

NATIONAL REPORT OF UKRAINE ON HARMONIZATION OF SOCIETY'S ACTIVITY IN NATURAL ENVIRONMENT

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TO THE PARTICIPANTS AND GUESTS OF THE 5-TH PAN-EUROPEAN MINISTERIAL CONFERENCE "ENVIRONMENT FOR EUROPE"



Вітаю учасників та гостей представницького форуму, присвяченого актуальним питанням захисту навколишнього середовища.

Україна, послідовно проводячи політику інтеграції до європейської спільноти, докладає всіх зусиль для беззаперечного дотримання норм екологічної безпеки. Наша держава в інтересах міжнародного співтовариства пішла на радикальні заходи — добровільно відмовилася від ядерної зброї та закрила Чорнобильську АЕС. Це підтверджує наше незмінне прагнення зробити Європейський дім якомога безпечнішим для всіх його мешканців.

Упевнений, що ваша конференція стане важливим кроком на шляху розв'язання глобальних екологічних проблем, сприятиме гармонізації життєдіяльності людини в природному середовищі.

Бажаю вам плідної роботи й успіхів у вашій благородній справі.

I would like to welcome the participants and guests of the representative forum dedicated to the timely issues of environmental protection.

Ukraine, which has been consistently a policy of integration into the European Community, is making every effort to meet unconditionally all norms of environmental safety. Our state has undertaken radical measures in the interests of the international community by voluntarily abandoning nuclear weapons and shutting down the Chernobyl Nuclear Power Plant. These actions reaffirm our unshakable desire to make the European home as safe as possible for all its inhabitants.

I am confident that your conference will represent an important step towards a solution of global environmental problems and promote harmonization of human activities with the natural environment.

I wish you fruitful work and success in your noble cause.

 Президент України
Л. Кучма

*The President of Ukraine
Leonid Kuchma*

СТРАТЕГІЯ ФОРМУВАННЯ ДЕРЖАВНОЇ ПОЛІТИКИ НА ЗАСАДАХ СТАЛОГО РОЗВИТКУ



Шановні учасники Конференції! Уряд України щиро вітає Вас із знаковою подією на шляху, визначеному рішеннями Всесвітнього саміту в Йоганнесбурзі.

Нові процеси європейської інтеграції вимагають від керівників урядів, міністрів нових рішень, нових практичних кроків, спрямованих на формування екологічно безпечного довкілля для Європи. Саме наші узгоджені спільні рішення, ефективна співпраця у сфері зміцнення природного каркасу Європи, збереження і відтворення її біорізноманіття, водних і земельних ресурсів, наша ефективна внутрішня і зовнішня екологічна політика, яка має ґрунтуватися на рішеннях всесвітніх самітів у Ріо-де-Жанейро і Йоганнесбурзі, формують головні засади сталого

розвитку окремих країн і регіону ЕВК ООН в цілому.

Україна багата насамперед своєю природою, землею і людьми. Вона має унікальний масив чорноземних ґрунтів - понад 20 % світових ресурсів. Зразок цих ґрунтів як «Еталон чорнозему», взятий із Добровеличківського району Кіровоградської області, знаходиться у Парижі - в Лабораторії земельних ресурсів Європи. Народ України доброзичливий і працьовитий, має високий освітній та інтелектуальний потенціал. Саме ці дві домінанти - природна та інтелектуальна - визначені як базові стратегічні напрями формування національної політики розвитку на засадах екологічної, економічної та соціальної збалансованості.

Це знайшло своє втілення в Основних напрямках державної екологічної політики України та в Посланні Президента України до Верховної Ради України «Європейський вибір. Концептуальні засади стратегії економічного та соціального розвитку України на 2002-2011 роки».

За минуле десятиріччя в Україні стали чинними 15 основних природоохоронних законів, 40 двосторонніх міжнародних угод, 20 природоохоронних конвенцій глобального та регіонального характеру, 5 додаткових протоколів і поправок до цих конвенцій. Уряд готує до підписання, ратифікації або приєднання ще 20 міжнародних конвенцій, протоколів і угод.

Для уряду України головне завдання сьогодні полягає у відпрацюванні ефективних механізмів реалізації визначених стратегічних напрямів національного розвитку з урахуванням досвіду європейських та інших країн світу, спираючись на консолідовану міць національних рушійних сил (політичних, державних, наукових, бізнесових, громадських).

Урядом України вже прийнята Комплексна програма реалізації рішень Всесвітнього саміту в Йоганнесбурзі. Принципи сталого розвитку, його екологічні аспекти закладені у Програму дій уряду на 2003 - 2004 роки. Активізувало свою діяльність Міністерство екології та природних ресурсів України. Проведені у 2003 році парламентські слухання про стан виконання та ефективність природоохоронного законодавства в Україні ще раз висвітили гостроту проблем, що стоять перед

STRATEGIC LINES OF PUBLIC POLICY FORMING ON THE GROUNDS OF SUSTAINABLE DEVELOPMENT

Dear participants of the Conference! The Government of Ukraine sincerely congratulates you on this special occasion, a milestone on the path chosen by decisions of the World Summit in Johannesburg.

New processes of European integration require from government heads and ministers new solutions, new practical steps aimed at development of ecologically safe environment for Europe. Our co-ordinated, common decisions, our effective co-operation in the domain of enhancement of the natural frame of Europe, conservation and restoration of its biological diversity, water and land resources, our effective domestic and foreign environmental policy, which has to comply with decisions of the world summits in Rio and Johannesburg, form major principles of sustainable development in some countries and UNECE region as a whole.

Ukraine is rich in its nature, in its lands and people. It possesses a unique tract of chernozem land exceeding 20% of the total world resources of chernozem. The sample of this soil taken from Dobrovelychkivsky region of Kirovogradska oblast is kept as a «Standard chernozem» in Paris, in the Laboratory of land resources of Europe. People in Ukraine are friendly and laborious; they have significant educational and intellectual potential. These two dominants, natural and intellectual, are determined as basic strategic lines of national development policy forming on the basis of environmental, economic, and social balance.

This was externalised in the Main Lines of National Environmental Policy of Ukraine and in the Address of the President of Ukraine to Verkhovna Rada of Ukraine «European Choice: Conceptual Grounds for the strategy of Economic and Social Development of Ukraine for 2002-2011».

For the last decade in Ukraine 15 main environmental laws, 40 bilateral international agreements, 20 environmental global and regional conventions, 5 additional protocols and ammendmeds to these conventions came into force. The government is preparing 20 more international conventions, protocols and agreements for signing, ratification or joining.

For today, the Government of Ukraine faces the task of elaboration of efficient mechanisms for realisation of the adopted strategic lines of national development, taking into account experience of European and other countries and relying on the consolidated power of all national driving forces (political, governmental, academic, business, and civil).

The Government of Ukraine has already adopted the Comprehensive programme of implementation of decisions by the World Summit in Johannesburg. Principles of sustainable development, its environmental aspects are incorporated in the Action Programme of the Government of Ukraine for 2003-2004. The Ministry of Environment and Natural Resources of Ukraine invigorated its activity. Public hearing on the issue of compliance with the environmental legislation in Ukraine, which took place in 2003, once again highlighted acuity of the challenge faced by the country in the domain of conservation and restoration of natural environment, providing of environmental safety.

In recent years we witnessed emerging of centres of instability and intergovernmental conflicts caused or reinforced by environmental degradation and natural resources exhaustion, first and foremost energy resources.

державою у справі захисту і відтворення природного середовища, забезпечення техногенно-екологічної безпеки.

Ми є свідками того, як в останні роки погіршення стану довкілля на планеті і вичерпання природних ресурсів Землі, перш за все - енергетичних, викликали або підсилювали джерела нестабільності та міждержавних конфліктів.

Глибоко стурбовані загрозливою деградацією біосфери, учасники Йоганнесбурзького саміту вирішили «активно розвивати і зміцнювати пов'язані між собою та підтримуючі одне одного ключові компоненти сталого розвитку - економічний розвиток, соціальний розвиток та охорону й відтворення навколишнього середовища - на місцевому, національному, регіональному і глобальному рівнях».

Це рішення покладене в основу формування сучасної державної політики України щодо збереження довкілля, раціонального використання і відтворення природних ресурсів, переходу на засади сталого розвитку.

Зокрема, здійснюється розробка системного Екологічного кодексу України, формування Національного екологічного фонду, системи екологічного аудиту і страхування, державного екологічного моніторингу України. Політичні рішення переорієнтовуються на вирішення гострих екологічних проблем в екологічно-депресивних регіонах України (Чорнобильська зона, Донбас, Придніпров'я, Криворіжжя), формування екологічних передумов для сталого розвитку на місцевому рівні.

Практично реалізується політика щодо покращення стану інформованості та сприяння участі громадськості у процесі прийняття рішень з питань охорони довкілля та їх виконання.

В Україні сформувалася сучасна наукова школа сталого розвитку, в основу якої покладені біотична та інноваційна моделі регулювання життєдіяльності, а також базові пріоритети в економічній, соціальній та екологічній сферах. Провідну інтелектуальну роль у суспільстві відіграє Національна академія наук України.

Уряд України впевнений, що ті надзвичайно складні завдання, які життя сьогодні поставило перед країнами Європи, спільними зусиллями ми зможемо вирішити. Надто важливо - знайти спільні підходи й інтереси. А вони закладені в ідеї екологізації усіх сфер буття, у створенні ефективних систем гармонізації життєдіяльності суспільства, у виконанні загальноєвропейських стратегій збереження біологічного та ландшафтного різноманіття, відповідальності за майбутнє нашого спільного дому - планети Земля.



**Голова Національного
організаційного комітету,
Прем'єр-міністр України
В.Ф.Янукович**

Driven by anxiety about threat of biosphere degradation, the participants of the Johannesburg Summit decided to vigorously develop and strengthen the inter-linked and hanging together key components of sustainable development: economic development, social development, conservation restoration of the environment, on local, national, regional, and global levels.

This decision actually underlies the forming of the modern state policy of Ukraine on environment conservation, rational use and restoration of natural resources, transition to sustainable development.

In particular, elaboration Environmental Code of Ukraine, establishing of the National Environmental Fund, the system of environmental audit and insurance, the system of environmental monitoring of Ukraine. Besides, acute environmental problems in the regions of environmental tension (Donbas, middle Dnieper area, Chernobyl zone, and Kryvorizhya) are supposed to be resolved, and prerequisites for sustainable development on the local level are to be formed.

The policy on improvement of informing and promotion of society participation in decision making on environmental issues and these decisions fulfillment is implemented in practice.

A modern scientific school of sustainable development emerged in Ukraine, which is based on biotic and innovation model of life activity regulation, as well as on basic priorities in economic, social and environmental domain. The National Academy of Sciences of Ukraine plays a leading intellectual role in society.

The government of Ukraine is sure that we will cope, by joint effort, with the challenge that all European countries are facing now. It is very important to find common approaches and interests. And they are incorporated in the idea of ecologization environmentally of all spheres of life activity, in creation of effective systems of life harmonization, in implementation of Pan-European strategies of conservation of biological and landscape diversity, responsibility for the future of our common home - the Earth planet.

***Head of National Organisational Committee
Prime-Minister of Ukraine
V.F. Yanukovych***

ОСНОВІ ЗАСАДИ І ПРИОРІТЕТИ ЕКОЛОГІЧНОЇ СТРАТЕГІЇ УКРАЇНИ НА ПЕРШІ ДЕСЯТЬ РОКІВ ХХІ СТОЛІТТЯ



Необхідність актуалізації державної екологічної політики, розширення її до масштабів національної екологічної стратегії обумовлена діалектикою розвитку суспільства в умовах системної трансформації, зобов'язаннями щодо реалізації рішень Всесвітнього саміту в Йоганнесбурзі (2002 р.) та політикою європейської інтеграції України.

Концептуальні основи національної екологічної стратегії ґрунтуються на закладених раніше базових передумовах:

екологічна стратегія розглядається як паритетна складова національної стратегії переходу до сталого розвитку з усіма системними та інтегрованими положеннями, принципами і цілями;

національна екологічна стратегія формується і реалізується у взаємозв'язку із Концепцією національної безпеки України, що обумовлює

пріоритетність екологічної безпеки у процесі переходу до сталого розвитку;

національна стратегія має бути гармонізована з європейською екологічною стратегією відповідно до геополітичного курсу європейської інтеграції України;

при формуванні національної екологічної стратегії мають бути враховані стан виконання і перспективи розвитку міжнародних зобов'язань і співпраці, оцінки громадськості, європейською та міжнародною спільнотою результативності природоохоронної діяльності в Україні за минуле десятиріччя, досвід виконання національних екологічних програм, у тому числі з міжнародною допомогою, можливості нарощування потенціалу гармонізації життєдіяльності суспільства і переходу до сталого розвитку;

формування національної екологічної стратегії має здійснюватися з урахуванням пріоритетності екологічних проблем України за критеріями ризику впливів на всі сфери життєдіяльності суспільства, здоров'я населення та інтереси прийдешніх поколінь.

Особливість екологічних проблем України характеризується проявом складних природно-техногенних процесів:

радіаційне забруднення великих територій, пов'язане з Чорнобильською катастрофою;

забруднення токсичними, побутовими та іншими відходами значних територій внаслідок їх техногенного перевантаження та нераціональної структури виробництва і природокористування;

забруднення стічними водами великих і малих річок як результат невиваженості й недалекоглядності в господарюванні;

підтоплення значних територій внаслідок нераціонального гідротехнічного будівництва і меліорації;

регіональні повені, що пов'язані зі змінами клімату, надмірностями в землекористуванні;

BASIC PRINCIPLES AND PRIORITIES FOR NATIONAL ECOLOGICAL STRATEGY OF UKRAINE FOR THE FIRST DECADE OF THE 21-ST CENTURY

Necessity to actualize the government environmental policy, to scale it up to the national ecological strategy has been caused by dialectics of the society development in conditions of systemic transformation primarily by Ukraine's, commitments to implement decisions of the World Summit in Johannesburg (2002) as well as by Ukraine's policy for the European integration.

Conceptual grounds for the national ecological strategy are based on the following reference premises:

- the ecological strategy is considered as the parity component of the national strategy of transition to balanced sustainable development with all outcoming systemic and integrated provisions, principles and targets;

- the national ecological strategy takes shape and is implemented in the interrelation with the Concept of the National Safety of Ukraine that makes environmental safety a priority in transition to balanced development;

- the national ecological strategy should be harmonized with the European ecological strategy in compliance with Ukraine's geopolitical course for the European integration;

- the national ecological strategy accounts for provisions of the national ecological education concept and makes a big emphasis on the necessity to shape up the high level of ecological culture, awareness and spirituality of the Ukrainian people;

- formation of the national ecological strategy should account for the following: the actual condition of international commitments' implementation and the prospects for developing cooperation; assessment of Ukraine's environmental action efficiency in the past decade by the European and the global community; scientific expert assessment of experience accumulated in the course of implementing national environmental programs with international support; estimates for capacity to augment environmental potential in harmonizing society vital activities and transition to balanced development;

- formation of the national ecological strategy should account for Ukraine's environmental priorities by risk of impact on all society life aspects, public health and interests of the generations to come.

Peculiarities of Ukraine's environmental challenges find their expression in the following natural and technogenic features:

- radiation contamination of significant territories as the result of Chernobyl disaster;

- contamination of significant territories with toxic, domestic and other waste resulting from their technogenic overload as well as lack of rational production structure economy management;

- waste water polluting large and small rivers resulting from lack of rational economy management;

- submerging of significant areas as the result of lack of rationale in hydrotechnical engineering and melioration;

- regional floods caused by climate change and irrationality in land use;

- evolvment of exogenous geological processes (soil shifts, surface subsiding, etc.);

розвиток екзогенних геологічних процесів (зсуви, осідання поверхні й т. ін.);
деградація родючості ґрунтів унаслідок зниження культури землеробства,
надмірної хімізації, мінералізації тощо;

недостатньо утверджений рівень екологічної свідомості, освіченості і культури.

З урахуванням вищевикладеного актуалізуються наступні стратегічні цілі на перші десять років XXI століття:

забезпечення екологічної безпеки усіх сфер життєдіяльності;

екологічне оздоровлення і відтворення порушених екосистем, у першу чергу басейнових;

створення екологічних передумов для переходу до сталого розвитку, передусім на екологічно депресивних територіях;

збереження і розширення біологічного та ландшафтного різноманіття;

внутрішня інтеграція екологічних вимог у секторальну політику, в системи забезпечення життєдіяльності суспільства;

впровадження міжнародних стандартів, регламентів системного екологічного управління і аудиту, розвиток корпоративних систем екологічного управління;

демократизація процесу прийняття рішень і підсилення відповідальності за їх виконання.

Стратегічні цілі досягаються шляхом формування і реалізації відповідних заходів згідно з наступними критеріями:

стан здоров'я населення - сучасних і прийдешніх поколінь;

гармонізація життєдіяльності суспільства у природному середовищі;

екологічна свідомість і відповідальність усіх верств населення;

екологічна чистота і культура виробництва й господарювання;

економія ресурсів, енергії, збереження самовідновлюваних властивостей і господарської ємності біосфери.

