zanjir (ozuqa zanjiri, oziqlanish zanjiri) [yun. “trophe” – ozuqa] – organizmlarning ekotizmdagi modda va energiyaning o’zgarishini amalga oshiruvchi o’zaro munosabatlari; ozuqa – istemolchi munosabatlari orqali bir biri bilan bog’liq bo’lgan turlar guruhlari (yani har bir to’plam o’zidan keying to’plam uchun ozuqa bo’lib xizmat qiladigan zanjir).

Trophic chain (food chain, feeding chain) [greek “trophe” – nutrition] – interrelation between organisms through which passes a transformation of a substance and energy in ecosystem; group of species connected with one another by a relation: food – consumer (chain where every previous link serves as nutrition for the next one).

Tuproq tanazzuli – tuproqning biota yashash muhiti sifatida, hamda tabiiy yoki antropogen ta’sirlar natijasida tuproq unumdorligi, uning xususiyatlarining muttasil yomonlashishi.

Soil degradation – stable impairment of characteristics of soil as a habitat of biota and also decrease of its fertility as a result of affecting of natural or anthropogenous factors.

Tuproqning kuchsizlanishi – tuproqdan nooqilona foydalanish yoki tuproq mahsuldorligini pasayishiga olib keluvchi tabiiy rivojlanish jarayoni natijasida tuproq tarkibidagi ozuqa moddalarining kamayib ketishi.

Soil exhaust – impoverishment caused by nutrient materials in result of its irrational usage or during natural evolution leading to a decrease in fertility of soils.

Tuproqning ikkilamchi sho’rlanishi – suv rejimini sun’iy o’zgartirganda suvda oson eruvchan tuzlarning minerallasgan sug’orish suvlari yoki yer osti suvlari bilan olib kirilib tuproqda yig’ilishi.

Secondary salinization of soil – accumulation in soil of freely soluble salts at the artificial changing of a water regime in result of their inflow with mineralized sprinkling or ground waters.

Tuproqning ifloslanish darajasi – tuproqdagi ifloslantiruvchi modda miqdorining uning maksimum ruxsat etish darajasi qiymatiga nisbati.

Rate of fouling of ground – proportion between the contain of pollutant in soil and its maximum permissible limit.

Tuproqning sho'rlanishi – asosan grunt suvlarining bug'lanishi, o'zak jinslarining sho'rliigi bilan tuproqda erigan tuzlarning to'planishini (sho'rxoklanishini) keltirib chiqaradigan jarayon.

Soils salinization – process of accumulation of dissoluble saltis in soils (saliniferous process) caused predominantly by vaporization of ground waters, salinity of mother rocks.

Turlar xilma-xilligi indeksi – turlar miqdori va biron bir ko'rsatkich (soni, biomassasi, mahsuldorligi va boshqalar) o'rtasidagi nisbat.

Index of species divercity – proportion between a number of species and any index of significance: number, biomass, productivity, etc.

Umumiy suvdan foydalanish – bu atama birorta uskuna, texnik vosita yoki qurilmasiz suv havzalaridan foydalanishni anglatadi. Umumiy suvdan foydalanish suvdan foydalanganlik uchun litsenziyani talab qilmaydi. Shunday bo'lsa-da, suv xo'jaligi qonunlariga asosan suvdan foydalanish lozim. Umumiy suvdan foydalanishga cho'milish, suvda hordiq chiqarish, kichik kemaliarda suzish, texnik qurilmalardan foydalanmay shaxsiy ehtiyoj uchun suvni olish kiradi.

General water use – this term refers to the use of water bodies without the application of equipment, technical means and facilities. General water use does not require a license for water use, although the water use should be carried out in accordance with the water legislation. General water uses include bathing, recreation on water bodies, boating in small vessels, water abstractions for personal needs and without technical facilities.

Urbanizatsiya - shaharlarning o'sishi va rivojlanishi, shahar aholisi mavqesining mamlakat, hudud, jahon miqyosida o'sishi.

Urbanization – a growth and development of cities, a specific gravity increase and a role of urban population in a country, region, world.

Favqulodda ekologik vaziyat – odamlar qurbon bo'lishi, ular salomatligi yoki atrof-muhit holatiga sezilarli zarar yetishi, jiddiy moddiy harajatlar va aholi farovonligi buzilishiga olib keluvchi falokat,

xavfli tabiat hodisasi, kasofat, tabiiy yoki boshqa ofatlar natijasida muayyan hududda vujudga kelgan vaziyat.

Environmental emergency – a situation occurred at a particular site as a result of an accident, a hazardous natural phenomenon, a catastrophe, a natural or other disaster, which might result, or has already resulted, in a harm to human health or natural environment, or significant material losses.

Fauna [lot. “fauna” – qadimgi Rim mifologiyasida dala va oʻrmonlar hukmdori, chorvalar homiysi] – muayyan hududda yashagan (yoki yashashayotgan) barcha hayvon turlarining evolyutsiya jarayonida tarixan shakllangan majmuasi. Hayvonot olamining iborasi bilan bir xil maʼnoni anglatadi.

Fauna [latin “fauna” – in ancient Roman mythology, the goddess of fields and forests, patroness of herds] – evolutionally and historically formed collection of all types of animal that are living (or that lived) on a considered territory. Same as animal wild world.