Національна екологічна стратегія має гармонійно поєднувати:

біотичний підхід, що заснований на біотичному механізмі регулювання та природній домінанті життєдіяльності суспільства;

інтеграційний підхід, що має забезпечити інтеграцію екологічних вимог в усі сфери життєдіяльності, у формування інтегральних індикаторів розвитку та кумулятивної ефективності;

системний підхід, що забезпечує взаємну обумовленість екологічних проблем, стратегічних цілей та еколого-економічних механізмів їх досягнення, цілісність і системні взаємозв'язки як екологічного, так і всіх інших аспектів національної політики, ефективність реалізації прийнятих рішень.

Процес реалізації національної екологічної стратегії потребує тісного взаємопов'язування короткострокових, середньострокових та довгострокових цілей і етапів на десятирічному відрізку часу. Особливість їх полягає у тому, що слід дотримуватися принципу «снігової кулі» – від малих проектів до великих, від некапіталомістких заходів до середніх і капіталомістких.

Головна мета сучасного етапу національної політики – суттєве покращення стану навколишнього середовища України (антропосфери, соціосфери, техносфери, біосфери, атмосфери, гідросфери, літосфери), створення еколого-економічних передумов для сталого розвитку нашої держави.

Основними пріоритетами національної екологічної стратегії об'єктивно визначені:

екологізація усіх сфер життєдіяльності населення у контексті національної безпеки України;

soil fertility degradation as the result of deteriorating land treatment culture, excessive use of chemicals and mineral fertilizers, etc.;

not sufficiently confirmed level of environmental awareness, education and culture.

Accounting for the above, the following strategic targets are defined for the first decade of the 21-st century:

ensuring ecological safety in all the domains of vital activities;

ecological rehabilitation and reproduction of destroyed ecosystems, first of all those basin ones;

rehabilitation and protection of human habitat, primarily in the environmentally unsafe territories;

conservation and expansion of biological and landscape diversity network;

environmental requirements integration into sectoral policy, into support systems for society vital activities;

introduction of international standards, regimens of systemic environmental management and audit as well as development of corporate systems in environmental management;

democratization of decision making process and raising responsibility for their implementation, mass media activation.

Strategic goals are achieved through shaping up and implementing the respective measures meeting the following criteria:

public health and future generations health;

society vital activities harmonization in the natural environment;

ecological awareness and responsibility of all population strata;

environmentally clean production culture, economy management;

saving of resources energy, preservation of self-renewable characteristics and biosphere economic capacity.

The national ecological strategy has in harmony to combine:

biotic approach based on biotic mechanism in regulating the natural environment and nature as a dominant in society vital activities;

integration approach, that is to ensure the process of integrating environmental requirements and aspects into all vital activities domains, into sectoral policy as well as formation of integrated development indicators and integrated efficiency;

systemic approach ensuring systemic causality of environmental problems, policy, strategic targets as well as environmental and eco-economic mechanisms of their implementation, integrity and systemic interconnection in implementing the national environmental policy with all the other aspects of sectoral policy and effectiveness in implementing adopted decisions.

Implementation stage of the national ecological strategy covers the following: short-term, middle-term and long-term targets for the period of ten years. The specific feature manifests in the necessity to adhere to the "snow ball" principle and move from small projects to large ones, from low capital measures to those requiring capital investment. The major objective of the modern stage of the national policy is significant improvement of Ukraine's environment state (anthroposphere, sociosphere, technosphere, biosphere, atmosphere, hydrosphere), creation of environmental and economic preconditions for sustainable development of our country.

Major priorities of the national ecological strategy are the following:

ecologization of all society activity domains in the context of Ukraine's national safety;

implementation of the system of professional environmental preparation of state offi-

впровадження системи професійної екологічної підготовки державних службовців, керівників і посадових осіб, які приймають відповідальні рішення на локальному, регіональному і державному рівнях;

вдосконалення законодавчої та нормативно-правової бази, прискорення процесу гармонізації екологічного законодавства України з вимогами міжнародних стандартів, зокрема з нормативами ЄС;

забезпечення екологічної безпеки ядерних об'єктів та місць накопичення радіоактивних відходів, підвищення ступеня захищеності населення та довкілля від радіаційного впливу, пом'якшення наслідків катастрофи на Чорнобильській АЕС;

захист, стабілізація та поліпшення екологічного стану в містах і промислових центрах, зокрема Донецько-Придніпровського регіону;

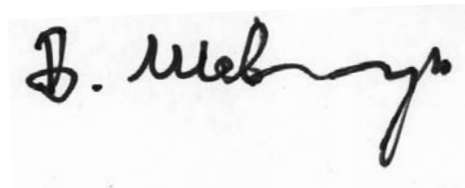
запровадження інтегрованого управління водними ресурсами з метою їх збереження і відтворення, прискорення переходу до управління водокористуванням за басейновим принципом;

поліпшення екологічного стану річок та підземних вод України, зокрема басейну Дніпра, та якості питної води;

формування екологічно збалансованої системи природокористування на основі екологічно безпечних технологій та адекватної структури виробничого потенціалу у промисловості, енергетиці, будівництві, сільському господарстві, на транспорті;

реалізація заходів щодо пом'якшення негативного впливу глобальних екологічних проблем, зокрема змін клімату, на стан екологічної безпеки України.

Національна екологічна стратегія здійснюється у контексті реалізації національної стратегії переходу до сталого розвитку відповідно до рішень Всесвітнього саміту у Йоганнесбурзі та політичних орієнтирів панєвропейського процесу «Довкілля для Європи».



**Міністр екології та
природних ресурсів України
В.Я. Шевчук**

cials and heads, which take responsible decisions at the local, regional and state level;

- improvement of legislative and normative legal base, acceleration of the process of harmonization of Ukraine's environmental legislation with international standards requirements, particularly with EU normatives;
- ensuring of safety of nuclear objects and places of radioactive wastes accumulation, increasing of safety level of population and environment from radioactive impact, mitigation of Chornobul Nuclear Power station catastrophe results;
- protection, stabilization and improvement of environmental state in cities and industrial centres particularly Donetsko-Prydniprovsky region;
- establishment of integrative water resources management for their preservation and reproduction, acceleration of transition to water use management according to the basin principle;
- improvement of environmental state of rivers and underground water of Ukraine, particularly Dnipro basin and drinking water quality;
- formation of environmentally balanced system of nature use at the basis of environmentally safe technologies and an adequate structure of productional potential in industry, energy, building, agriculture, transport;
- implementation of measures on mitigation of negative impact of global environmental problems, particularly climate changes, on environmental safety state in Ukraine;
- consolidation of the national driving forces for society vital activities and balanced development harmonization based on new ecological and spiritual values.

The national ecological strategy is being implemented in the context of implementing the national strategy for transition to balanced development according to decisions of the World Summit in Johannesburg and political orients of the Pan-European process «Environment for Europe».

***Minister of Ecology and
Natural Resources of Ukraine
Shevchuk V.Y.***

Composition of the Editorial Board on Preparation of the National Report of Ukraine on Harmonization of Society Activity in Natural Environment

Co-heads of the editorial board:

Janukovysh
Viktor Fedorovysh

Head of the National Organizational Committee on Preparation of the Fifth Pan-European Ministerial Conference, Prime-Minister of Ukraine

Paton
Borys Yevgenovysh

President of the National Academy of Sciences of Ukraine

Responsible Head of elaboration:

Shevchuk
Vasyl Yakovysh

Minister of Ecology and Natural Resources of Ukraine

Members of the editorial board:

Biliausky
Georgiy Oleksijovysh

Deputy Director of the Ukrainian Institute of Environment and Resources Research by the Council of National Security and Defense of Ukraine

Volosbyn
Valentyn Vasyliovysh

Head of the Sector of Nature Use and Protection of Scientific-Organizational Department of the Presidium of the National Academy of Sciences of Ukraine

Kachynsky
Anatoliy Bronislavovysh

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Sviatoslav Sergiyovysh

Head of the State Administration of Ecology and Natural Resources of the Ministry of Ecology of Ukraine in Donetsk Region

Kuchar
Valeriy Pavlovych

Director of the Institute of Bioorganic Chemistry and Petroleum Industry of the National Academy of Sciences of Ukraine

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<i>Satalkin Juriy Mykolajovych</i>	Senior Scientific Officer of the Ukrainian Institute of Environment and Resources Research by the Council of Security and Defense of Ukraine (coordinator of the working group)
<i>Tolstouhov Anatolij Volodymyrovych</i>	Head of the All-Ukrainian Ecological League, People's Deputy of Verkhovna Rada of Ukraine
<i>Shpak Anatolij Petrovych</i>	First Vice-President of the National Academy of Sciences of Ukraine

The following persons took part in preparation of certain chapters:

Demkiv O.I., Gvozdetsky P.M. (editor), Getman V.V., Kvashuk L.P., Kyrylchuk I.G., Koval G.M., Mazurkevych O.O., Marushevsky G.B., Matorin Y.M., Mezherin V.O., Pylypchuk M.O., Stetsenko M.P., Tymochko T.V., Tolkachev V.A., Trofimova I.V., Yakovlev Y.O.

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CONTENTS

1. Ukraine: Brief geographic description	20
2. National development of Ukraine: Environmental perspective	21
2.1. Economic inheritance and environmental after-effects	21
2.2. Formation of national environmental legislation	24
2.3. Harmonisation of Ukrainian and European laws	25
2.4. Elaboration of national environmental policy	25
2.5. Regional environmental policy forming	26
2.6. Development of ecological and economic mechanisms	27
2.7. Environmentally sustainable development of basic domains and sectors of the economy of Ukraine	28
2.8. Innovation policy of development: Environmental perspective	29
2.9. Development of ecological education	29
2.10. Environmental partnership development	32
2.11. Integration into European environmental community	33
3. Natural-Resource Potencial of Ukraine	36
3.1. Land Resources	36
3.2. Water Resources	40
3.3. Forest Resources	43
3.4. Atmospheric Air	44
3.5. Bowels and Territories in which Minerals are Produced	46
3.6. Biodiversity	48
4. National cultural and environmental networking	52
4.1. Biospherical centers of cultural and environmental network	52
4.2. Historical and cultural heritage	59
4.3. Global aspects of national cultural-environmental network forming	60
4.4. State programme of forming of national ecological network in Ukraine	61
4.5. Fund of natural reserves	62
4.6. Recreational resources	67
5. Effectiveness of the National Environmental Policies in the past Decade	68
5.1. National Environmental Programs Implementation	69
5.2. Efficiency of Government Ecological Control	70
5.3. Overcoming Chornobyl Disaster Aftermath	71
5.4. Natural Resources Balanced Use and Reproduction	72
5.5. Reinforcing economic mechanisms of Kyoto Protocol in Resolving Climate Change Issues	75
5.6. Effectiveness of International Cooperation	78

5.7. Effectiveness Assessment and Recommendations of the Committee on Environmental Policy of the European Economic Commission	80
6. The National Driving Forces for Harmonizing and Accelerating Processes of Transition to Sustainable development	82
6.1. Institute of State Authority	82
6.2. The National Academy of Sciences of Ukraine	83
6.3. The System of Training and Education	84
6.4. Mass Media	85
6.5. Environmental Public Interest Groups and NGOs	86
7. National Strategies for Social Harmonization and Transition to Sustainable Development	89
7.1. Harmonizing Approaches for the Choice of Sustainable Development Strategies	89
7.2. Innovation Strategy for Harmonizing Society Vital Activities and Nation's Balanced Development	91
7.3. Replacement of Inefficient Production and Consumption Structures	93
7.4. Modern Ukrainian School of Noospherogenesis and Harmonized Development of the Society	96
7.5. The National Strategy for Harmonizing Society Vital Activities and Sustainable Development within the Context of the World Summit Decisions(Johannesburg, 2002)	99
Appendix. General overview of anthropogenic influence on environment in Ukraine.	108

1. UKRAINE: BRIEF GEOGRAPHIC DESCRIPTION

Ukraine is situated in the Eastern Europe, in the South it is washed by the Black Sea and Azov Sea. The capital of Ukraine is city of Kyiv.

Area – 603,700 sq.km ,

Population – 48,400,000.

Areal extent: West to East - 1,316 km.
North to South- 893 km.
State border length - 6,500 km.

Extreme points: North - village of Petrivka, Chernihivska oblast,
South - cape of Sarych, Autonomous Republic of Crimea,
West - town of Chop, Zakarpatska oblast,
East - village of Chervona Zirka, Luhanska oblast.

Neighbouring countries: Poland; Slovakia; Hungary; Romania; Moldova; Russian Federation; Belarus.

Climate. On the Eastern European plain (95% of the territory) and in the Ukrainian Carpathians and Crimean Mountains (5% of the territory) the climate is mainly temperate continental, on the southern coast of the Crimea the climate features subtropical characteristics.

Main rivers (length in the territory of Ukraine, km):

Dnipro	1,121	Western Boog	401
Dniestr	925	Oril'	384
Southern Boog	806	Teteriv	365
Siversky Donets	700	Sula	363
Horyn'	577	Ingul	354
Desna	575	Ros'	346
Ingulets	549	Uday	327
Psel	520	Samara	320
Sluch	451	Vorskla	317
Styr	424	Vovcha	323
		Khorol	308

Major lakes and coastal lakes, sq.km:

Lakes		Coastal lakes	
Yalpug	149	Dniprovsko-Booz'ky	800
Kugurluy	82	Utlyutsky	700
Kagul	82-93	Dnistrovsky	360
Sasyk-Syvash	71	Sasyk, Kunduk	205
		Molochny	168
		Tyligul'sky	150-170

Major peaks, height in metres:

The Ukrainian Carpathians		The Crimean Mountains	
Goverla	2061	Roman-Kosh	1545
Brebeneskul	2032	Demir-Kapu	1540
Petros	2020	Zeytin-Kosh	1534
Gutyn Tomnatyk	2016	Kemal'-Egerek	1529
Rebra	2010	Eklizi-Burun	1527
Pip-Ivan	1936	Angara-Burun	1453

2. NATIONAL DEVELOPMENT OF UKRAINE: ENVIRONMENTAL PERSPECTIVE

2.1. Economic inheritance and environmental after-effects

As of the date of Independence Declaration, the situation in Ukraine was rather peculiar. Though its surface area did not exceed 3% of the total area of the former Soviet Union, Ukraine possessed 25% of the country's industrial potential; therefore, it accounted for 25% of the total volume of environmental pollution.

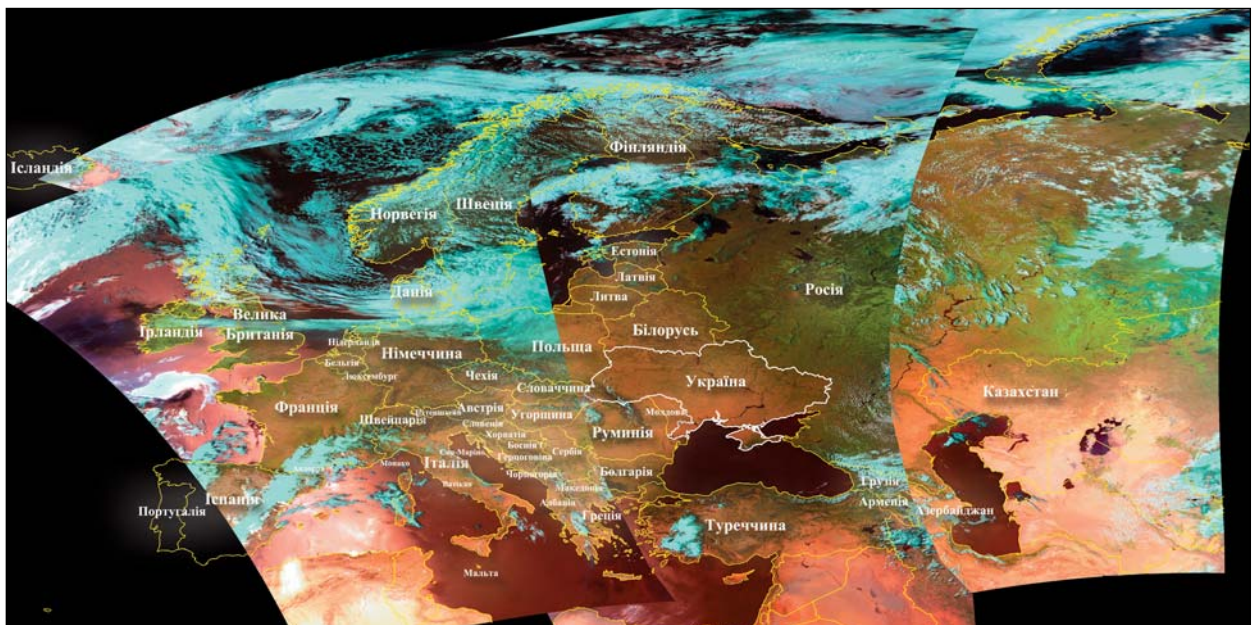
In 1991, manufacturing of one unit of product in Ukraine required several times as much raw materials and energy as that in advanced countries. Development of power engineering implied mainly use of non-renewable natural resources. In the structure of energy industries, heating-and-power plants provided 69% of the total capacity, nuclear power plants - 27%, and hydroelectric stations - 4% of the national energy capacity.

National income increase was accompanied by greater use of natural resources for manufacturing purposes and perpetual growth of wastes generation. According to judgement of experts from the World Bank, the level of energy consumption per unit of national product in Ukraine was 8 to 10 times

higher than that in the countries of European Union.

Unbalanced deployment of production facilities, which occurred over a long period of time, resulted in 4-5 times higher level of man-caused load on the environment than that in advanced countries. The share of ploughed-up lands constitutes 80% of farmland and 57% of the total area of land; the amount of water used in technological processes, compared to the newer technologies, exceeds the needed amount 2 to 5 times, and even 10 to 13 times at some enterprises.

Under the centralised command-administrative system, the strategy for development of the economy in Ukraine lacked proper assessment of ecological conditions specific to different regions. As a result, some regional centres feature excessive density of industrial production facilities causing higher level of environmental pollution and intensive use of natural resources. Economic capacity of the biosphere was neglected in the process of regional industrial structure deployment thus creating extremely strong concentrators of man-caused pressure in some regions of Ukraine.



Europe – space glance (data obtained NOAA satellite).

One of such is Donetsko-Prydniprovsky industrial complex, which ranks as one of the most significant sources of pollution in Europe.

The crisis in agricultural sector was caused primarily by the collapse of the traditional husbandry and creation of major agro-industrial enterprises. Hypercentralisation and enlargement policy implemented in the agricultural sector management resulted in problems characteristic of industries and cities. Giant cattle-breeding and pig-breeding farms intended for 25-100 thousand heads of animals became the largest sources of environmental pollution in rural areas. Pollution due to a pig-breeding farm containing 100,000 pigs equates to that caused by a city counting 400,000 inhabitants.

A tragedy in the modern Ukrainian history is so-called Chornobyl «breakdown», which is the major manmade environmental disaster contributing significantly into the global ecological crisis. More than 200,000 people were relocated from over 2,000 places situated in the contaminated zone.

Actually, Ukraine was left on its own with regard to resolving the Chornobyl problem. At that time numerous promises to help were

made, but most of them were not fulfilled. By now a new Chornobyl threat has emerged: the threat of possible consequences if the Chornobyl Nuclear Power Plant is closed without proper financial provision for safe functioning of objects and territories thereof.

In regard to water supply, Ukraine is listed among regions of Europe, which are experiencing the most acute lack of water. Transit



river flows, canals and waterways effecting inter-basin streamflow redistribution, partly make up for water deficiency. Building of major water-storage reservoirs along the Dnieper River, intended for electric power and water supply for industrial centres of Kryvorizhya and Donbas, as well as for watering of farmlands in the Black Sea region and Crimea, did not justify hopes and resulted in adverse environmental after-effects. Over 500,000 hectares of prolific soil were submerged and out of agricultural use; under-flooding zone covered nearly 100,000 hectares of land adjoining these storage reservoirs. Meanwhile, power production by co-ordinated hydroelectric system on the Dnieper River did not exceed 4% of the national volume of electricity production. Green scum and progradation of reservoir shorelines became very common.



Ecological conditions of the Black Sea and Azov Sea is close to crisis due to pollution of the offshore water by industrial and sewage effluent from the «hot points» on the shore and to polluted flow of such rivers as Danube, Dnipro, Dniestr, Southern Boog, and Don.

The problem of over-border pollution of the North-West shelf in the Black Sea by the flow of Danube and pollution of the Dnipro River from the territory of Russia and Belarus is still awaiting its resolution on international level. Water pollutants migrating from the area of Danube shelf owing to natural factors, bring 50% of actual pollution from Danube to the Ukrainian contiguous zone thus causing decrease in bio-productivity in the major places for commercial fishery of main types of food fish.

Many species of flora and fauna in Ukraine are in grave jeopardy, especially in the areas of intensive economical activity. It was stated, as early as 1991, that preservation of just 50% of species of living things required reserving 10% of land. At that time the area of all reserves in Ukraine constituted only 2.1% (1,211,000 hectares) of the optimal rate of 15%, declining to 0.5% in some regions. State of affairs in the domain of reservation, as Ukraine inherited it from the Soviet Union, was not satisfactory in terms of preservation of gene pool of animals and plants.

Under the Soviet system the economy of Ukraine used 1.3 to 1.5 billion tons of raw materials every year. The major part of these has returned into the environment as wastes. By 1991, 17 billion tons of wastes were accumulated in Ukraine on the surface area of 53,000 hectares. Most of them were accumulated in Dnipropetrovsk and Donetsk regions, the utilisation rate being very low. The problem of handling toxic wastes was not solved; there were 2,700,000 tons of such wastes accumulated in Donetska oblast, 3,200,000 tons - in Dnipropetrovska oblast, 1,300,000 tons - in Kirovogradska oblast, 1,700,000 tons - in Mykolayivska oblast.

Summary

Environmental after-effects of totalitarian economic management in the territory of Ukraine can be described as a state of emergency causing systemic, rather complicated problems on the path to sustainable development. Nearly all environmental prerequisites



of sustainable development - soil, water, forests, farmlands, minerals, underwent considerable changes due to antropogenic impact. Such situation requires implementation of adequate ecological policy highlighting natural resources potential restoration, ecological rehabilitation of waters, and legislative submission of managerial, commercial, and investment activities to this dominant.

2.2. Formation of national environmental legislation

For the years of our independence, a number of environmental laws were adopted and a new code formed, which includes the Land Code (1992), Forest Code (1994), Water Code (1995), Fossil Code (1994), the Laws of Ukraine «On Natural Environment Protection» (1991), «On Fund of Nature Reserves» (1992), «On Ambient Air Conservation» (1992), «On Wildlife Protection» (1993), «On Environmental Impact Assessment» (1995), «On Nuclear Energy Use and Radiation Safety» (1995), «On Radioactive Waste Handling» (1995), «On Municipal and Industrial Wastes» (1998), «On Plant Kingdom Protection» (1999), «On Environmental Emergency Zone», «On Protection of Population and Territories against Natural and Man-Caused Emergencies», «On Extrahazardous Objects» (2000) etc.

Citizens' right to environmentally safe life has been stated in the Constitution of Ukraine. According to the Constitution, provision of environmental protection and maintaining of ecological balance in the territory of Ukraine, as well as elimination of the Chernobyl catastrophe after-effects, is the constitutional obligation of the Government.

Authorised bodies of executive power, such as Ministry of Environment and Natural Resources, State Committee of Forestry, State Committee of Land Resources, State Committee of Water Industry, and State Department of Fish Industry at the Ministry of Farm Policy, exercise control over environmental law observance.

Main tasks of these bodies are as follows:

- Increase in environmental control efficiency aimed at procurement of strict observance of effective environmental law;
- Persistent improvement of legislative basis;
- Dissemination of the up-to-date methods and techniques of monitoring;
- Improvement of methods and reference support for environmental protection;
- Control over:
 - Use and conservation of land, minerals, ground waters;

- Use and conservation of surface waters, marine environment, natural resources of territorial waters, continental shelf, contiguous zone;
- Ambient air conservation;
- Protection of forests and other vegetation;
- Wildlife protection, including struggle against poaching;
- Use and conservation of territories and objects belonging to reserves;
- Harmful substances handling, including toxic industrial waste and municipal solid wastes;
- Observance of radiation safety regulations;
- Observance of environmental legislation and environmental protection regulations when cargoes and means of transport cross the state border.

Summary

At the moment, it can be considered that the Ukrainian environmental legislation has already come into being, though it has not yet become an effective system of legal support for environmental bearing of the national course of development. The problem of law enforcement, of providing potent mechanisms for attaining this objective became extremely acute.

Rather severe is also the problem of continual improvement of the effective legislation in accordance with current requirements of the economy under reformation and actual conditions of economical activity. The general principle «polluter pays» should be stipulated in the law, and the national environmental legislation is to be brought to conformity with European regulations.



2.3. Harmonisation of Ukrainian and European laws

In pursuance of the Decree by the President of Ukraine #1072 «On the Programme of Integration of Ukraine into the European Unit» of September 14, 2000, the Government has been developing and implementing the detailed programme of co-ordination of the Ukrainian environmental law with the EU legislation. Integration of Ukraine into the European Union is to be effected through development of legislative basis, subordinate legislation, methodological basis, and institutional basis harmonised with the European rule and meeting the requirements of Ukrainian and European environmental safety.



With a view to co-ordinating environmental legislation, the Government of Ukraine takes appropriate steps; i.e., draft laws «On Environmental Audit», «On Ecological Insurance», «On Environmental Safety from Natural and Man-Caused Factors», «On Ratification of the Kyoto Protocol to the United Nations Framework Convention on Climate Change» were developed. Adopted was the Law «On Amendments to Legislative Instruments in View of Ratification by Ukraine of the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters». A series of legislative and sublegislative enactments was developed, which are crucial for Ukraine in order to comply with terms of the Montreal Protocol on substances destructive to the ozone layer. Export and import licensing is implemented with respect to ozone cracking substances. Mechanisms of legislative control over interaction between environmental protection bodies with other relevantly

authorised executive power bodies, including law machinery, are under development. The Law of Ukraine «On the Programme of Forming of National Ecological Network in Ukraine for 2000-2015» has been carried into effect.

Summary

Integration of Ukraine into the European Union, from its environmental perspective, should take place by way of systemic improvement and reconciliation of environmental management and protection, as well as of interaction between governmental bodies and NGO, with European legislative and institutional bases. Fulfillment of this task requires primarily that the national environmental policy should be identified and harmonised with the European environmental policy.

2.4. Elaboration of national environmental policy

Environmental policy of Ukraine, in general, has been framed over the period of time since Independence Declaration. In March 1998 Verkhovna Rada of Ukraine approved «Policy Statement and Guidelines on Environmental Protection, Natural Resources Use, and Procurement of Environmental Safety». This legal instrument declared a long-term public policy of resolving environmental problems in Ukraine.

Given numerous environmental problems of different level of complexity and extreme-



ly limited supply of resources available for their resolving, the national priorities in the domain of environmental protection and efficient use of natural resources include:

- ensuring environmental harmlessness of nuclear power plants and radiation protection of the population and environment; reduction of adverse impact of

- Chornobyl catastrophe to a minimum;
- improvement of ecological balance in the Dnieper River basin and of drinking water quality;
 - stabilisation and enhancement of environmental conditions in cities and industrial centres of Donetsko-Prydniprovsky region;
 - construction of new and reconstruction of operational facilities at the municipal sewage disposal plants;
 - the Black Sea and Azov Sea pollution prevention, enhancement of ecological conditions thereof;
 - development of a well-balanced system of nature management and adequate structural change in production facilities of the Ukrainian economy; use of environmentally appropriate technologies in industries, power engineering, construction, farming, transportation sector of economy;
 - securing of biological and landscape diversity, development of reservations.

Public policy in the domain of environmental protection and effective and saving nature management closely relates to ecological programmes, which are the main means of environmental policy implementation. Nature conservation programmes are aimed at ambient air and water quality improvement, at development of reserves, at deployment of united ecological network, at implementation and observance of principles of environmentally balanced development.

Summary

The European Union policy requires that Ukrainian environmental policy should be perpetually amended and developed. The regulations enacted in 1998 are to be modified in view of some new global realities, both European and Ukrainian, and of decisions made by the World Summit in Johannesburg. The problem lies in lack of permanent national legislative mechanism for updating strategic decisions on environmentally sustainable development of Ukraine, for integration of environmental policy objectives into the body of other developmental policies objectives: social and economic policy, innovation policy etc.

2.5. Regional environmental policy forming

Basic principles of the regional environmental policy are stipulated in the «Policy Statement and Guidelines on Environmental Protection, Natural Resources Use, and Procurement of Ecological Security».

Harmonisation of national and regional interests underlies the processes of regional development in Ukraine. Shifts in regional policy, which occur in Ukraine nowadays, result both from the level of the authorities' and public awareness in the core regional socio-economic processes, and from the



model selected for further governmental control over sustainable regional development. The model of regions' and depressed areas' development assumed as a basis for the Conception of Governmental Regional Policy, contains the following objectives:

- provide incentives for local authorities for efficient draft on national funds and local budgets' funds;
- co-ordinate actions taken by central public bodies and local authorities aimed at resolving of regional development problems;
- formulate principles enabling definition of depressed areas; specify the procedure of qualifying an area as depressed; determine tools of central and regional support for development of such areas;
- determine the mechanism of financing the aforementioned incentives for regional development given active budget constraints.

The Conception of Governmental Regional Policy stipulates as follows.

To encourage sustainable development of regions, contractual relationship is introduced

between the Government, central public bodies and local self-government bodies. Under terms and conditions of regional compacts, concerted actions are to be taken, which have national priority and are financed from the state budget on the basis of subsidiarity. In the above actions obligations of local self-government bodies are stipulated.

Depressed area is defined as a settlement, political district or aggregate thereof. A set of indicators should be determined with respect to environmental, economic and social conditions on the territory that is to be given the status of depressed area. Over the period of rehabilitation, these indicators should meet scientifically grounded and legally confirmed criteria of life activity on this territory.

The funds stipulated in regional compacts and the funds aimed at depressed areas support are annually allocated by the State Budget of Ukraine. These funds do not include transfers appropriated in the State Budget for levelling of budgets.

A dedicated parliamentary-governmental commission on sustainable development of regions has been established to take into account interests of regions and of central authorities in planning regional development, to co-ordinate activity of these power bodies and to provide transparency in the process of determining depressed areas. This commission is to act as an arbiter for resolving problems, which can occur within the compact relationship.

Summary

The Donetsko-Prydniprovsky region and the Dnieper River region can be regarded as an example of efficacy of the regional environmental policy in Ukraine. However, our country still lacks an integral regional environmental policy harmonised with the national environmental policy. The regional environmental policy is to a certain extent efficient owing to the activity of local authorities and the public. The problem is that the current system of state nature management remains overcentralised and basically departmental, adhering to strict distribution of functions and taking account of territorial interests.

2.6. Development of ecological and economic mechanisms

Nowadays, the main constituents of nature management and environmental protection economic mechanisms are developed and implemented in Ukraine. The foremost of these are:

- duties and fines for environmental pollution;
- dues for specific use of natural resources (minerals, waters, lands, forests, biological resources);
- reparation of damages caused by breach of environmental legislation.

Implementation of ecological-economic instruments created incentives to use natural resources more intensively and revealed actual sources of environmental activity financing.

With a view to financing of expenditures for conservancy activities aimed at restoration and proper maintenance of natural



resources, a special item «Environmental protection and nuclear safety» was included into the State Budget since 1994. This section appropriates funds for protection and effective use of water, mineral, land resources, for afforestation and planting forest shelter belts, maintenance of reserves, running of local conservancy bodies.

Since 1992, the system of state special purpose funds intended for environmental protection is operating in Ukraine on national and local levels. In 1998, these funds were included into relevant budgets (previously they were off-budget funds).

Underefficiency of the current system of environmental funds is caused by a series of reasons; the major of these reasons are as follows:

- scattering of resources across numerous funds (1500 units);

- on the local level, funds are not always used properly;
- lack of mechanism for inciting effective use of appropriated funds.

Under present conditions, this form of accumulating of and draft on funds needs urgent reforming. In our view, the most reasonable way to do it is to establish the National Environmental Fund on national and regional levels, which should act as a legal entity.

We believe that integration of environmental funds in a united financial system, provided that all elements of regional funds' independence are retained, will provide good opportunities for mutual insurance, crediting, and pooling resources for implementation of specific environmental projects. The draft law «On National Environmental Fund» elaborated by the Ministry of Environment and Natural Resources awaits being enacted.

The Government vigorously promotes implementation of environmental investment projects. The priority projects on environmental protection are being carried out, including those within the National Programme for sanitation of the Dnieper River basin and enhancement of drinking water quality, the Programme of utilisation of industrial and municipal wastes for a period till 2005, Governmental Programmes of social and economic development of Polisky, Karpatsky, and Prychornomorsky region etc.

Due to the credits obtained from the European Bank of Reconstruction and Development, reconstruction and completion of central sewage disposal plants in Zaporizhya comes to the end, their capacity totalling 435,000 cubic metres per day. The Government of Denmark, in the framework of the Programme of two-way assistance, carries out a series of multipurpose investment projects aimed at reconstruction of public utilities and other objects of municipal economy in 9 towns of Ukraine; they also conduct research on feasibility of investment project on wastes handling in Kyiv (total price of the project is 100,000,000 US\$). The Government of Japan, in the context of the Programme of assistance, works on the project regarding water treatment in the city of Kryvyi Rih.

Summary

Further improvement of the economic machinery for national environmental policy can be seen in establishing of the National Environmental Fund and introduction of the principle «polluter pays» into Ukrainian legislation. These steps will enable mastering market mechanisms of environmental payments management, adjusting these payments to the damage inflicted, providing purposeful financing without extra expenditures from the State Budget and local budgets, and expanding of assessment basis.

Ukraine actively co-operates both with international financial organisations (the World Bank, EBRD) and with many countries on the two-way basis, thus ensuring receipt of significant amounts of money intended for resolving of many national and regional problems. However, this international support could be much more effective if national ecological and economic machinery operated adequately.

2.7. Environmentally sustainable development of basic domains and sectors of the economy of Ukraine

National environmental policy is carried out both through purposeful national, governmental, and regional programmes (nature conservancy, sanitation, restoration etc. programmes) and through national or governmental development programmes for different domains of economy. In the National Energy Programme of Ukraine till 2030, the strategy of environmentally sustainable development of the fuel and energy complex (FEC) was stipulated. This strategy is based on step-by-step augmentation of environmentally sound basis of the complex, these steps subject to the priority of taken measures and their ecological and economic efficacy.