Fatsiya – L. G. Berg boyicha eng kichik (elementar), jinslarning letologik tarkibi, reifining tuzilishi, namlanish xarakteri, mikroiklimi, tuproq sharoitlari oʻzgaras va bir beotsenozga ega boʻlgan tabiiy majmua.

Facies – according to L. G. Berg, the last-sized natural territorial complex, where one lithologic composition of soils, identical nature of a relief, humidity character, one microclimate, one soil variety and one biocenosis is saved.

Fizik ifloslanish – ekotizimga uning harorat-energiya, toʻlqin, radiatsion va boshqa fizik xossalarning meʼyordan ogʻishiga olib keluvchi begona fizik energiya manbalarining kirib kelishi.

Physical pollution – introduction in ecosystem of sources of physical energy, expressing in deviation from a norm of its temperature-power, wave, radioactive and other physical characteristics.

Fitosenoz [yun. “phyton” – oʻsimlik va “koinos” – umumiy] – yer yuzasining bir turdagi hududini egallagan, muayyan tarkib, tuzilish, bichim hamda oʻsimliklarning bir-biriga boʻlgani kabi, ularni oʻrab turgab muhit bilan munosabatlarni ifodalaydigan (tavsiflaydigan) oʻsimliklar majmui.

Phytocenosis [greek “phyton” – plant and “koinos” – communal] – a part of of a biocenosis, a collection of plants that occupy homogeneous area of a surface, characterized by particular composition, constitution,

adding and up and relationship of plants as with one another, so with environment.

Flora – muvayyan hududni egallagan barcha o'simlik turlarining tarixan tarkib topgan va rivojlanib kelayotgan guruhi. Atama o'simlik to'plami va o'simliklar qoplamalari atamalari bilan bir xil ma'noni anglatadi.

Flora – a historically formed and dynamically developing collection of all species an individually of plants, that occupies a particular territory. Same as Vegetable World. Vegetation.

Fotosintez [yun. "photos" – yorug'lik va "synthesis" – birlashish] – yashil o'tlar, suv o'tlari va ayrim mikroorganizmlar to'qimalarida yorug'lik ta'siri ostida uglekislota va suvdan organik moddalarning hosil bo'lishi va kislorodning ajralib chiqishi.

Photosynthesis [greek "photos"-light and "synthesis" – joint, combination] – formation in cells of green plants, algae and some micro-organisms of organic matters from carbonic acid and water under operating of a light accompanied by separation of oxygen.

Fotosintetik faol radiatsiya (FFR) – o'simliklarning fotosintez jarayonida ishtirok etadigan qoyosh nurlari spektrining 380-710 nm uzunlikdagi to'liqlari. FFR energetik birlikda yoki kelayotgan umumiy qo'yosh radiatsiyasi oqimiga nisbatan % hisobida o'lchanadi.

Photosynthetically active radiation (PAR) – an area of a spectrum of the sun (a wave length of 380-710 nms), used by plantes during photosynthesis. PAR is expressed in power units or in % to a general current of a solar radiation.

Xavfli chiqindilar – jamiyat hayot faoliyatida hosil bo'ladigan boshqa zararli mahsulot (chiqindilar), noto'g'ri munosabatda ular inson salomatligi yoki atrofga jiddiy zarar yetkazishi mumkin. Yonib ketish, tez zanglash, kimyoviy faollik yoki zararlilik kabi to'rt xususiyatdan birortasiga ega bo'lgan chiqindilar; 2) insonning texnologik faoliyati natijasida hosil bo'lgan chiqindilar, shuningdek, yaroqsiz holga kelgan hamda inson organizmi va ekotizimlarga zarar yetkazuvchi kimyoviy mahsulotlar. X.ch. ularning surunkali salbiy ta'siri tufayli "sust harakatdagi bomba" deyiladi.

Hazardous waste – 1) by products of society that can pose a substantial hazar to a human health or the environment when improperly managed waste possesses at least one of four characterstics – ignitability, corrosivity, reactivity, or toxicity; 2) wasted of technological activity of person, and also collaped chemical products

exercising harm to an organism of a person and ecosystems. H.w. are called "time bomb" because of their chronic affecting.

Sunami [yap.] – suv osti qattiq yer qimirlashi yoki suv osti va orol vilqonlarining otilib chiqishi natijasida okean (ummon) yuzida hosil bo'ladigan bahaybat to'lqinlar. Okean sohillarida S. – halokatlari tabiiy ofatdir.

Tsunami [jap] – giant surges emerging on a surface of the ocean as a result of strong underwater earthquakes or belching of underwater and insular volcanoes. On the coast a strong T. is a natural disaster of catastrophic character.

Chiqindilar – muayyan joyda ma'lum qoidalarga asosan joylashtiriladigan va keyinchalik ishlatiladigan, qayta ishlov beriladigan yoki yo'q qilinadigan, ko'miladigan xom-ashyo, materiallar qoldiqlari, talabga javob bermaydigan asosiy va qo'shimcha materiallar, ishlatilgan va o'zining oldingi sifatini yo'qotgan tayyor mahsulot.

Wastes – remains of raw-stuffs, materials, sub-standart any by-products, finished products, that where used and lost the primal consumer qualities, arranged practicular places by the applicable rules, with the further obligatory usage or liquidation, burial, on a source of formation.