Three major lines were identified in the policy of environmentally sustainable development of the fuel and energy complex of Ukraine. The first line is significant reduction and possibly partial elimination of gas and smoke emission, waste discharge and other kinds of harmful impact of FEC works on the environment and population owing to heat and electric energy saving. Thereupon, essential decrease in volume of consumed energy resources (organic and nuclear fuel) is expected and less use of environmentally harmful technologies of extraction and processing of these resources.



Environmentally sustainable development of the agrarian sector of economy of Ukraine includes the following:

- development of nature conservancy measures on the basis of international law requirements and strengthening of its significance in the practice of agricultural management;
 - elaboration of a system of economic incentives for production of ecologically pure agricultural products with use of biological farming technologies;
 - maintenance of ecologically favourable environment, infrastructure, and conditions of work, leisure, and physical development of rural populace;
 - cessation of use of low-yield farmlands, mainly in regions with large share of ploughed-up lands.
- Environmentally sustainable development of water industry is to be organised in accordance with the National Programme of water industry development, which was enacted as the Law of Ukraine by Verkhovna Rada in 2002. The Programme set the following objectives:
- ecological-economic and sanitation regulation and state water consumption management with absolute priority given to water resources conservation; maintenance of favourable conditions of catchment basin landscapes' functioning; maintenance of good ecological conditions of water bodies;
 - ecologically balanced, in terms of water management, development of regions, taking account of water resources' current state and forecast;
 - devising and implementation of methods of water resources consumption, conservation, and restoration, based on basin principles of management;
 - economic instruments' priority with respect to water regulation; efficient combination of these instruments with administrative and legal measures;
 - implementation of water-saving and energy-saving technologies in different domains of economy;
 - giving priority to development of water consumption system in regard to social sphere;
 - comprehensive approach to territorial organisation of production, land and water use depending on water resources capacity of a catchment basin;
- creation of highly productive and ecologically resistant agricultural landscapes;
 - harmonious combination of laws of economy and laws of nature functioning within the bounds of the territory, with allowance for limitations on the load on farmlands, biological resources, and landscapes;
 - establishing of requirements in regard to environmental safety and implementation thereof into the agricultural management system;
 - ensuring extended restoration of fertility of the soil by way of development and implementation of a set of soil conservancy measures;
 - promotion of environmentally sound way of handling pesticides and agricultural chemicals;
 - elaboration of the mechanism of economic, administrative, and criminal responsibility of agricultural tenants and other users for breach of environmental requirements;

- «programme-purposeful» method of planning, forecasting and arrangement of water industry management;
- compliance with effective international conventions on water management; co-operation with neighbouring countries in the domain of water resources use and conservation, and prevention of harmful impact of water in transborder water bodies;
- extensive involvement of the public in discussion of, planning of, and control over the process of water resources use.

Summary

At present, Ukraine has available strategies of environmentally sustainable development of basic domains and sectors of economy, legally formulated in the programme documents. The problem lies in ensuring of efficiency of these strategies, finalising of mechanism for their implementation. The only solution for this problem is establishing of potent sectoral (corporate) systems of environmental management in compliance with international standards and European regulations with relevant effective economic machinery.

2.8. Innovation policy of development: Environmental perspective

Ukraine is listed among countries with high scientific potential. First of all, our country has generally recognised schools of thought, significant and even unique achievements in numerous spheres: in development of new materials, of biotechnology, in radio electronics, cryogenics, nuclear physics, electric welding, information science, and telecommunications.

Innovation policy of the country is stated in the Law of Ukraine «On Innovation Activity», in the Message from the President of Ukraine to Verhovna Rada of Ukraine «European Choice: Conceptual Grounds for the Policy of Economic and Social Development of Ukraine for 2002-2011», and in the Draft National Doctrine of Innovation Development and Modernisation of the Economy of Ukraine. Unfortunately, environmental aspects were not given priority in these documents. More account of them is taken in the Message from the President of Ukraine to Verhovna Rada of Ukraine.

Meanwhile, it should be mentioned that the National Academy of Sciences acknowledges that environmental protection, pollution-free power engineering and resource-saving technologies are the priorities.

The present day requires extension of environmental priorities along the lines of innovation policy: innovations in the domain of sanitation of the environment and restoration of natural resources; development of environmental innovative business enterprising; creating of eco-socio-technoparks; ongoing improvement of environmental management



systems; building-up of regions' ecological innovative potential and of relevant innovation infrastructures.

Summary

National innovation policy must possess mechanisms not only of technological, but also of environmental anticipation. Besides, its priorities should be in compliance with national environmental policy's priorities as one of the dominants of sustainable development and of the process of environmental shift in life activity of the society.

2.9. Development of ecological education

Ecological education in Ukraine has rich history, from introduction of the first course units of environmental protection and nature conservancy into curricula of different institutes of Ukraine in the middle of 1970s till development and approval of the Conception of Ecological Education in Ukraine (2001) and

elaboration, approval and step-by-step performing of this Conception's implementation schedule for 2002-2005 (2002).

A milestone in the development of ecological education in Ukraine was joint Regulation of the State Committee of Environmental Protection of the Ukrainian SSR and the Ministry of Higher and Specialised Secondary Education of the Ukrainian SSR «On the State of Ecological Education in the Framework of the Ministry of Higher and Specialised Secondary Education of the Ukrainian SSR» (#11/4/210 of April 24, 1990), which approved the «Republican Programme of Ecological Education in Higher and Secondary Special Educational Institutions of the Ukrainian SSR for the period till 2005». In pursuance of this Programme, the number of institutions where professional ecologists were trained greatly increased, the scope of the educational course augmented, and a series of new research lines of practical importance was added, which had to ensure environmental solutions in all spheres of activity.

The next important step was the Decree by the President of Ukraine of September 12, 1995 «On Main Lines of Reforming of the Higher Education System in Ukraine» which set the task to develop the aforementioned



Conception of Ecological Education in Ukraine.

The Conception is a very important regulating official act, which stipulates chief aims and tactical schemes of evolving ecological education in all sections of population, from children to elderly people, aimed at forming of environmental awareness and culture in citizens, acquiring habits and fundamental ecological knowledge. This document provides grounds for development and imple-

mentation of new ecological education programmes both for pre-school- and school-children and for students of colleges, technical schools, institutes, and universities, as well as for managers of institutions and enterprises, specialists in various domains and industries.

Ecological education reforming is executed with obligatory allowance for ecological laws and rules, and for scientific principles, which act concurrently in the biological, social, economic, technological, and military spheres.

Ecological education at institutes depends on the level of the institute's research and educational potential and on regional needs, and is provided within the framework of approved educational programmes for different qualification levels: «junior specialist», «bachelor», «specialist», and «master». The standard of ecological education on «bachelor's» level has been developed recently by experts and submitted for consideration and approval to the Ministry of Education and Science of Ukraine.

In the recent years, the Ukrainian Environmental League has been paying great attention to increase of environmental awareness in people. Over nearly 10 years the National Ecological-Naturalist Centre of Pupils and Students works on ecological education; local ecological-naturalist centres in Zhytomyrska, Zakarpatska, Donetska, Luhanska and other oblasts have also revived their work.

In 1994, the guidance commission on ecological education was established at the Ministry of Education and Science of Ukraine; over the last 10 years this commission did a great and important work, promoting evolution of ecological education.

In 1994, a new specialism of «Ecology» was added to the list of specialisms, in which students were trained at institutes. According to the Regulation by the Cabinet of Ministers of Ukraine #607 of May 24, 1997, professional training is provided in the following specialisms: «Ecology and environmental protection», «Applied Ecology» (by branches), and «Operation of environmental monitoring facilities». Specialists in ecology are being trained in 23 institutes of I-II levels of accreditation and in 52 institutes of III-IV levels of accreditation.

In 2001, a dedicated institute for training of specialists in ecology was established, Odessa State Ecological University, which is the basic branch institute developing manpower for the Ministry of Environment and Natural Resources of Ukraine.

In the last decade, a great number of instructional courses on ecological subjects was developed; prepared and published were dozens of manuals and handbooks on different ecological disciplines, including such new subjects as «Ecological audit», «Environmental monitoring», «Ecological business enterprising», «Environmentally sustainable development of power engineering», «Methods of environmental parameters measuring», «Urban ecology», «Ecological economy», «Ecology and sustainable development», «Environmental management», «Production modernisation: systemic-environmental approach», «Basics of professional training of civil servants and managers in the domain of environmental policy and management» etc.

Summary

Development of the national educational system and its major constituent of ecological education is one driving force in the process of the Ukrainian society's transition to harmonious development.

Upon adoption of the Conception of Ecological Education, reorganisation of education started, using principles of ecologically balanced concordant development.

The priority of ecological education in the nearest future is to resume teaching of the discipline «Basics of ecological knowledge» in all schools of Ukraine. Therefore, arrangements for training of highly qualified school faculty are required, as well as for professional training of civil servants and managers in the basics of environmental policy and management.

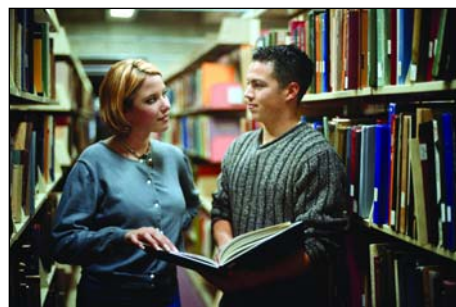
2.10. Environmental partnership development

The major driving forces, on the national level, of the society's life harmonisation and sustainable development of the country include state institutions (legislative, academic, educational, executive), local self-government bodies, non-governmental organisa-

tions, citizens' associations, business groups, and populace. For the time being, these driving forces feature different level of environmental activity and therefore, different level of influence on the society, on the processes of implementation of sustainable development principles. Unfortunately, current situation is that numerous civil environmental organisations and NGOs existing in Ukraine cannot perform their socio-ecological functions in full, since the integral systemic public policy on civil and non-governmental organisations and national environmental partnership is lacking.

The grounds for civil environmental organisations' activity in Ukraine are set in the obsolete Laws of Ukraine «On Citizens' Associations» and «On Natural Environment Protection». Amendments to these Laws with respect to national environmental partnership's development are being prepared and adopted without proper expert justification and without widespread public discussion. Lack of efficient mechanisms and procedures for development of national environmental (as well as general) partnership has detrimental impact on efficacy of national driving forces.

Meanwhile, it should be mentioned that the Ministry of Environment and Natural Resources has available an advanced mechanism of interaction with civil and non-governmental organisations.



Signing and ratification by Ukraine of the Aarhus «Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters» in 1999 incited Ukrainian authorities to develop a strategy enabling them to meet the requirements of

this Convention and stirred up activities of civil environmental organisations.

The Public Council established at the Ministry of Environment and Natural Resources consists of representatives of the national level civil environmental organisations and co-ordinates activities regarding adoption of the Aarhus Convention requirements in Ukraine. The scope of responsibilities of the Public Council includes provision of the community with information on environmental conditions, involvement of the public in legislative activity, civil environmental control, deployment of local branches of the Public Council in oblasts, ecological education and children's environmental movement, and organising of civil environmental actions etc.

Nowadays, approximately 500 civil environmental organisations operate in Ukraine. Specific conservancy measures taken by these organisations are aimed at environment enhancement, municipal improvements and enhancement of adjacent terrain, afforestation of riverbanks, cleansing and water purification in rivers, ponds, springs, and maintenance of reserves and objects of cultural heritage of Ukraine.

Summary

Over the last decade, potent driving forces of the national level accumulated in Ukraine, which are capable of providing significant acceleration of the process of society's life harmonisation and of transition to sustainable development, provided that the integral public policy on national environmental partnership is developed. Numerous instances of effective activity of civil and non-governmental organisations, business quarters, and of local initiatives can be given. They require systemic legal and governmental support. In environmental sphere, more than anywhere else, favourable conditions for development of national environmental partnership emerged.

2.11. Integration into European environmental community

Under conditions of formation of the state of Ukraine and social and economic reforming, national interests of safe life activity is the highest priority. Meanwhile, both the political circle and the community realise that it will be difficult for Ukraine to manage the

environmental after-effects inherited from the past on its own, without proper international aid.

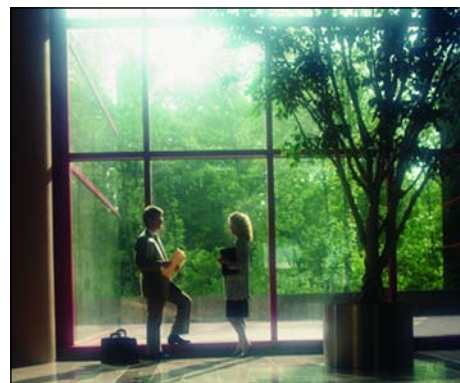
On the other hand, the natural potential of Ukraine is the ecosystem constituent of European natural resources, as such, their conservation and restoration can be regarded as a common cause for Europe. In terms of history and geography, Ukraine belongs to the European environment. Therefore, the crucial factors are the level of advance and implementation of political, economic, and institutional machinery for environmental integration of Ukraine into Europe.

In 2000, the «State Programme of Forming of National Ecological Network in Ukraine for 2000-2015» was adopted.

The Programme was developed in compliance with recommendations by «Pan-European Biological and Landscape Diversity Strategy» (1995). This Programme highlights the issues of forming of the European environmental network as an integral system of European countries' territories with natural or partly changed landscapes.

Unification of the National environmental network with environmental networks of neighbouring countries in the context of the European network is to be executed by way of creating common transborder elements of environmental networks within natural regions and corridors, agreeing the projects on land amelioration in the border zone.

The process of environmental integration of Ukraine into Europe is supported by the



agreement on partnership and co-operation between the European Union and Ukraine, in particular, general policy of the EU regarding Ukraine.

The Ministry of Environment and Natural Resources took active part in elaboration of the issue on environmental protection and nuclear regulation in the Programme of Integration of Ukraine into the EU enacted by the Decree of the President of Ukraine #`1072 of September 14, 2000.

With a view to implementation of the above Decree, the following priority lines were determined in 2000:

- ensuring of public participation in decision making and access to justice in environmental matters;
- development of ambient air's and water's quality standards;
- elaboration of adapted norms and standards for assessment of likely impact of genetically modified organisms on conservation and sustainable use of biological diversity;
- improvement of nuclear units' inspection procedures;
- arrangement for and exercising of supervision over account and control of nuclear materials;
- adherence to principles of nuclear and radiation safety regulation based on the international approach and recommendations of IAEA.

Co-operation with the EU took place in the framework of TACIS programme. Launch of environment conservancy projects within the TACIS programme in Ukraine contributes to higher efficacy of nature conservation measures taken both on governmental and on regional level. It also enables Ukraine to fulfill obligations ensuing from the signed conventions and agreements on environmental protection. The projects implemented within the TACIS programme of environmental protection include:

- development of regional systems of industrial wastes treatment in Ukraine;
- transborder monitoring and water quality assessment of rivers Uzh, Latorytsa, and Western Boog;
- development of municipal economy and public utilities;
- water resources management; conservation of biological and landscape diversity in Bukovyna Carpathians;
- environmental protection in the Black Sea region.

Ukraine is a party to 35 bilateral agreements, 14 of these are inter-departmental agreements. Among the partners of Ukraine are the following countries: Republic of Poland, Republic of Moldova, Hungarian Republic, Russian Federation, Republic of Belarus, Republic of Slovakia, Romania, and Republic of Bulgaria. Significant advance can be observed in the domain of co-operation with the U.S.A., Canada, the Netherlands, Denmark, Germany, Switzerland, and Great Britain. Launched is the process of elaboration of inter-departmental agreements on co-operation in the environmental domain with Estonia, Czech Republic, Greece, Morocco, Argentina, Kazakhstan, and Brazil.

Ukraine concluded an agreement with Poland on transborder conveyance of hazardous wastes (1994) and agreement with Russian Federation on co-operation in issues of mercury-bearing wastes (1997). In 1993 Ukraine signed the frame agreement with Republic of Moldova on co-operation in the environmental domain. Both countries also signed a separate agreement on use and conservation of transborder water bodies. Implementation of these agreements will help to protect the Dniestr River against pollution. Joint workgroup has been organised, which is to control the adverse impact of technogenic factors on this river.

Ukrainian-Dutch co-operation covers environmental management, development of nature reserves, water resources management, and of late - climate change. Bilateral agreements with the Netherlands and Switzerland deal with water purification projects in Odessa and on sugar refineries, and with reconstruction of pump stations in the town of Mariupol on Azov Sea. Co-operation with Denmark resulted in pilot projects on building of toxic wastes processing plants in industrial regions of Ukraine, the project of «clean technologies» in engineering industry of Ukraine etc.

Bilateral relationships are of especial importance with respect to sharing experience in resolving environmental problems and principles underlying national environmental policy.

In September 1997, representatives of Belarus, Bulgaria, Estonia, Latvia, Lithuania, Poland, Moldova, Romania, Slovakia, and

Ukraine signed the Torun Declaration on co-operation in the domain of environmental protection among countries of Eastern and Central Europe. The parties committed themselves to developing of co-operation in all spheres of environmental protection, including climate change, energy and health problems, monitoring of environmental conditions, general and institutional issues of environmental policy, support for regional strategies of sustainable development. Representatives of signatory powers conduct yearly meetings with the purpose of sharing information and experience.