Chiqindilarni yo'qotish – 1) Chiqindilarni muddatsiz saqlash yoki qayta ishlash joylariga ko'chirish. Chiqindilarni yo'qotishning oddiy usullariga ularni poligonlarga chiqarish yoki yoqish kiradi; 2) Chiqindilarni joylashtirish, qayta ishlash, ulardan qayta foydalanish, yo'qotish va qo'shimcha qayta ko'rib chiqish jarayoni.

Waste disposal – 1) Waste disposal is the process of their moving off to the places for their final deposition or recycling. The usual method of waste disposal is their transportation to the landfill site or their incineration; 2) considered in complex the processes of arranging, processing, usage, liquidation or burial of wastes.

Chiqindilardan takroran foydalanish – Chiqindilarni (odatda muayyan qo'shimcha qayta ishlash yoki ishlov berishdan keyin) texnologik jarayonida ikkilamchi qo'llash. Takroran foydalanish materiallarini olib chiqib, yo'qotish o'rniga ularni to'plash hamda ishlab chiqarish va iste'mol jarayonlariga qaytarish bo'yicha muayyan oddiy operatsiyalarni bajarishni nazarda tutadi. Chiqindilarni reduksiya qilish tushunchasi ostida ham aynan shu tushuncha yotadi.

Waste reuse – the use of a waste material for the second time in a technological process (often after some treatment for making-up) is

called a waste reuse. Reuse is intended to perform some simple operation on collection of materials and putting them back into the production and consumption processes instead of disposing them. Almost the same principle lies in a basic concept of the waste recycling.

Chiqindilardan foydalanish – chiqindilarni ikkilamchi xom-ashyo sifatida ishlatib asosiy mahsulot olish.

Waste utilization – deriving of the basic product with usage of wastes as a second-use raw material.

Chiqindilarni zararsizlantirish va ko'mish poligoni – ishlatilmaydigan chiqindilarni markazlashtirilgan holda yig'adigan, tashiydigan, saqlaydigan, xususiyatlarni o'zgartiradigan va ularni tartiblashtirilgan tarzda ko'mish bilan shug'ullanadigan maxsus korxonalar (maydon).

Landfill site for the wastes disposal – a specialized facility for the centralized collection, transportation, storage, changing of characteristics and arranged burial of unreclaimable wastes.

Chiqindilarni qayta ishlash – ma'lum texnologiyaga ko'ra chiqindilardan xom-ashyo sifatida foydalangan holda qo'shimcha mahsulot olish.

Reclamation – deriving of additional finished products under a particular technology with utilization of wastes as raw materials.

Chiqindilarni yo'q qilish – chiqindilarning kimyoviy tarkibini butkul ravishda o'zgartirish jarayoni, masalan: yoqish, oksidlash, shisha va keramika mahsulotlarini tayyorlash.

Liquidation of wastes – processes of destruction of wastes accompanied by practically irreversible changing of their elemental composition, for example: incineration, acidification, binding in glass and ceramics.

Cho'llashish – cho'llarning (sahroning) qo'shni hududlar hisobiga kengayishi. Ch. ham tabiiy shartlar evaziga ham tabiatga bo'lgan antropogen ta'siri oqibatida sodir bo'ladi.

Desertification – expansion of the desert's area at the adjoining territories. D. may be caused both by natural reasons and by anthropogenous impacts on the environment.

Ekologik yondashish – organizmlarning, xususan, insonlarning birinchi o'rinda atrof-muhit bilan bo'lgan va o'zaro munosabatlarni tadqiq qilish va ifoda etishga yo'naltiruvchi umumilmiy qarash.

Ecologic approach – general scientific approach orienting, first of all, on studying and reflecting of relation and interaction of organisms and special case of a person with environment.

Ekologik inqiroz – inson faoliyati yoki tabiiy omillar (masalan, iqlimning o'zgarishi) ta'siri ostida atrof-muhit holatining turg'un, nisbatan asta sekin qaytarish mumkin bo'lgan yoki qaytarish mumkin bo'lmagan ravishda oshishi (strukturasi soddalashishi, energetik yoki ekologik potentsiyalining pasayishi).

Ecologic crisis – stationary, rather gradual reversible deterioration of environment (simplification of its structure, decrease of power or ecological potential) aroused by activity of a person or natural factors (e.g. changing of climate).

Ekologik madaniyat – atrof - muhitdan tabiatning rivojlanish qonuniyatlarini anglab yetgan hamda inson faoliyati tasirining yaqin va uzoq kelajakdagi oqibatlarini inobatga olgan holda foydalanish; E. m. – umuminsoniy madaniyatning moddiy va ma'naviy mehnat mahsuli sifatida aks etgan tarkibiy qismidir. E. m. taraqqiyoti kasbiy ekologik ta'lim va tarbiya hamda haqqoniy ekologik ma'lumotlarni ommaga yetkazish bilan chambarchas bog'liqdir.

Ecologic culture – usage environment on the basis of knowledge of the natural laws on the nature development, with allowance for proximate and distant consequences of environmental change under influencing of human activity; E. c. is an integral party of universal culture represented in totality of products of material and spiritual labor, development of E. C. is interdependent with progressing of professional ecological education, training and informing.

Ekologik ta'lim (ma'lumot) – tabiatni muhofaza qilish tadbirlarini ilmiy asosda amalga oshirish uchun zarur bo'lgan sistematik bilimlarni chuqur o'zlashtirish jarayoni va natijasi.

Formation ecological – process and result of mastering of systematic knowledge, skills and experience with the purpose of scientifically reasoned realizations of measures on natural conservation.

Ekologik alarmizm [frans. “alarme” – xavotirlik, bezovtalik] – e'tiborini insonning tabiatga ko'rsatayotgan ta'sirining halokatli oqibatlariga hamda “tabiat - jamiat” tizimini optimallashtirish borasida tezkor va qat'iy choralar ko'rilishi zarurligiga qaratgan ilmiy oqim.

Ecological alarmizm [french “alarme” – alert, anxiety] – a scientific current, stressing catastrophic consequences of man's

influence on the nature and necessity of taking immediate decisive steps for optimization of a system “nature – society”.

Ekologik barqaror taraqqiyot – kelgusi avlodlar uchun zarar keltirmagan holda insoniyat o‘z ehtiyojlarini qondirib taraqqiy etishi. E.b.t. kontseptsiyasi insoniyatning uzoq muddatli taraqqiyotining zamini bo‘lib uning kapital mablag‘larini oshishiga va ekologik sharoitning yaxshilanishiga turtki bo‘ladi.

Ecologically sustainable development – development of the mankind, at which satisfaction of needs carried out without any damage to the future breeds. The concept of E.s.d. is considered as a precondition of a long time advance of the mankind accompanied by augmentation of the capital and improving of ecological situation.

Ekologik bumerang – insonning ekologik qonuniyatlarini hisobga olmasdan, tabiatga o‘tkazgan ta‘sirini qaytib kelib o‘ziga salbiy ta‘sir ko‘rsatishini va murakkab vaziyatni yuzaga keltirishni aks ettiruvchi ibora.

Boomerang ecological expression - for identification of a difficult situation aroused by the poor accounting ecological laws, in result of influence on nature, conducted by the person, converts against himself.

Ekologik valentlik [lot. “valentia” – kuch] – biologik turning atrof-muhitning turli sharoitlarda yashay olish xususiyati.

Valence ecological - [lot. “valentia” – power] – ability of biological species to exist in various conditions of the environment.

Ekologik volyuntarizm - [lot. “voluntary” – iroda] tabiatdan ekologik chegaralarni (me‘yorlarni) hisobga olmasdan foydalanish. E. v. ekologik madaniyati past jamiyatga xosdir.

Ecologic voluntarism [lat. “volutar” – will] – nature use disregarding of ecological limitations. E. v. is characteristics for society of a lower ecological culture.

Ekologik omil – organizmning moslashish reaksiyasini iroda qiladigan tabiiy muhit omili. Ma‘lumki, organizmning moslashishi chegarasidan tashqarida letal omil (o‘lim) yotadi. E. o. odatda abiotik, biotik va antropogen omillarga bo‘linadi.

Ecological factor – factor of an environment, identifying the adapting reactions of an organism. As it is known, outside an adaptivity of an organism is a lethal factor (death). E.f. is usually subdivided into abiotic, biotic and anthropogenous factors.

Ekologik tolerantlik – organizmning atrof-muhitning salbiy ta‘siraga bardosh berish qobiliyati.

Ecological tolerance – capacity of an organism to tolerate unfavorable environmental impacts.

Ekologik xavfsizlik – tabiiy muhit va aholi salomatligiga xavf-xatar yetgazmaydigan holat. E. x. atrof muhitga salbiy antropogen ta'sirni kamaytirishga yo'naltirilgan tadbirlar majmuini amalga oshirish orqali erishiladi.

Safety ecological – the position, at which there is no threat of damaging the natural environment and health of the population. S. e. is reached by complex of measures, directed on a decrease of negative anthropogenous environmental impact.

Ekologik ekspertiza [lot. “expertus” – tajribali] – taklif etilayotgan loyihaning atrof-muhitga ko'rsatiladigan ta'sir oqibatlarining oldini olish maqsadida uning ta'sir samarasini oldindan aniqlashga qaratilgan faoliyat.

Ecological expertise – [lat. “expertus” – experienced] – an activity on eliciting and forecasting of effects of assumed project's impact with the purpose of extenuation of consequences of environment impact.

Ekologiya – [yun. “oikos” - uy, joy va logos – ta'limot, so'z] – E. Gekkelning ta'riflashicha, biologiyaning organizmlar bilan muhitning uzaro munosabatlarini o'rganuvchi bir bo'limi (auto-ekologiya va sin-ekologiya). E. barcha tirik organizmlar va muhitni hayot uchun qulay qiladigan barcha jarayonlarni o'rganadi.

Ecology – [greek “oikos” - home, place and “logos” – doctrine, word] – according to E. Hekkel, a branch of a biological science about relationships between organisms and environment (auto ecology and synecology). E. studies all living organisms and all functional processes making environment suitable for life.

Ekotizim – A. Tensli tomonidan kiritilgan bo'lib, u tarkibidagi organizm va anorganik omillar teng huquqli komponentlar bo'lmish dinamik muvozanatdagi nisbatan barqaror tizimni ifodalaydi. Boshqacha qilib aytganda, tirik mavjudodlar jamoalari va ularning yashash muhitini o'z ichiga qamrab olgan funktsional tizimga ekotizim deyiladi.

Ecosystem – a concept, introduced by A. Tensly, meaning a rather stable system of dynamic equilibrium, in which organisms and inorganic factors are full components. In other words, E. represents organisms, jointly operating on a section, and their communities interacting with environment.