Bearing in mind strengthening of economic relations between countries participating in the Central European Initiative (CEI) and Black Sea Economic Co-operation (BEC), development and implementation of specific projects on environmental protection, Ukraine vigorously makes use of the potential of co-operation in the frameworks of these groups.

Summary

Being an integral part of the European environment, Ukraine carries out zealous policy of integration, both into the European Union and on bilateral basis. A number of agreements (bilateral and multilateral) have been signed and are in the process of implementation, as well as joint programmes. Fulfilled are obligations of Ukraine under the terms of Memorandum on Mutual Understanding between the governments of «Great Seven» countries, European Commission, and Ukraine with respect to shutdown of Chornobyl nuclear power plant. Unfortunately, European partners of Ukraine neglect the Plan for improvement of objects' safety at the Chornobyl power plant after its shutdown. This poses a new man-caused environmental threat not only on the national scale, but on the European scale as well.



3. NATURAL-RESOURCE POTENTIAL OF UKRAINE

The territory of Ukraine has unique complex of physical-geographic, landscape, hydrologic, structural-geologic and other features that enabled formation of a significant number and volumes of natural resources. Presence of several geographic-climatic zones and location of the territory within water catchment areas of two seas - Black and Baltic ones - cause significant alteration of hydrographic network, vegetative cover, fertility of soils and other indices of the natural-resource potential.

According to the assessments of the Council for Study of the Productive Forces of Ukraine, the most valuable resources are land (72 %) and mineral raw materials (26 %).

However, it does not reduce economic and ecological significance of water, timber, recreation resources, fauna, and flora as necessary contributors to life activity and balanced development of the state.

Significant amount of natural and recreation resources in the territory of Ukraine has unsurpassed economic and environmental parameters. To the latter relate first of all a unique mass of black soil (20 % of the world resources), reserves of high-quality caking coal in the Donbas region, sources of mineral waters in Carpathian province (several

dozens of mineral water types), including known in the world water of «Naftusia» type, as well as deposits of medical brine and mud in the areas adjacent to the Black sea.

Present situation in the use of natural resources is to a great degree inherited from the practice used in previous times, especially in technogenically overburdened areas of Ukraine. At the same time one can count on increase of the natural-resource potential provided correct policy of natural resources reproduction is followed.

3.1. Land Resources

Ukraine occupies the biggest territory in Europe; qualitative composition and bioproductivity of its soils is one of the richest in the world. High natural productivity determines leading role of the land stock as one of the most important resources and the most valuable part of the national wealth.

At the beginning of the year 2003 land stock of Ukraine made up 60.4 mln hectares. A significant part of the land area (69.3 % or 41.8 mln ha) belongs to agricultural lands 78 % of which (32.5 mln ha) are arable lands (see table 3.1).



Changes in land-use in the process of land reform (data of Landsat satellite).

Table 3.1. Land Stock of Ukraine

Types of Basic Lands, Functional Use	Area of Lands	
	Total thous. ha	% Total Territory
Agricultural Lands	41854,3	69,3
Including:		
Arable Land	33080,9	54,8
Perennial Plantations	1000,5	1,6
Hay Fields and Pastures	7772,9	12,9
Forests and other areas covered with woods	10380,2	17,2
Including:		
Covered with forest vegetation	8874,8	14,7
Not covered with forest vegetation	180,7	0,3
Built up Lands	2336,9	3,9
Including:		
Lands Under Residential Buildings	427,7	0,7
Lands Under Industrial Buildings	334,2	0,6
Lands Under Public Buildings	221,3	0,4
Lands under streets, squares, embankments	519,6	0,9
Lands Under Transportation Facilities	459,0	0,8
Open swampy lands	940,4	1,6
Open Lands Without Vegetation Cover or With Insignificant Vegetation Cover (Sands, Steep Slopes, Areas Under Landslides, Broken Stone, Pebble, Bare Cliffs)	1168,5	1,9
Other Lands	1259,5	2,1
Total Area of Lands (Earth)	57939,8	96,0
Water Areas (Territories Covered by Surface Water)	2415,0	4,0
All Together (Territory)	60354,8	100,0

Agricultural utilization of the territory achieved 72 %, ploughed up area makes up 56%.

To the most important criteria of the soil quality relates humus content. Studies of the soil layer conducted in 1981 showed that average humus content in the plowed land made up 3.2 % (124.8 tons per 1 ha). Soils with the highest humus content are concentrated in Kharkiv region - 4.9 % of humus (191.1 tons per 1 ha), Kirovograd and Dnipropetrovsk regions - 4.5 % (175.5 tons per 1 ha). At the same time the studies have shown that almost in all regions is observed reduction of the humus content in soil layer.

Land stock of Ukraine is characterized by high bioproductive properties. According to scientific estimates the state can provide with foodstuffs 300-320 mln people provided optimum structure of land use and respective level of farming agriculture are achieved.

State monopoly to the land is the main handicap on the way to development of market economy in the country that caused the need to conduct land reforms from the very first days after the country gained independence.

De-monopolization of the land ownership started in the country after adoption of the Land Code of Ukraine (edition of 13.03.92). Collective and to a limited degree private ownership to land were legalized. It was declared that all forms of ownership enjoy equal rights.

Constitution of Ukraine adopted in 1996 determined land (i. 13) as the main national wealth put under a special protection of the state.

Processes causing changes in the present land-use system in the agricultural sector of Ukraine are of reformatory character and targeted at three main goals - ownership refo-

rmation, equitable development of land management methods, and improvement of the land use efficiency. Much was done during the period from 1992 through 2002 to achieve these goals.

An updated, brought into agreement with the norms of Constitution of Ukraine, market oriented Land Code adopted on October 25 2001 makes it possible to completely include land as one of the main means of production into economic turnover.

As of 01.01.2002 structure of the land stock of Ukraine looks as follows (see diagram 1).

According to the data of State Committee for Land Use (Derzhkomzem), irrigated lands occupy 2329.7 thous. ha, i.e. 3.9 % of the territory of Ukraine, including: agricultural lands - 2323.9 thous. ha (arable land - 2244 thous. ha, long fallow - 0.2, perennial plantations - 67.3, hay lands - 2.8, pastures - 9.6 thous. ha), forests and other areas covered by woods - 0.4 thous. ha.

During last decade area of irrigated lands which are not watered at all increased almost four-fold, norms of agricultural crops watering have also reduced thus causing reduction of hydro-environmental load on the soils.

Structure of the land stock includes 3296,9 thous. ha of drained lands common in the territory of 19 regions of the country (except Dnipropetrivs'k, Kirovograd, Mykolajiv,

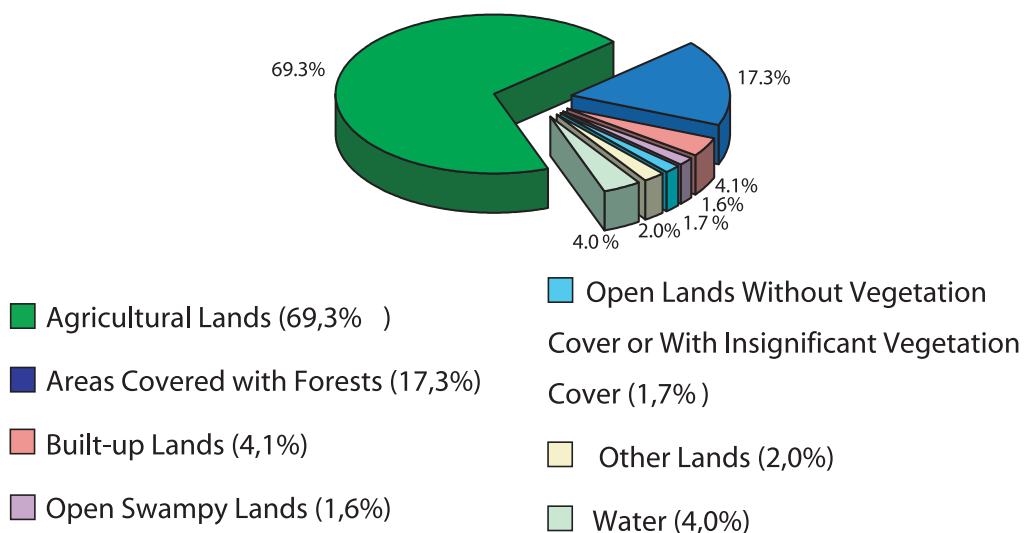
Kherson, Zaporishje regions and Autonomous Republic Crimea). The biggest areas of drained lands are located in L'viv, (513.2 thous. ha) Zhitomir (425.4 thous. ha), Volyn' (416.6 thous. ha), Rivno (390.4 thous. ha), and Chernihiv (300 thous. ha) regions.

State of the drained lands in recent years was rather complex because agro-technical and agro-reclamation measures (chemical reclamation, drainage, etc.) were carried out on a very limited territory.

Special attention is paid to the state of water-logged lands which require special attention concerning support of their important functions in regard to formation of water conditions, microclimate and other peculiarities of the location, preservation of bio-variability, etc.

Legal acts of Ukraine establish a set of limitations in regard to the use of waterlogged lands. According to the decree of the Cabinet of Ministers of 08.05.1996 No 486 «On Approval of the Procedure for Determining Size and Limits of the Water Preservation Zones and Conditions for Conducting Economic Activity on the Latter» flooded areas together with the first terraces located above flooded areas, embankment shoulders and steep banks of the rivers, adjacent gorges and ravines are obligatory a part of water preservation zones and, as a result, are

Diagram 1. Land Stock Structure of Ukraine



the territories to which relate limitations established by the legislation in regard to these zones. «Water Code of Ukraine» determines additional requirements concerning use of flooded areas of small rivers, in particular; prohibition of ploughing up and application of chemical substances, construction (except hydro-technical, hydro-metric and line structures), gardening, and truck farming.

Lands of mountainous and foothill territories have unique natural features, especially concerning their biologic and landscape diversity, bio-resources, sanitation and recreation potentials, etc. formed under influence of various climatic and relief conditions. The area of mountainous and foothill territories makes up about 7 % of the territory of Ukraine. Forest conservation degree on the mountainous and foothill lands is about 46 %.

Structure of lands in Ukraine gradually changed during last decade. The area of arable lands in all groups of owners and users reduced by 1034.0 thous. ha; at the same time area occupied by long-fallow lands increased by 431.2 thous. ha.

It is a positive trend because the area of ploughed up lands in Ukraine exceeds environmentally substantiated limits. Arable lands occupy 56.2 % of total area of the land in Ukraine while in developed European countries this index does not exceed 30-32 %. Almost 20 years ago appeared a scientifically substantiated concept according to which it was necessary to reduce area of arable lands in Ukraine by 6-8 mln ha and to

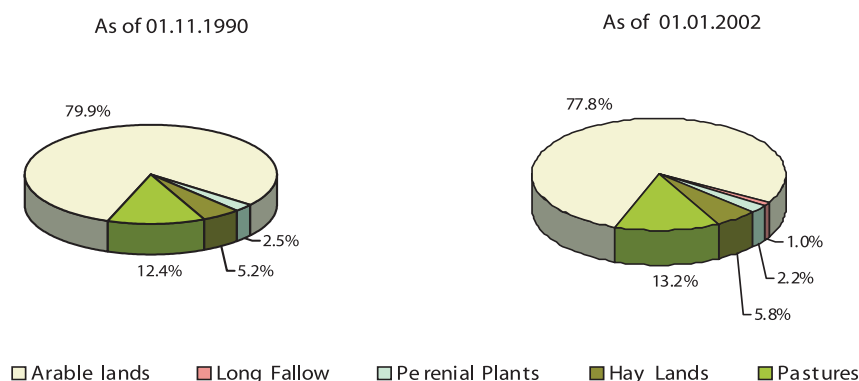
arrange meadows and forests on the withdrawn from cultivation lands. It was proposed to arrange meadows first of all on low-productivity faintly and medium washed out slope lands having slopes up to 5°-7°. Forests had to be planted on degraded strongly washed out arable lands with slopes exceeding 7°. Structure of agricultural lands in Ukraine is given on diagram 2.

At present in state ownership remain 49.7 % of the land stock of Ukraine. These are mainly non-agricultural lands. Diagram 3 shows dynamics of property in land forms development.

During the period from 1992 through 2002 essential changes have taken place in ownership of agricultural lands. Only 28.9 % of agricultural lands of the country remained in state ownership as of 01.01.2002. These lands were mainly used for scientific and training purposes, as well as for seed growing, carrying out breeding activity, growing of medicinal plants, and production of specific kinds of agricultural products. Distribution of agricultural lands on the basis of forms of ownership is given in diagram 4.

At present primary privatization of agricultural lands in Ukraine is mainly over - non-state-owned agricultural enterprises were allocated 30 mln ha of lands which were divided into shares among members thereof. Their cost is about 260 billion hryvnas. As of 01.02.2003 seven million peasants became owners of the certificates which entitled them to a land lot (share). More than 46.2 % of them have already received state acts confirming their title to the land.

Diagram 2. Structure of Agricultural Lands in Ukraine, %



So, practically a new market land system is established in Ukraine based on the private ownership to land, market forms of economic structures, paid land use, possibility of market-type turnover of various designation lands.

3.2. Water Resources

Ukraine has 63119 rivers, including 9 big ones (water catchment areas above 50 thous. km²), 81 medium ones (from 2 to 50 thous. km²), and 63029 small ones (less than 2 thous. km²). Their total length is 206.4 thous. km, 90 % of which fall on small rivers. Geographically almost all river basins (except South Bug) belong to international water basins - the fact that stipulates activity of transboundary water-environmental relations and need for accelerated development of the basin water resources management (table 3.2).

Water stock of Ukraine includes about 8073 lakes and firths, the total watertable area of which is 4021.5 km², the watertable area of firths is 1073 km². The number of water bodies that have water volumes of 1 mln km³ and more is 944. A relatively small part of the territory is occupied by the swamps, swampy terrain and excessively humidified lands - 3.6 mln ha, but they play a significant resources-stabilizing role. Water resources of Ukraine are distributed as follows.

The most arid regions:

Lugans'k, Dnipropetrovs'k, Donets'k, Zaporizhia, Kirovograd, Mykolajiv, Odesa, Kherson regions, and Autonomous Republic Crimea.

Normally humidified regions:

Vinnytsia, Volyn', Zhytomyr, L'viv, Rivno, Sumy, Ternopil', Khmel'nyts'k, Chernihiv, Kyiv, Cherkasy, Poltava, and Kharkiv

Diagram 3. Dynamics of Property in Land Forms Development

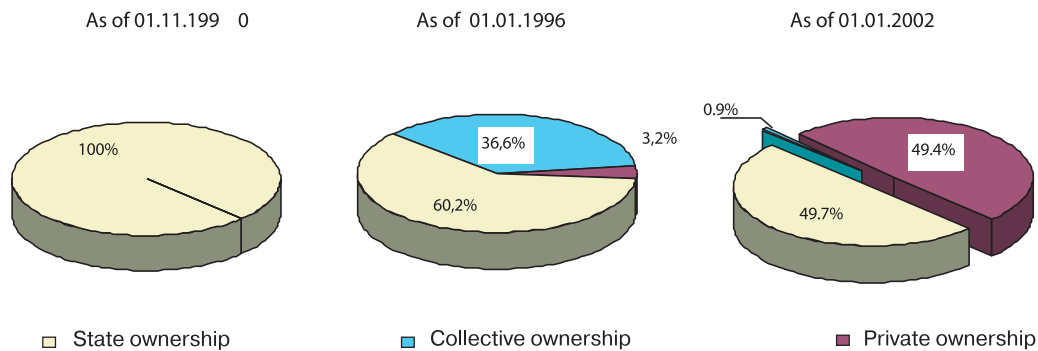
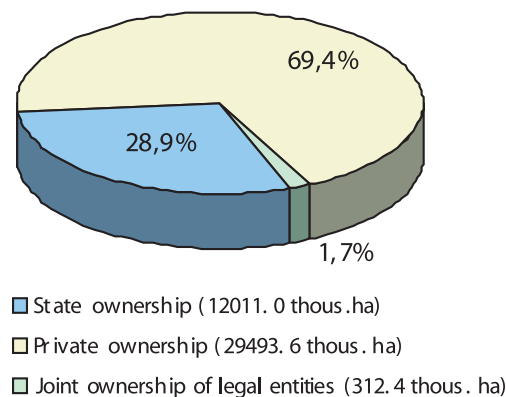


Diagram 4. Distribution of Agricultural Lands According to Forms of Ownership, %



regions.

The most humidified regions:

Zakarpats'ka, Ivano-Frankivs'k, Chernivtsi regionsi.

Interstate water bodies:

The Dnipro, Sivers'ky Donets', the Dniester, the Danube, West Bug.

Ukraine belongs to the least provided with water resources European countries. Its main component is river run-off. Average total annual hydraulicity is 87.1 km³.

Significant water resources are concentrated in lakes of Ukraine located all over its territory. According to approximate assessments volume of water in fresh-water lakes reaches 2.3 km³ while in salty lakes and firths it reaches 8.6 km³. The swamps contain about 30 km³ of water that belongs to the category of bound ancient reserves.

Predicted resources of fresh underground waters make up all together 20.9 km³ per year, while operational resources make up 5.7 km³. Balance reserves of underground waters that are not hydraulically connected with the surface run-off and are additional water resources of local formation make up about 7 km³. The biggest volumes of underground waters occur in the basins of the Dnipro (61 %), Sivers'ky Donets' (12 %), and the Dniester (9%). The economy uses besides fresh water about 1 km³ of sea water.

At present water of the majority of water bodies of Ukraine is classified as polluted

and dirty one (IV-V quality class). The most critical situation is observed in the basins of rivers Dnipro, Sivers'ky Donets', rivers of the Sea of Azov basin, certain tributaries of the Dniester, West Bug where water is classified as very dirty (VI class). Environmental and metabolic regress are peculiar features for majority of water body ecosystems of Ukraine. It is to a great degree connected with technogenic pollution and ploughing up of water catchment landscapes.

A trend of underground water quality worsening continues to exist as a result of bringing pollutants with wastewater into underground aquifers and intensive exploitation of productive aquifers. Polluted sections of underground water occur mainly in the areas where big industrial and agricultural enterprises are located, first of all, surface waste disposals (storages, ash dumps, tailing dumps, slurry ponds, etc.). More than 290 underground water pollution centers were detected in Ukraine in main aquifers, and in more than 90 operable water intakes is observed a progressive worsening of water quality. Underground waters which continue to remain main reliable source of water supply, especially in rural areas, not always meet requirements set for potable water first of all as a result of increased content of nitrate and phosphorus compounds and bacteriological pollution.

Oxygen conditions in the rivers of Ukraine were satisfactory except local and short-

Table 3.2. Main Characteristics of the Biggest Rivers of Ukraine

River Names	Length, km		Water Volume in the Main River Bed, km ³	Basin Area, thous. km ³	
	Total	Within the Country		Total	Within the Country
The Dnipro	2200	981	53,9	504,0	291,4
The Dniester	1360	705	10,0	72,1	52,7
Sivers'ky Donets'	1053	700	4,5	98,9	54,5
South Bug	806	806	3,4	63,7	63,7
The Danube including Kilija Branch	2900	174	214,0	817,0	64,0
	-	-	123,0	-	-

*) Data of the Department of hydro-meteorological service and monitoring of the Ministry of Environmental Resources.

term reduction of oxygen content in waters of certain rivers in summer time. The latter phenomenon is explained by reduced solubility of oxygen at high water temperature.

In prevailing majority of river basins of Ukraine, it is observed a favorable trend to reduction of mineral compounds of nitrogen (nminer.) that determine the level of the natural waters eutrophication. Previous year content of nminer. in the rivers of Crimea didn't change and in the waters of the Dnipro its content has reduced.

In waters of the Danube, South Bug, the Dniester, rivers of Crimea and basin of the Sea of Azov insignificant reduction of mineral compounds of phosphorus was observed.

In waters of the Danube, the Dnipro, and West Bug reduction of the dissolved organic substances concentration was observed, while in the runoff of the Dniester and South Bug their content increases.

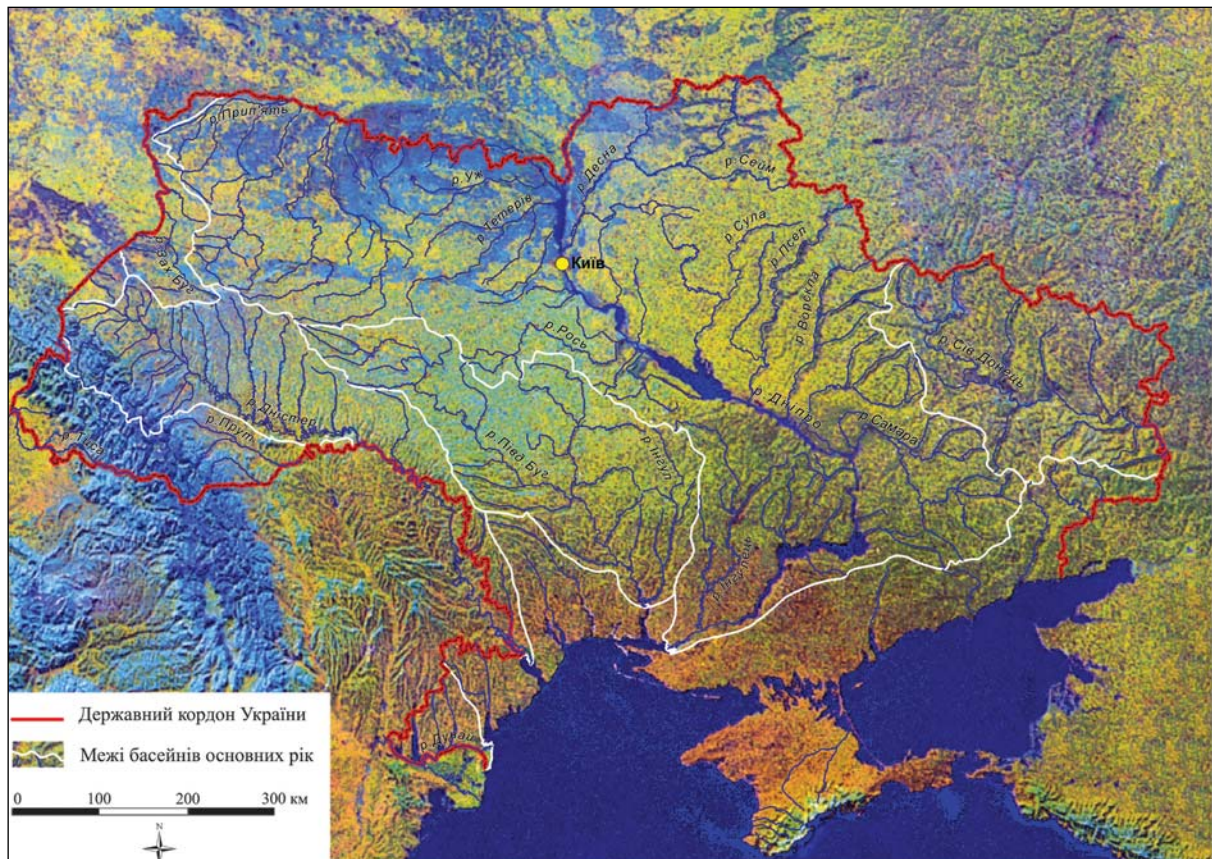
There is a trend towards reduction of surface waters pollution with heavy metals in a majority of rivers of Ukraine. The highest content of copper and manganese in 2001

was observed in the basin of the Dniester; zinc - in waters of South Bug and Sivers'ky Donets'; chromium - in the basin of West Bug. The lowest content of all metals in water environment, except copper, was registered in water bodies of Crimea.

At the same time a certain concern causes an appreciable increase of phenol content in water. It is peculiar first of all to the rivers of the Sea of Azov basin - the fact that can be connected with influence of mining areas of the Donbas.

An impeding factor for using water resources is their changeability in time: under natural conditions on spring run-off falls 60-70 % in North and North-East and up to 80-90 % in South thereof.

Territorial distribution of water resources does not correspond to location of water-retaining branches of economic complex of Ukraine. The largest number of water resources (58 %) is concentrated in the rivers of the Danube basin in the border areas in which need in water does not exceed 5 % of their total reserves. The least



Map-scheme of drainage network of Ukraine (space photographs of NOAA satellite).

provided with water resources are the Donbas, Kryvorizhja, Crimea, and South regions of Ukraine in which are located the biggest consumers of water.

Territorial and time run-off non-uniformity is removed by means of 1.16 thous. water reservoirs (total volume is almost 55 km³), more than 28 thous. artificial ponds, 7 big channels (total length is 1021 km, throughput 1000 m³/s) 10 big water ducts by means of which water is supplied into the areas which lack water. Water reservoirs of the Dnipro cascade (usable volume of 18.7 km³) provide for more than half water consumption volume of Ukraine.

Multi-branch complex created in Ukraine consumes in the process of production significant volumes of water resources although within the last decade gross need in water reduced by 40 %. The needs are met by intake of fresh water from the surface (24 %) and underground (3 %) sources, mine (about 2 %) and sea (more than 1 %) water, as well as due to the use of water included into the circulating water supply systems (70 %) (table 3.3).

Recent years volumes of water included into circulating water supply systems have stabilized - 41.3 km³, irreversible water intake being 5.3 km³ or 31 % of the total volume of taken fresh water.

3.3. Forest Resources

Ukraine has small area of forests and lacks its own timber resources. According to the data of the State Committee for Forestry of Ukraine, area of forests in its territory is 10.8 mln ha including 9.4 mln ha of lands covered with forest vegetation the total timber reserves of which equal 1.74 billion m³. Timber reserves are assessed in national equivalent approximately at the value of 3.4 billion USD, and according to the world prices their value is 27 billion USD. During the last decade a positive dynamics in change of the forest stock area is observed. Beginning from 1996 this area has increased by 45.5 thous. ha (Fig. 3.1).

The biggest forest masses are concentrated in Polissia (Zhitomir, Rivno, Kyiv, Chernihiv, and Volyn' regions) and Ukrainian

Carpathians (Transcarpathian, Ivano-Frankivs'k, L'viv, and Chernivtsi regions). Extremely insufficient areas of forestlands are in Mykolajiv, Zaporizhia, Kherson, Dnipropetrovs'k, Odesa, Kirovograd, Donets'k, and Poltava regions (Fig. 3.2).

Beginning from 80-th of the previous century forests in Ukraine started to be mainly used for environmental-public purposes. Sixty five percent of the total area of forests (6.96 mln ha) are used for this purpose. These are mainly forests of the 1st group that carry out sanitation-hygienic (18.7 %), protection (30.4), and water-protection (3.6) functions, as well as forests of special designation (3.1 %). To this category also relate protection parcels of forests of the 2nd group (8.7 %). The rest forests are forests of the 2nd group, which belong to the category of commercial ones. They are distributed on regional basis. For example, in the industrial Donbas, Dnipro- and Black sea-adjacent areas lacking forests, as well as in Crimea, all forests are mainly used for environmental-public purposes.

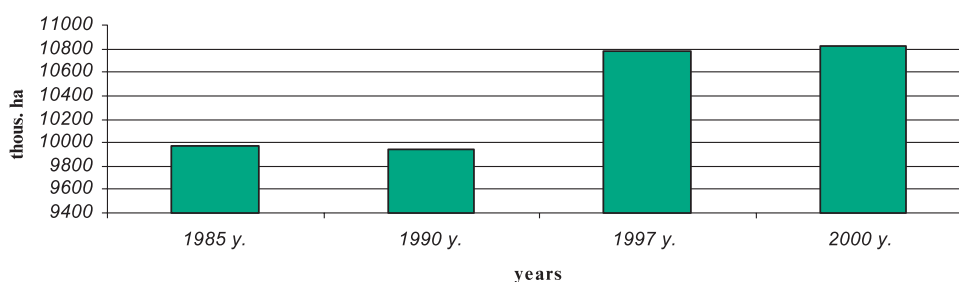
It should be taken into account that percentage of forests in Ukraine makes up 15.6 %, i.e. it is almost three times less than percentage of forests in West Europe (43.2 %). So, this percentage is not an optimum one (20-22 %) when forests as the most complex and the most powerful vegetation group can effect most positively climate, soils, erosion processes, and provide economy with necessary volumes of timber (table 3.4). According to the latest assessments the area of forests has to be increased at least by 2-2.5 mln ha in order to get optimum level of forest percentage.

Average reserves of timber per 1 hectare of the lands covered with forests equal 186 m³ and are much less than in Switzerland (278 m³/ha), Austria (234 m³/ha), Rumania (251 m³/ha), Check Republic and Slovakia (217 m³/ha). Average increase of these reserves per 1 ha of lands covered with forests is 3.8 m³/year.

Age-old structure of forest plantations in Ukraine is not able to ensure sustainability, continuity and uniformity of forest exploitation because in it prevail young and middle aged forest stands, and the area of maturing, mature, and overmature plants is below

Table 3.3. Use of Water Resources in Ukraine in 1990 – 2001, mln km³

Index	Years				Water Use Indices (percentage relative 1990)		
	1990	1995	2000	2001	1995 .	2000 .	2001 .
Water Intake	35615	25852	18282	17577	73	51	49
Including							
- surface sources	29294	20681	14479	13954	71	49	48
- underground water	5200	4305	2987	2750	63	57	33
- sea water	1121	866	817	872	77	73	78
Losses in the course of transportation	2424	1946	2477	2328	80	102	96
Volumes of water used for the following purposes:	30201	20334	12992	12168	67	43	40
- economic and running water systems	4646	4404	3311	3041	95	71	65
- industrial use	16255	10417	6958	7033	64	43	43
- irrigation	6958	3469	1699	1158	50	24	17
- agricultural water supply systems	1697	1331	512	381	78	30	22
Volumes of water discharged into water bodies	19329	14175	10517	10136	73	54	52
Including							
- polluted water	3199	4652	3313	3008	145	104	94
Irreversible use of water from water bodies	14630	9630	5962	5267	66	41	36
Circulating and repetitive sequential water supply	67661	51054	41523	41334	75	61	61
Gross need in water	103276	76906	59805	58911	74	58	57
Treatment plants capacity	8131	8419	7992	7790	103	98	96

**Fig. 3.1. Change of the Forest Stock Total Area**

the optimum level. However, the share of mature forests has lately increased from 6 % to 11 %.

3.4. Atmospheric Air

State Hydrometeorologic Service carries out on regular basis monitoring of 54 large and small towns and 13 agglomeration industries that are mainly concentrated in

the Donets'k-Dnipro adjacent industrial regions and characterized by high levels of discharge into the atmosphere of not just classic pollutants, but also cancerogenic substances.

In general during recent years annual concentrations of dust, nitrogen oxides, sulfur dioxide and carbon oxide reduced together with the level of pollution. However, they frequently exceed 1.1 times and more maximum permissible concentration levels

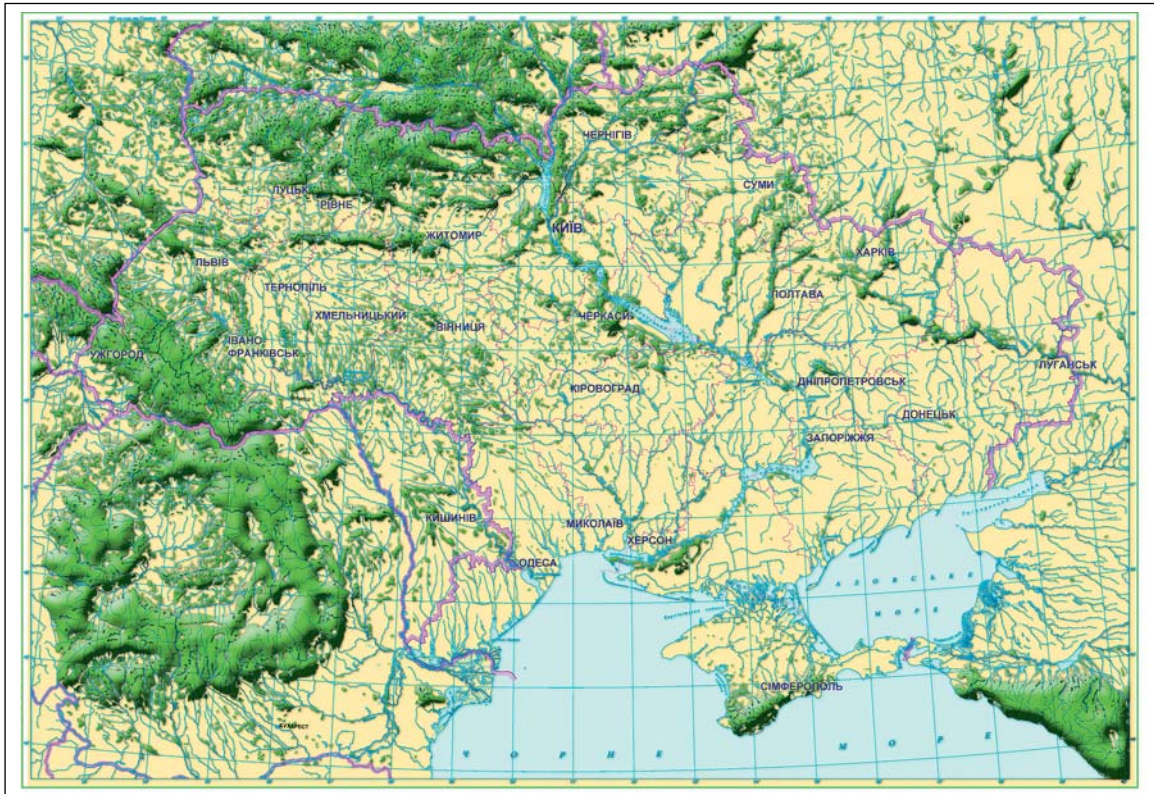


Fig. 3.2. Map of Forests of Ukraine

Fig. 3.2. Map of Forests of Ukrain

Natural Zone	Percentage of Forests in the Past	Percentage of Forests at Present	Optimum Percentage of Forests
Ukraine	44.4	15.6	20-22
Including			
Polissia	72.8	26.8	32
Forest steppe	52.0	13.0	18
Steppe	20.0	5.3	9
The Carpathians	76.0	42.0	45
The Crimea	14.2	10.4	19

established by the Ukrainian standards of air quality. For example, excess of nitrogen dioxide was observed almost in all big cities, and in general annual measurements of various pollutants conducted twice a year indicate that concentration of at least one substance exceeds maximum permissible levels. It mainly concerns toxic air pollutants.