Ekotsid – [yun. “oikos” – uy, vatan va lot, “caedere” – o'ldirish]-hayot muhitini atayin barbod qilish, bu esa yalpi biotsidga olib keladi.

Ecocide – [greek “oikos” – home, motherland and latin “caedere” – to kill] deliberate killing of a habitats resulting an biocide.

Endem – [yun. “endemos”- mahalliy] – faqat aynan shu mintaqada yashaydigan biologik tur.

Endemic – [greek “endemos” – domestic] biological species living only in a given region.

Qirilib borayotgan turlar – biologik xususiyatlar hozirgi zamon tabiiy yoki inson tomonidan o'zgartirilgan yashash sharoitlarga mos kelmaydigan, ularga moslashish qobilayati esa tugab-bitgan turlar (qar. adaptatsiya). Q.b.t insonning ko'magisiz halokatga mahkum. Odatda Q.b.t qizil kitoblarga kiritiladi; ularga nisbatan maxsus chora tadbirlar ko'riladi. Yana qarang yo'q bo'lib ketayotgan tur.

Extincting species – species, biological features of which do not correspond to the modern natural or changed by person conditions of existence and capacity of adapting to them (see Adapting) are exhausted. Without a targated support by a man E. s. are doomed on loss. As a rule, E.s. are registered in the red books; in relation to them special measures on protection are established. See also Endangered species.

Qonunbuzar – qoyilgan talablarga rioya etmaydigan shaxs, tashkilot yoki muassasa.

Violatar – a person or organization or institute not observing a compliance with the requirements.

Quyuyq tuman – 1) chang zararlari va tuman tomchilaridan iborat aralashma; 2) atmosferaning ko'z ilg'aydigan aerazol qatlam, parda, tuman va boshqa ko'rinishdagi har qanday ifloslanishni ifodalaydigan atama.

Smog – 1) a mixture from fragments of dust and drops of a mist; 2) a term describing any visible impurity of atmosphere looking like an aerosol sheet, mist, fog, etc.

Qo'riqxona – hudud yoki akvatoriya uchastkasi bo'lib, unda butun tabiiy majmua va biologik xilma-xillikni saqlash maqsadida xo'jalik faoliyatining barcha ishlab chiqarish shakllari man qilinadi va o'tkazilish uslublari tabiiy izlanishlarga yo'l qoyiladi.

Wildlife reserves areas – a part of territory or the dock spaces, for which with the purposes of conversation of a natural complex and biological diversity are completely eliminated all manufacturing forms of an economic activity and scientific studied are enabled, methods of implementation of which do not introduce any disturbance or damage into usual course of natural processes.

Havoni ifloslantiruvchi – havoda mavjud bo‘lgan va muayyan kontsentratsiyada odamga, hayvonga, o‘simliklarga yoki moddiy obyektlarga zarar yetkizishi mumkin bo‘lgan har qanday modda. Ifloslantiruvchi moddalar tabiiy va sun‘iy uchuvchan moddaning deyarli barcha qo‘shilmalarini o‘z ichiga olishi hamda qattiq zarrachalar, suyuqlik tomchilari, gaz va qorishma shaklida bo‘lishi mumkin. Umuman olganda, ifloslantiruvchi moddalar ikki guruhga bo‘linadi: 1) aniqlash mumkin bo‘lgan manbalardan bevosita havoga chiqariladigan, 2) ikki yoki va undan ortiq birlamchi ifloslantiruvchi moddalarning o‘zaro ta‘siri yoki ifloslantiruvchi moddaning, odatda atmosferada mavjud modda bilan reaksiyasi natijasida, yorug‘lik tasirida yoxud havoda hosil bo‘ladigan ifloslantiruvchi moddalar.

Air pollutant – any substance in air that could, in high enough concentration, can harms to man, animals, vegetation or material. Pollutants may include almost any natural or artificial composition of airborne matter capable of being airborne. They may be in the form of solid particles, liquid droplets, gases, or in combination there. Generally, they fall into two main groups: 1) those emitted directly from identifiable sources (see air emissions) and 2) those produced in the air by interaction between two or more primary pollutants, or by reaction with normal atmospheric constituents, with or without air activation.