Comparison of measurement data with the standards included into Recommen-

ations of the World Health Organization indicating air quality in Europe show that air quality in regard to classic pollutants, except nitrogen oxides, improves. Concentrations of SO_x and CO are within the values established by the Recommendations because WHO standards in regard to these substances are less stringent. However, even WHO standards are exceeded in almost all big cities of Ukraine when we speak about

specific and toxic pollutants. The worst general situation is observed in Kyiv, Kharkiv, Dnipropetrovs'k, Donetsk, Kryvyi Rig, L'viv, Mariupil', Odesa, and Zaporizhia.

The concentrations in wet precipitation in the territory of Ukraine correspond in majority of cases to the main natural values. The highest concentration of pollutants in precipitation was observed in the Donetsk region. Acid precipitation was observed in Autonomous Republic Crimea and Odesa region (pH value was below 4.5), while in Volyn' and Chernihiv regions, and cities Kyiv and Lviv low-acid precipitation was detected within 4.5 - 5.5 pH.

Besides, six stations located in Kyiv, Boryspil', Boguslav, Odesa, L'viv and the Karadag natural preserve in Crimea conduct monitoring of general ozone concentrations and state of the ozone layer. Long-term results confirm aggravation of the ozone deficiency that can worsen environmental conditions especially during the period of biologically active solar ultraviolet radiation (spring-summer seasons).

3.5. Bowels and Territories in which Minerals are Produced

As of 01.01.2003 mineral basis of Ukraine includes about 20010 deposits and manifestations of 113 kinds of minerals, 7892 of which contain 97 minerals, are commercially important and included into the State Balance of Ukraine. The estimated value of reserves of the deposits explored in the second half of the XX century is 7 - 7.5 trillions USD. From 40 % to 75 % of explored mineral reserves are produced at commercial level. Iron ore reserves constitute 14 % and manganese ore reserves more than 43 % of the world reserves. Ukrainian reserves of titanium, zirconium, uranium, lithium, graphite, kaolin, fire-proof clays, sulfur, potassium salts, decorative stones, etc. are among the biggest in the world. Ukraine is also one of the leading producers of a great number of minerals: coal, manganese and iron ores, titanium, graphite, kaolin, etc. (Fig. 3.3).

Mineral - raw material complex of Ukraine is one of the most important components of

national economy. About 5 percent of the world volume of mineral -raw material resources are produced in Ukraine, and annual production of the mining industry makes up 25-28 billion USD (in prices of the world market).

Coal is produced in Ukraine in three coal basins - the Donbas, L'viv-Volyn' basins (bituminous coal) and Dnipropetrovs'k brown coal basin. Complex environmental situation existing in the coal mining regions is caused by the fact that each third mine operates for more than 50 years. Mining operations are carried out at depths up to 1400 m.

Total area of coal basins is about 160 000 km² (26 % of the territory of Ukraine), in particular, the area of the Donbas is 50 000 km², total area of mines is 13000 km² while about 12000 km² of them are in the Donbas.

Iron ores are produced in Ukraine at Kryvoriz'ke, Kremenchuts'ke and Bilozirs'ke deposits, manganese ores are produced at Nikopol' deposit.

State Balance of Ukraine takes into account raw oil, gas, and gas condensate reserves of 323 fields. Main bulk of them (191) is concentrated in East region, 96 fields are located in West region and 36 - in South region.

During recent years on average 4 mln tons of raw oil with condensate and 18 billion m³ of gas were produced annually in Ukraine - the values which constitute 10 % and 20 %, respectively, of the raw materials consumed by the country.

Deposits of native sulfur are located in Ukraine within L'viv and partially Ivano-Frankivs'k regions. Beginning from 50-th of the XX century Rozdil'ske deposit, from 60-th - Podorozhnens'ke, and from 70-th - Jazivs'ke and Nemyrivs'ke deposits started to be developed. At present quarrying of sulfur is stopped because of a number of economic and environmental problems. Sulfur is produced on a limited scale (2 deposits) using only the method of underground smelting.

In major part of the regions of Ukraine resources of underground hydrosphere are an important factor for stabilization of hydro-environmental situation.

Forecasted resources of fresh underground waters in Ukraine make up 61689.2 thous. m³/day, 57499.9 thous. m³/day of

which have mineralization level up to 1.5 g/dm³ which makes them suitable for potable water supply. As of 01.01.02 373 underground water fields were explored which include 977 locations with commercial reserves approved by the state standards of USSR and Ukraine in the amount of 15829.8 thous. m³/day.

At present 152 locations of the mineral water fields are explored and their reserves are approved. Their total commercial resources make up 64865.7 m³/day. Mineral water fields were found in all regions of Ukraine except Ivano-Frankivs'k and Sumy regions.

As of 01.01.2002 two thermal water fields (underground water with a temperature above 20°C) were explored in detail in Ukraine - Beregivs'ke in Transcarpathian region and Novoselivs'ke in Autonomous

Republic Crimea. Thermal water reserves in Beregivs'ke field make up 0.871 thous. m³/day according to the category C₂.

At present Ukraine gradually solves complex problems connected with environmental re-cultivation of a great part of mining districts caused by the previous extensive development of industrial sectors and resource-consuming technologies. Environmental problems caused by outdated technologies and worn fixed assets consist in accumulation of huge volumes of industrial waste which transform into technogenic resources, significant losses of mineral raw materials (up to 70 % of oil reserves, 50 % of salts, 28 % of coal, 25 % of metals remain in the bowels), high anthropogenic load on the environment, violation of the geologic environment, hydro-geologic, and hydrologic conditions stability against the

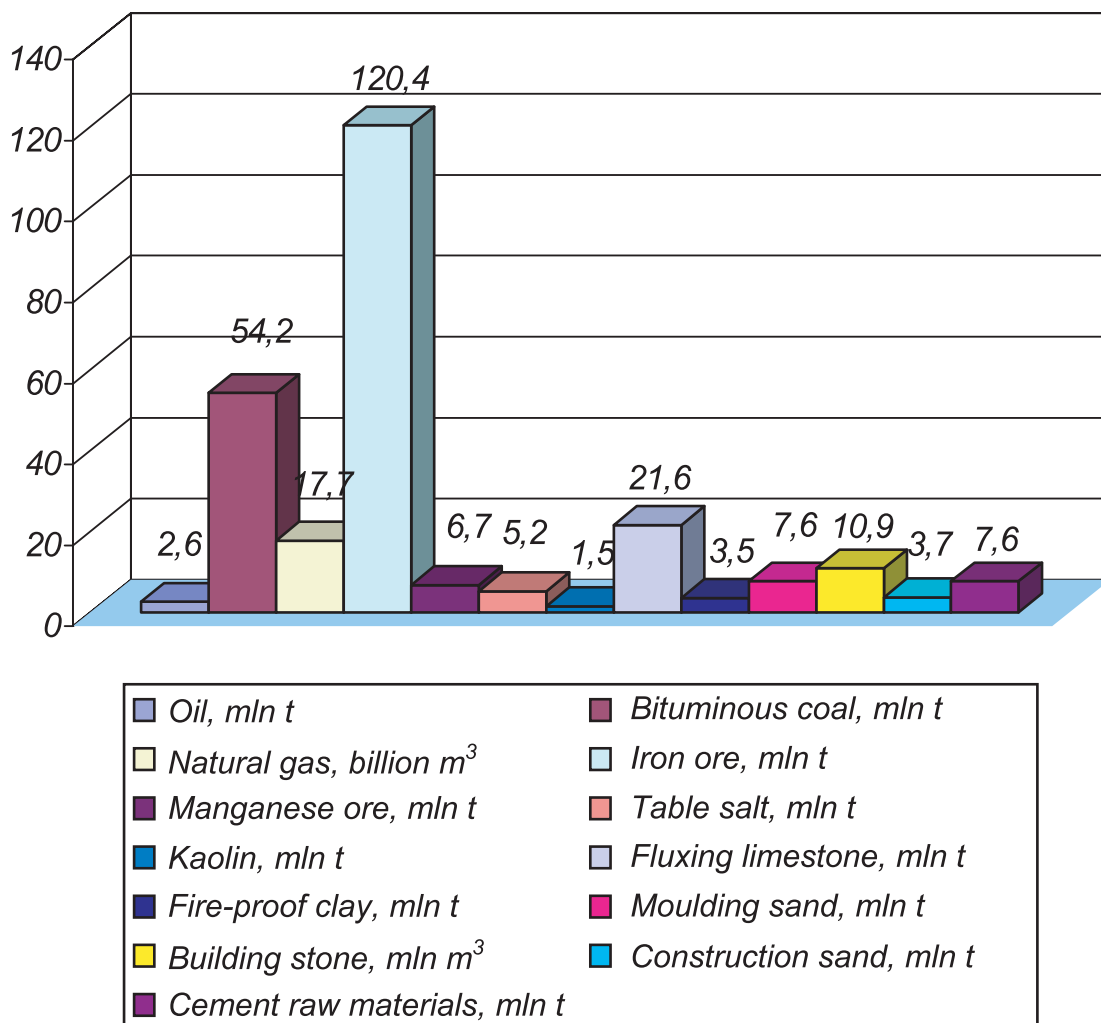


Fig. 3.3. Production of Main Types of Raw Materials in 2001

background of rather limited water resources.

Mineral-raw material basis of Ukraine has a significant economic potential capable of ensuring further development of national economy under market conditions. The most important task on the way is ensuring of a balanced restructuring of developed mining regions and formation of new developed regions with the use of state-of-the-art geologic-economic models and comprehensive monitoring of the bowels.

3.6. Biological diversity in Ukraine

While occupying less than 6% of the area of Europe, Ukraine holds approximately 35% of its biological diversity due to location at the junction of various natural zones and covering of the crossing of animals' and plants' migration paths. Relatively small surface area contains four natural zones: broad-leaved woodlands, forest-steppe, steppe, and Mediterranean

zones. Potent ecosystem of the Dnieper River and variety of landscapes is also a characteristic feature of Ukraine.

Different zones in Ukraine, if judged by estimated biological diversity, can be ranged in ascending order as follows: meadows, marshes, wetlands, steppes, and woodlands. Given significant area of agricultural lands (up to 70% of the total area of lands), a major part of biological diversity remains associated with man-changed ecosystems; however, the situation changes for the better owing to nearly permanent increase in the total area of reserves and buffer zones (see Fig. 3.4).

Ukraine is inhabited by representatives of over 70,000 taxa. The Red Book of Ukraine contains 511 species of plants and 382 species of animals. Over 3,500 aggregations of plant formations are distributed across the territory of Ukraine. According to the Green Book of Ukraine, 126 plant formations are considered to be rare or threatened with extinction.



Kryvyi Rig iron ore mining quarries

Experts from Europe (Atlas Flora Europaeae, 1999) state that Ukraine is situated in the sector of Europe where the density of genetic diversity ranges between 23 and 430 conventional units, the top index is characteristic of the Carpathians and Crimean highlands. Compared to some neighbouring countries, the taxonomic core of Ukrainian biodiversity has certain advantages; this makes our country to some extent responsible for ensuring biodiversity preservation in Pan-European context (see Table 3.5)

Note. The data presented in the table were obtained from printed sources and via Internet, including the web-site of the European Centre for Nature Conservation (ECNC).

It is obvious that figures shown in the table are just estimates, as we deal with living beings. Ambiguous research data available in Ukraine, with respect to the list and number of species, emphasises once again extraordinarily dynamic and complicated nature of biodiversity. Ukrainian publications over the period of 1992 - 2002 contain records of the following quantities of species in the

Ukrainian fauna and flora: nematodes - 1,200-1,600; protozoa - 1,800-1,840; invertebrates - 44,000-44,371; wild and cultivated vascular plants - 5,099-5,101; fishes - 184-189; birds - 400-420; mammals - 101-113 (figures are given for 1992 and 2002 respectively).

Larger number of species at the end of the past decade can be explained both by revisions, new findings, better information about biodiversity, and by real changes in the natural environment that occur due to alleviation of man-caused load. Meanwhile, some previous species extinct, while some new ones permeate into the territory of Ukraine.

During 1992 - 2002 Ukrainian researchers registered more than 15 instances of extinction of species and emergence or penetration of new species. In most cases, these findings concerned the Black Sea and Azov Sea (meaning algae, polychaete, mollusca etc.).

Analysis of water life diversity, including species of fishes, elicited negative trends, which have their grounds. So, as far back as 2000, experts from EEC stressed significant

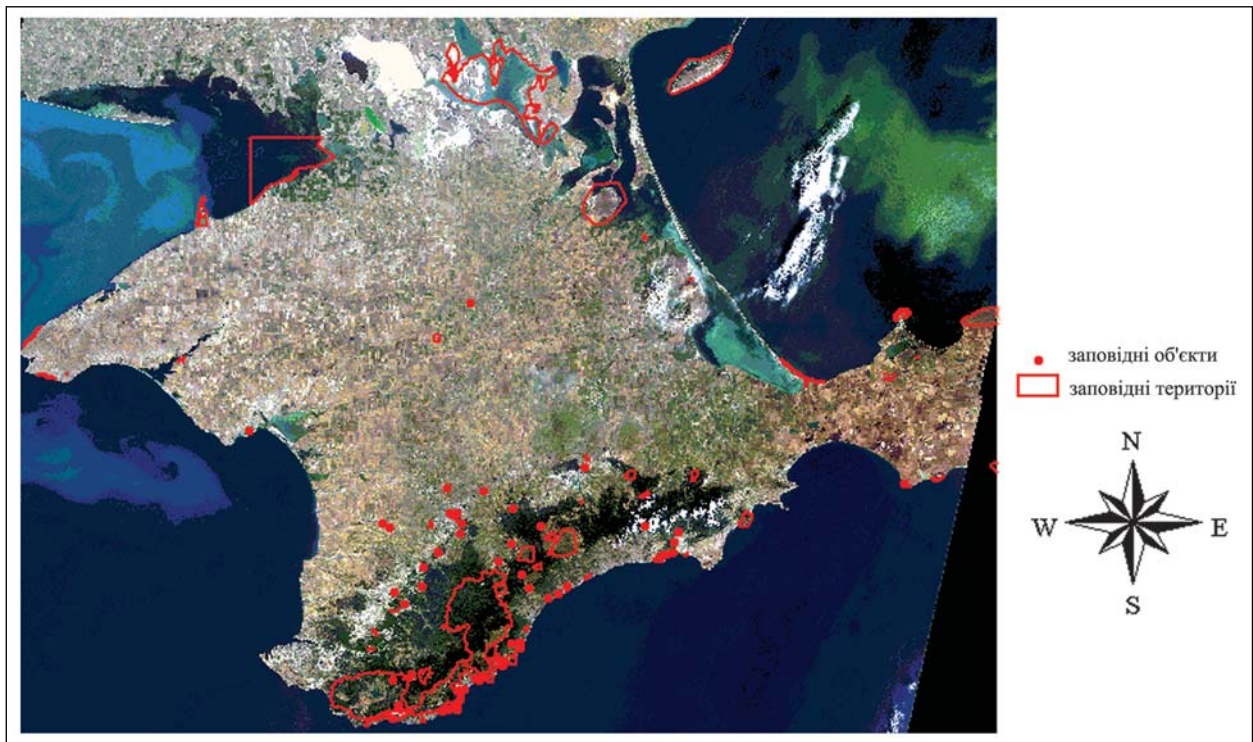


Fig. 3.4. Augmentation of the total area of reserved territories in the Crimea over the last decade as a way to improve the balance between seats of biodiversity and man-changed territories. (The data obtained by remote probing Landsat 7, 1999-2000).

drop in fishery volume in inland waters of Ukraine*.

The number of steppe species in the flora of grassland steppes of Mid-Dnieper area decreased by 4% (19 species) over the last century, this decrease resulting from the negative anthropogenic impact and probably, from the climate change. In particular, on the Southern Coast of Crimea local flora has undergone significant changes, as the endemic species list has been enlarged and penetration of 6-7 adventive species from other regions of the world observed. Such changes occur mainly due to destruction of natural niches and forming of qualitatively new ones under pressure of recreational factors, urbanization, fires etc. During 16 years that passed after the Chernobyl catastrophe, natural restoration of deciduous and coniferous kinds of trees was observed on the open lands in the contaminated zone. Cessation of agricultural management and hunting in the contaminated zone around the Chernobyl power plant enabled recovery of number of mammals, e.g. lynx or even desman.

A specific example of local positive changes of European importance can be seen in the current situation regarding condition of red-listed species in the contaminated zone. It is shown that 23 species of plants and at least 38 species of animals regis-

tered in the Red Data Book of Ukraine are available and in quite satisfactory condition in the contaminated zone. Increase in quantity of red-listed hydrophytes was discovered, such as salvinia, lings, as well as of mammals and birds of prey. Obvious is recovered condition of species for which endangering factors include mowing and burning down of grass, ploughing-up of soil, use of pesticides etc. General forecast for development of fauna complexes in the zone is favourable.

The contaminated zone features as a unique object in Europe, since the process of ecosystem's self-restoration under conditions of abrupt, long-term absence of human impact can be watched here.