FOYDALANILGAN VA FOYDALANISHGA TAVSIYA ETILADIGAN ADABIYOTLAR

1. Karimov I.A. O'zbekiston XXI asr bo'sag'asida: xavfsizlikka tahdid, barqarorlik shartlari va taraqqiyot kafolatlari. – T., 1997.
2. Karimov I.A. Yuksak ma'naviyat – yengilmas kuch. –T., 2008.
3. Ashurmetov O.A., Raximova T.T., Raximova A.T., Hikmatov Sh.X. Ekologiya. – T., Chinor ENK, 2008.
4. Atabayev Sh., Tursunov E., Mirsovurov M. Abu Ali ibn Sino – ekologiya va salomatlik. “Ekologiya va salomatlik” gazetasi, 2012 y. 5, 24-27-sonlar.
5. Ataboyev SH.T., Malikov Z.V., Mamadaliyev Sh.P., Mirsovurov M.M. Ekologiya. T., 2011.
6. «Ekologiya xabarnomasi» jurnali. T., 2006-2011yil sonlari.
7. Korobkin V.I., Peredelskiy L.V. Ekologiya. – Rostov n/D : «Feniks», 2003. - 576 s.
8. Mardonov I. Rog'un GESi - mintaqa xalqaro kelajagiga tahdid. Matbuot anjumani, 16 mart, 2012 y., Toshkent sh.
9. Nig'matov A. Ekologiya nima? – T., 2003.
10. Ososkova T.A., Spektorman T.Y., Chub V.Ye. Iqlim o'zgarishi. – T., 2006.
11. O'zbekiston Respublikasida atrof tabiiy muhit muhofazasi va tabiiy manbalardan foydalanishning holati to'g'risida Milliy Ma'ruza. – T., 2006.
12. O'zbekiston Respublikasida atrof tabiiy muhit muhofazasi va tabiiy manbalardan foydalanishning holati to'g'risida Milliy Ma'ruza. – T., 2008.
13. O'zbekistonning ekologik sharhi. – T., 2008.
14. O'zbekiston: 2-chi ekologik faoliyat samaradorligi sharxi. Nyu-York va Jeneva., 2010.
15. Tursunov X.T., Raximova T.U. Ekologiya. – T., Chinor ENK, 2006.
16. Tursunov X.T. Ekologiya va Barqaror rivojlanish. – T., 2009.
17. To'xtayev A.S. Ekologiya. – T., O'qituvchi, 1998.
18. To'xtayev A.S. Ekologiya. – T., O'qituvchi, 2001.
19. www.iamivatgzt.uz
20. O'zbekiston ekologik portali - www.econews.uz
21. O'zbekiston Respublikasi Tabiatni muhofaza qilish Davlat qo'mitasi – www.uznature.uz

22. “Ekomaktab” ekologik-resurs markazi- www.ekomaktab.uz
23. Axelrod, Regina S., Stacy D. Van Deveer, and David L. Downie (Eds.). 2011. *The Global Environment: Institutions, Law, and Policy*, 3rd Edition. Washington, D.C.: CQ Press. ISBN-13: 978-0872899667.
24. Bostrom, Nick (2006): *Technological revolutions: Ethics and Policy in the Dark, Nanoscale: Issues and Perspectives for the Nano Century*, eds. Nigel M. de S. Cameron and M. Ellen Mitchell (John Wiley, 2007): pp. 129-152.
25. Derived from Jaffe et al. (2002) *Environmental Policy and technological Change* and Schumpeter (1942) *Capitalism, Socialisme and Democracy* by Joost.vp on 26 August 2008
26. Egerton, F. N. (2007). "A History of the Ecological Sciences, Part 23: Linnaeus and the Economy of Nature". *Bulletin of the Ecological Society of America* **88** (1): 72–88. [doi:10.1890/0012-9623\(2007\)88\[72:AHOTES\]2.0.CO;2](https://doi.org/10.1890/0012-9623(2007)88[72:AHOTES]2.0.CO;2)
27. Dickinson, G., and K. Murphy. 1998. *Ecosystems: A Functional Approach*. London: Routledge.
28. Nakano *et al.* (1998) "Dynamic Simulation of Pressure Control System for the Closed Ecology Experiment Facility", *Transactions of the Japan Society of Mechanical Engineers*. **64**:107-114.
29. Peter Rillero, Dinah Zike Ecology, 2005. P.132, 143.
30. <http://ocw.mit.edu/OcwWeb/Biology>
31. <http://en.wikipedia.org/wiki/>
32. www.arxiv.uz
33. www.avanta.ru

MUNDARIJA

SO'Z BOSHI.....	3
I BOB. EKOLOGIYA FANI HAQIDA UMUMIY MA'LUMOTLAR.....	5
1-§. Ekologiya fani va uning vazifalari.....	5
2-§. Ekologiya fanining rivojlanish tarixi.....	8
II BOB. TABIAT VA JAMIYAT ORASIDAGI MUNOSABATLAR.....	14
3-§. Ekologik muammolar.....	14
4-§. Ilmiy-texnika inqilobini atrof-muhitga ta'siri.....	15
III BOB. TABIATNI MUHOFAZA QILISHNING ILMIY-NAZARIY ASOSLARI.....	18
5-§. Muhit va ekologik omillar.....	18
IV BOB. POPULYATSIYA VA EKOTIZIMLAR EKOLOGIYASI.....	30
6-§. Populyatsiya haqida tushuncha.....	30
7-§. Ekotizim va biogeotsenozlar haqida tushuncha.....	36
8-§. Ekotizimda energiya oqimi va biologik mahsuldorlik. Ekotizimlarning o'zgarishi (Oziqa zanjiri, ekologik piramida va suksessiya).....	40
V BOB. BIOSFERA.....	44
9-§. Biosfera va noosfera haqida tushuncha.....	44
VI BOB. TABIIY RESURLAR VA ULARDAN OQILONA FOYDALANISH.....	48
10-§. Tabiiy resurslar.....	48
11-§. Chiqindilar muammosi.....	50
VII BOB. ATMOSFERA VA UNI MUHOFAZASI.....	53
12-§. Atmosfera havosini muhofaza qilish.....	53
VIII BOB. SUV RESURSI VA UNI MUHOFAZASI.....	59
13-§. Suv resursi.....	59
14-§. Orol dengizi va Orolbo'yi muammolari.....	63
15-§. Aydar – Arnasoy ko'llar tizimidagi ekologik vaziyat.....	66
IX BOB. TUPROQ RESURSI VA UNI MUHOFAZASI.....	68
16-§. Tuproq resursi.....	68
X BOB. O'SIMLIK RESURLARI VA ULARNI MUHOFAZA QILISH.....	70
17-§. O'simliklar dunyosi.....	70
XI BOB. HAYVONOT DUNYOSI VA UNI MUHOFAZA	

QILISH.....	75
18-§. Hayvonot dunyosi.....	75
XII BOB. ALOHIDA MUHOFAZA QILINADIGAN HUDUDLAR VA BIOLOGIK XILMA-XILLIK.....	78
19-§. Alohida muhofaza qilinadigan hududlar.....	78
20-§. Biologik xilma-xillik nima?.....	82
XIII BOB. CHO‘LLANISH.....	89
21-§. Cho‘llanish muammosi.....	89
XIV BOB. BARQAROR RIVOJLANISH.....	99
22-§. Barqaror rivojlanish vazifalari.....	99
XV BOB. SHO‘VQIN MUAMMOSI.....	104
23-§. Shovqinning atrof – muhitga ta’siri.....	104
XVI BOB. O‘ZBEKISTONNING EKOTURISTIK VA AGROTURISTIK SALOHİYATI.....	106
24-§. O‘zbekistonda ekologik turizmning rivojlanish Konsepsiyasi va uning yaqin kelajakdagi istiqbollari.....	106
25-§. Agroturizm.....	108
XVII BOB. QAYTA TIKLANUVCHI ENERGIYA MANBALARI.....	110
26-§. Quyosh energiyasidan foydalanish.....	110
27-§. Shamol generatorlari.....	112
28-§. Biomassadan foydalanish.....	113
XVIII BOB. EKOLOGIK XAVFSIZLIK.....	116
29-§. Ekologik xavfsizlikka tahdidlar.....	116
XIX BOB. EKOLOGIK TA’LIM-TARBIYA VA MADANIYAT. BARQAROR TARAQQIYOT TA’LIMI....	118
30-§. Ekologik ta’lim-tarbiya va madaniyat.....	118
31-§. Barqaror taraqqiyot ta’limi.....	119
O‘zbekcha-inglizcha izohli lug‘at.....	175
Foydalanilgan va foydalanishga tavsiya etiladigan adabiyotlar..	202

CONTENTS

INTRODUCTION.....	3
I CHAPTER. TOTAL FACTS ABOUT ECOLOGY SCIENCE.....	5
1-§. Ecology and its tasks.....	5
2-§. History of ecology.....	8
II CHAPTER. THE ATTITUDE AMONG THE NATURE AND SOCIALTY.....	14
3-§. Ecological problems.....	14
4-§. The influence of scientific-technical revolution to environment.....	15
III CHAPTER. SCIENTIFIC-THEORITICAL BASES OF NATURE PROTECTION.....	18
5-§. Environment and ecological factors.....	18
IV CHAPTER. POPULATION AND ECOSYSTEM ECOLOGY.....	30
6-§. Conception about population.....	30
7-§. Conception about ecosystem and biogeothenoces.....	36
8-§. Energy flow in ecosystem and biological productivity. Dynamics of ecosystems (Food chains, ecological pyramid and succession).....	40
V CHAPTER. BIOSPHERE.....	44
9-§. Conception about biosphere and noosphere.....	44
VI CHAPTER. NATURAL RESOURCES AND RATIONAL USE.....	48
10-§. Natural resources.....	48
11-§. Waste problems.....	50
VII CHAPTER. ATMOSPHERE AND ITS PROTECTION.....	53
12-§. Protection of atmosphere air.....	53
VIII CHAPTER. WATER RESOURCES AND ITS PROTECTION.....	59
13-§. Water resource.....	59
14-§. Aral sea problems.....	63
15-§. The ecological position of Aydar-Arnasay lakes system.....	66
IX CHAPTER. SOIL RESOURCE AND ITS	

PROTECTION.....	68
16-§. Soil resource.....	68
X CHAPTER. PLANT RESOURCES AND THEIR PROTECTION.....	70
17-§. Plant world.....	70
XI CHAPTER. ANIMAL WORLD AND THEIR PROTECTION.....	75
18-§. Animal world.....	75
XII CHAPTER. PROTECTED AREAS AND BIODIVERSITY.....	78
19-§. Protected areas.....	78
20-§. What is the biodiversity?.....	82
XIII CHAPTER. DESERTIFICATION.....	89
21-§. The problem of desertification.....	89
XIV CHAPTER. SUSTAINABLE DEVELOPMENT.....	99
22-§. The tasks of sustainable development.....	99
XV CHAPTER. NOISE PROBLEM.....	104
23-§. The influence of noise to environment.....	104
XVI CHAPTER. THE PROSPECTS OF ECOTOURISM AND AGROTOURISM OF UZBEKISTAN.....	106
24-§. The development of conception of ecological tourism in Uzbekistan and its prospects in future.....	106
25-§. Agrotourism.....	108
XVII. CHAPTER. THE CONTRARY ENERGY SOURCES.....	110
26-§. Usage of solar energy.....	110
27-§. Wind generators.....	112
28-§. Usage of biomass.....	113
XVIII CHAPTER. ECOLOGICAL SAFETY.....	116
29-§. Threats to ecological safety.....	116
XIX CHAPTER. ECOLOGICAL EDUCATION AND CULTURE. EDUCATION OF SUSTAINABLE DEVELOPMENT.....	118
30-§. Ecological education and culture.....	118
31-§. The education of sustainable development.....	119
Glossary in Uzbek- English.....	175
The used and recommended literatures.....	202

СОДЕРЖАНИЕ

ВВЕДЕНИЕ.....	3
ГЛАВА I . ОБЩЕЕ СВЕДЕНИЯ ПО ЭКОЛОГИИ.....	5
1-§. Дисциплин и задачи экологии.....	5
2-§. История развития экологии.....	8
ГЛАВА II. ВЗАИМОДЕЙСТВИЕ ПРИРОДЫ И ОБЩЕСТВО.....	14
3-§. Экологические проблемы.....	14
4-§. Научно-техническое революции и их воздействие на окружающей среды.....	15
ГЛАВА III. НАУЧНО-ТЕОРИТИЧЕСКИЕ ОСНОВЫ ОХРАНА ПРИРОДЫ.....	18
5-§. Среды и экологические факторы.....	18
ГЛАВА IV. ПОПУЛЯЦИИ И ЭКОЛОГИИ ЭКОЛОГИЧЕСКИЕ СИСТЕМЫ.....	30
6-§. Понятие о популяции.....	30
7-§. Понятие о экосистемы и биогеоценозы.....	36
8-§. Энергия экосистемы и биологическая продуктивность. Динамика экосистемы (Пищевая цепь, экологическая пирамида и сукцессия).....	40
ГЛАВА V. БИОСФЕРА.....	44
9-§. Понятие о биосферы и ноосферы.....	44
ГЛАВА VI. ЕСТЕСТВЕННЫЕ РЕСУРСЫ И РАЦИОНАЛЬНОЕ ИСПОЛЬЗОВАНИЕ.....	48
10-§. Естественные ресурсы.....	48
11-§. Проблема отходов.....	50
ГЛАВА VII. АТМОСФЕРА И ЕГО ЗАЩИТЫ.....	53
12-§. Защита атмосферы.....	53
ГЛАВА VIII. ВОДНЫЕ РЕСУРСЫ И ЕГО ЗАЩИТЫ.....	59
13-§. Водные ресурсы.....	59
14-§. Проблемы Аральского моря.....	63
15-§. Экологическое состояние озера Айдары – Арнасыя....	66
ГЛАВА IX. ПОЧВЕННЫЕ РЕСУРСЫ И ИХ ОХРАНА...	68
16-§. Почвенные ресурсы.....	68
ГЛАВА X. РАСТИТЕЛЬНЫЕ РЕСУРСЫ И ИХ ОХРАНА.....	70
17-§. Растительный мир.....	70

ГЛАВА XI. ЖИВОТНЫЙ МИР И ИХ ОХРАНА.....	75
18-§. Животный мир.....	75
ГЛАВА XII. ОСОБО ОХРАНЯЕМЫЕ ТЕРРИТОРИИ И БИОРАЗНООБРАЗИЕ.....	78
19-§. Особо охраняемые территории.....	78
20-§. Что такое биоразнообразие?.....	82
ГЛАВА XIII. ОПУСТЫНИВАНИЕ.....	89
21-§. Проблемы опустынивание.....	89
ГЛАВА XIV. УСТОЙЧИВОЕ РАЗВИТИЕ.....	99
22-§. Задачи устойчивых развитий.....	99
ГЛАВА XV. ПРОБЛЕМЫ ШУМА.....	104
23-§. Шумовое воздействие.....	104
ГЛАВА XVI. ЭКОТУРИСТИЧЕСКОЕ И АГРОТУРИСТИЧЕСКОЕ ПЕРСПЕКТИВЫ УЗБЕКИСТАНА.....	106
24-§. Концепция экотуризма в Узбекистане и его перспективы в будущем.....	106
25-§. Агротуризм.....	108
ГЛАВА XVII. ИСТОЧНИКИ ВОЗОБНОВЛЯЕМЫХ ЭНЕРГИЙ.....	110
26-§. Использование солнечных энергий.....	110
27-§. Ветровой генераторы.....	112
28-§. Использование биомассы.....	113
ГЛАВА XVIII. ЭКОЛОГИЧЕСКОЕ БЕЗОПАСНОСТЬ.....	116
29-§. Угрозы на экологической безопасности.....	116
ГЛАВА XIX. ЭКОЛОГИЧЕСКОЕ ОБРАЗОВАНИЕ, ВОСПИТАНИЕ И КУЛЬТУРА. ОБРАЗОВАНИЕ УСТОЙЧИВОГО РАЗВИТИЯ.....	118
30-§. Экологическое образование, воспитание и культура...	118
31-§. Образование устойчивого развития.....	119
Глоссарий на узбекском и русском языке.....	175
Использованные и рекомендуемые литературы.....	202

**O'. E. XO'JANAZAROV
D.MUXAMEDJANOVA**

EKOLOGIYA VA TABIATNI MUHOFAZA QILISH

Adadi 50 nusxa. Hajmi 13,75 b/t. Bichimi 60x84 ¹/₁₆
«Times New Roman» garniturasida. Ofset usulida bosildi.
Nizomiy nomidagi TDPU bosmaxonasida nashr qilindi.
Toshkent, Yusuf Xos Hojib 103.