Data obtained by Ukrainian researchers and outcomes of international projects give evidence that the main factors effecting decrease of biodiversity's sustainability in Ukraine are fragmentation of landscapes, complete tilling of soil and chemical pollution reaching 75-85% in some oblasts, nearly complete shift in water yield and chemical composition of water in surface water reservoirs.

Similar instances can be watched on the European scale. According to the data of 1996-2000, the number of endangered species of mammals increased both in the Eastern and in the Western parts of Europe.

Table 3.5. Index of biological diversity (maximum number of species)

Country	Mammals	Nesting birds	Reptiles	Amphibia	Freshwater fish	Invertebrates	Vascular plants
Ukraine	117	270	21	17	184	4,4371	5,101
Belarus	70	208	7	-	58	10,000	1,720
Bulgaria	94	383	36	16	207	25,761	3,583
Hungary	72	203	15	17	81	41,460	2,214
Poland	85	224	9	18	66	28,384	2,300
Romania	84	249	25	19	-	-	3,350
Turkey	116	284	102	18	175	-	8,579

* Fishing enterprises in Ukraine exercise fishery both in inland waters and in the fishery zone of Ukraine. The main fishing site is 200 miles shoaling water of other countries, which provide 94% of the total catch volume; around 4% of fish and seafood catch falls on the fishery zone of Ukraine and 1% - on the open ocean.

Most of European experts believe that this fact results from more sensitive nature of mammals' reaction to shifts in the land usage practice. Nowadays, the share of mammals among other animals is the largest and reaches 40%. Ukrainian scientists recorded similar trend in 1997 - up to 39.7%. Observations of rare species of animals in Ukraine show the trend of significant and nearly stable run-down in population and variety of species of predators, including numerous mammals. Later, on working meetings in Kyiv, the experts from the EEC summarised that approximately 9% of vascular plants, 38% of mammals, 38.1% of reptiles, and 29.4% of amphibia in Ukraine were endangered. The forecast was that, taking into account previous trends, the share of red-listed mammals in Ukraine would exceed 50%.

Ukrainian scientists expect that, provided the rate of red lists enlargement continues, the 3rd edition of the Red Data Book of Ukraine will contain up to 5% of fauna and 2/3 of vertebrates. In terms of practical

actions, reasonably anthropocentric approach was recommended for completion of red lists, combined with urgent designing of quasi-natural ecosystems and protection of functionally steady aggregations rather than species as such.

At the end of the last decade, the experts from the EU concluded that despite 25 years of implementation of the Community Environmental Policy, attempts to achieve sustainable positive changes in general quality of the environment in the EU countries failed. Such conclusion was rather unexpected. The state of biodiversity as a component of the environment in the aforementioned region is not perfect, but shows positive signs. Therefore, the future condition of biodiversity cannot be seen as fully predictable. Many factors interfere with the forecast: situational changes in land usage; further pollution of the environment; alien species etc. Statistical and other problems will also have their impact till at least 2010. Nevertheless, it can be stated that, given the climate change, biodiversity of highlands renders endangered, including mountains in Ukraine.

4. FORMING OF NATIONAL CULTURAL-ENVIRONMENTAL NETWORK

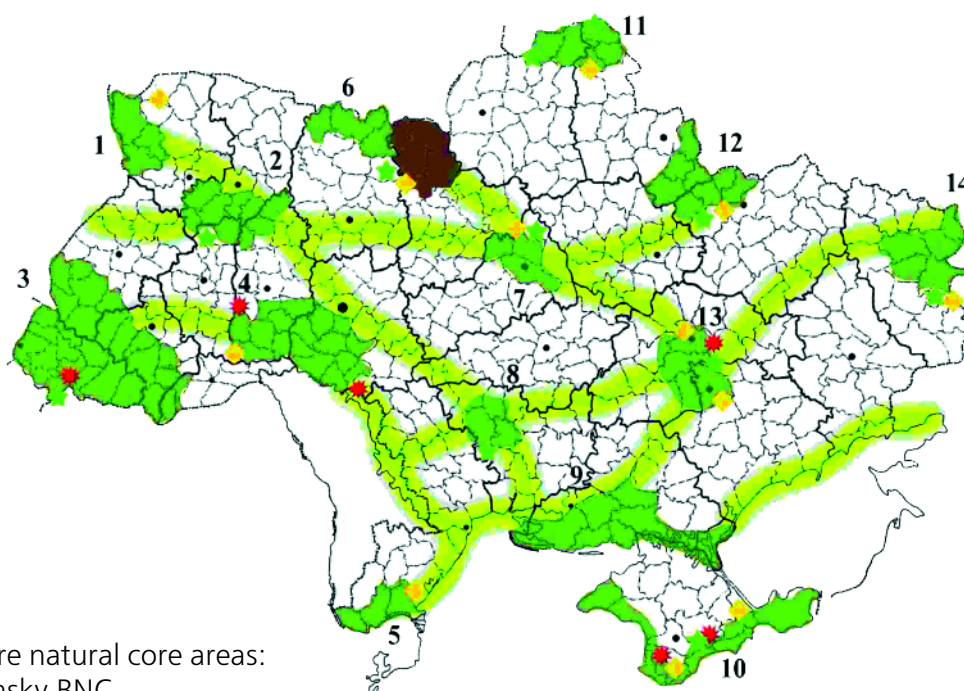
4.1. Biosphere centres of cultural-environmental network

On the surface of the Earth one can find relevantly stable landscape areas, which are called biogeocenoses, or ecosystems. As biotic components are the main constituents of such ecosystems, uniformity of biotic component results in emerging of biosphere core areas, alias centres (see Fig. 4.1). The map of Ukraine shows numerous biosphere

centres, and the table below contains relevant characteristics.

Cultural layers were developing around biosphere centres, together forming elements of the cultural-environmental network. Radically new structure of the biosphere emerged, where biosphere centres were interconnected by cultural, not transitional, zones. It should be emphasised that the cultural-environmental network is the

Layout of biosphere natural core areas



Biosphere natural core areas:

- 1 - Volynsky BNC
- 2 - Malo-Polisky BNC
- 3 - Karpatsky BNC
- 4 - Podilsky BNC
- 5 - Dunaisky BNC
- 6 - Tsentral'no-Polisky BNC
- 7 - Tsentral'no-Ukrainsky BNC
- 8 - Booz'ko-stepovyi BNC
- 9 - Dniprovsko-Sivashsky BNC
- 10 - Girsko-Krymsky BNC
- 11 - Desniansko-Starogutsky BNC
- 12 - Slobozhansky BNC
- 13 - Dniprovsko-stepovyi BNC
- 14 - Skhidnoukrainsko-stepovyi BNC

Fig. 4.1. Layout of biosphere natural core areas.

natural phenomenon. Under current conditions, this formation is destroyed, so we have to consider the issue of its restoring. This is one priority within the problem of recovery of biotic mechanism of natural environment management.

Biosphere Natural Centres (BNC)

1. Volynsky BNC

Conservancy characteristics

Exemplary centre of flora and fauna diversity of Ukrainian Polissia. Water rights of Volynsky BNC form one of the largest systems of lakes in Europe. Contains wetlands of international importance (national park «Shatsky" and floodplain «Prypiat'-Stokhid"). The best known as a migration route for birds and a seat of specific post-glacial flora in the middle part of Europe.

Negative factors

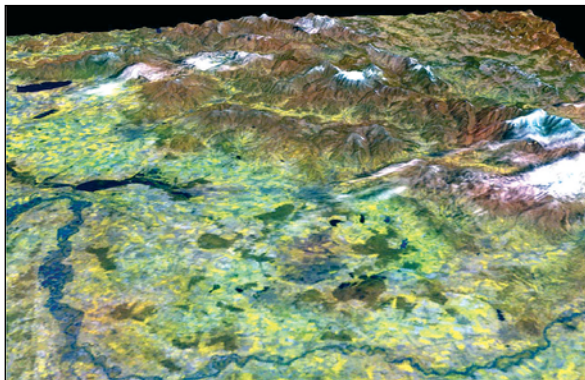
Development of karst, floods; mosaic radioactive pollution of certain territories. Presence of extensive (the largest in Ukraine) hotbeds of multiple infections.

Recommended activities

Development of recreational industry on the basis of national parks and other objects of the fund of nature reserves; development of environmentally sustainable fish industry and hunting.

Environmental requirements to economic activity

Environmentally sustainable forestry, restrictions on intensifying of farming, land-improvement within scientifically



DEM surface texturized on Zakarpattia oblast.

grounded limits, restoration of water-wetland lands. Safe operation of the Rivnenska nuclear power plant.

2. Malo-Polisky BNC

Conservancy characteristics

Occupies the territory within Ukraine, which is the main watershed between the Black Sea and the Baltic Sea drainage basins; comprises a set of low hills and ridges. Topography of the locality, patchiness of the top-soil, and specific climate resulted in emergence of unique forest and wetland flora and rich fauna. Includes the nature reserve «Roztochya" and the national park «Yavorivsky", which can become the basis of the prospective Ukrainian-Polish bilateral biosphere reserve «Roztochansky".

Negative factors

Excessive precipitation in individual years.

Recommended activities

Development of recreational business and tourism on the basis of national parks and other objects of FNR, development of environmentally sustainable forestry and hunting.

Environmental requirements to economic activity

Environmentally sustainable forestry, non-exhaustive hunting, restriction on density of transport network.

3. Karpatsky BNC

Conservancy characteristics

Prominent not only in Ukraine, but in Europe, centre of accumulation of relic, endemic, and rare species, of biodiversity in general, of its latitudinal and longitudinal migration paths etc. Ukrainian Carpathians contain the most developed in Ukraine network of territories belonging to the fund of nature reserves, including trilateral Polish-Slovak-Ukrainian biosphere reserve «Eastern Carpathians", Carpathian biosphere reserve, Carpathian national park, national park «Synevir" etc. The share of reserved territories here is the largest in

Ukraine, reaching 12% in Zakarpatska oblast.

Negative factors

Floods, windfalls, mud-flows, landslides, soil erosion. Existence of two large hotbeds of multiple infections.

Recommended activities

Development of recreational nature management, spa, tourism, including eco-tourism on the basis of biosphere reserves and national parks, development of mountain sports.

Environmental requirements to economic activity

Environmentally sustainable forestry and farming; ecologically balanced design, construction and operation of railroads, highways, gas and oil pipelines, and high-voltage lines.

4. Podilsky BNC

Conservancy characteristics

The core area of Podilsky BNC is Tovtry Ridge, which is considered to be the remains of the ancient Torton barrier-reef and is a unique in Europe geographic



formation. This territory avoided continental glaciation, thus enabling preserving of rich heat-loving flora, of which nearly one-fifth is endemic and sub-endemic species. Rich and specific fauna of steep slopes and caves facilitates habitation of rare species of birds of prey and bats. Fossil remains of animals and plants available here are of great interest. National parks of Podilsky BNC are located here.

Negative factors

Soil erosion, cave development.

Recommended activities

Preservation and reasonable use (mainly for tourist and recreational purposes) of Tovtry and Dnistrovsky canyon; spa; safe operation of the Khmelnytska nuclear power plant.

Environmental requirements to economic activity

Improvement of forestry and of aquatic objects construction on the Dniester River.

5. Dunaisky BNC

Conservancy characteristics

The core area of Dunaisky BNC covers Kilian delta of the Danube River and water reservoirs of the Lower Danube (Kartal, Kugurluy, Yalpug, Kytai etc.), as well as water reservoirs in the adjacent



part of Romania. This territory is registered as the water-wetland zone of international importance, being the place of water birds nesting. This is the newest naturally formed land in Europe. Both the plant kingdom and the wild life are amazingly rich and original. Over 50% of species of Ukrainian avifauna and all kinds of fishes registered in the European Red List can be found here, including spinous shark., Atlantic sturgeon, and Black Sea and Danube salmon. Dunaisky biosphere reserve occupies significant area within Dunaisky BNC.

Negative factors

Floods, silting and shallowing of rivers' arms and river-beds, ruin of river banks,

existence of hotbeds of multiple infections.

Recommended activities

Fishery, traditional farming and cattle-breeding, use of natural resources, in particular, of reed. Development of recreational industry and tourism.

Environmental requirements to economic activity

Non-exhaustive natural resources management, observation of fishing quota, environmentally justified norms of cattle grazing, of hay-mowing, reed stocking. Environmentally justified recreational industry.

6. Tsentral'no-Polisky BNC (Chornobyl contaminated zone)

Conservancy characteristics

Covers the valley of Prypiat' and Dnipro,



unites valuable natural complexes of these rivers, includes large area of marshes, water meadows, forests. Flora and fauna feature significant share of rare Boreal and Mid-European species. Following the cessation of economic activity, spontaneous recovery of water-wetland and other lands is observed, together with saturation of the territory with rare species increasing their population.

Negative factors

Important radioactive pollution of the territory, man-caused factors related to liquidation of the Chornobyl accident.

Recommended activities

Establishing of a biosphere radioecological reserve in the contaminated zone. Scientific research on and monitoring of

the biota state, development and testing of biological methods of improvement of polluted lands.

Environmental requirements to economic activity

Prohibiting of economic activity aimed at procuring of biological products (timber, fish, fur etc.).

7. Tsentral'no-Ukrainsky BNC

Conservancy characteristics

This region is usually called «Kaniv dislocations», it stretches along the Dnipro till



Moshnogirsky ridge inclusive. Significant share of water-logged ground gives rise to unique species of plants and invertebrates, which include Northern species isolated from their natural habitats, endemic and relic species. The region is an important segment of migration route of birds of passage. Ravine system of the region is one of the biggest in Europe and holds unique fossil fauna. The region includes such conservation areas as Kanivsky nature reserve and regional landscape park «Trakhtemyrivskyi».

Negative factors

Vulnerability of forest-steppe landscapes to erosion.

Recommended activities

Development of tourism and recreational industry.

Environmental requirements to economic activity

Balanced consumption of water resources, natural waters protection, environmental sustainability of con-

struction of hydrotechnical and power economy objects, forestry improvement, enhancement of FNR objects, erosion control, elimination of chemical and other harmful types of production from construction schedule.

8. Booz'ko-stepovyi BNC

Conservancy characteristics

Booz'ko-stepovyi BNC is a major accumulation centre of relic and endemic species, of biodiversity in general, of its latitudinal



and longitudinal migration paths etc. The BNC contains unique natural and historical landscapes. Balneotherapeutic potential comprises mineral and radon water reserves. Includes dense network of intact natural complexes (around 20%). Well-known place for boating and mountaineering.

Negative factors

Windstorms, icing, existence of multiple infections' hotbeds.

Recommended activities

Development of recreational nature management, sanatorium and resort sphere, ecotourism on the basis of regional landscape parks, sport and historical tourism.

Environmental requirements to economic activity

Environmentally sustainable farming, control over safety of nuclear power plants and military objects, termination of further hydro- and energy building.



9. Dniprovsko-Sivashsky BNC

Conservancy characteristics

The core area covers the intersection of three major eco-corridors: Prymorsko-stepovyi, Booz'ky and Dnirovsky, and makes a unique reservation of the landscape and biodiversity. Birds' migration paths of international importance cross this territory. The BNC includes 2 biosphere reserves, one national park and one regional landscape park and has extensive recreational and balneotherapeutic potential.

Negative factors

Eutrophic and man-caused pollution of water areas, breach of environmental requirements in forestry and farming, resort building, quarry of sand, clay, coquina; existence of multiple infections' hotbeds.

Recommended activities

Various types of recreational activity, traditional economic activity in conformity with environmental requirements, implementation of international research and conservancy projects and programmes.

Environmental requirements to economic activity

Environmentally sustainable forestry and farming, mining and chemical industry, health resort industry. Prevention from heavy industry development.



10. Girsko–Krymsky BNC

Conservancy characteristics

The core area represents one of the most illustrious biogeographic regions of Ukraine. It covers the Crimean Highlands and adjacent geological formations of Tarkhankut and Kerchensky peninsula. Its fauna and flora include significant amount of mountain endemic and relic species. Mediterranean species related to Asia Minor, Transcaucasian region, and Balkans play an important part. The BNC contains well developed network of reserved territories embracing nature reserves: «Karadaz'ky», which includes the only Jurassic massif in Europe with typical features of volcanic activity and rich reserve of minerals; «Cape Mart'yan» with relic plants species of Mediterranean type; «Yaltynsky» preserving typical mountain-forest natural complexes; and «Krymsky» comprising oak, beech, and pine forests with unique plots of relic species.

Negative factors

Lack of watering, acute deficit of water resources, seismically threatened territory, cave development, presence of extensive hotbeds of multiple infections.

Recommended activities

Development of recreational industry and tourism on the basis of relevant FNR objects, such as national parks, biosphere reserves, regional landscape parks etc.

Environmental requirements to economic activity

Environmental sustainability of agro-industrial production, of recreational activity and forestry, of transport net-



works. Environmentally grounded solution for the problem of water supply. Improvement of the FNR objects network, including transformation of the nature reserve «Krymsky» into biosphere reserve and establishing of the national park «Tavrida».

11. Desniansko–Starogutsky BNC

Conservancy characteristics

The prominent vertebrates species concentration centre and of biodiversity in general. Contains natural landscapes, unique in Ukraine, with large variety of pine forests, and archaeological monuments.

Negative factors

Radioactive pollution, consequences of the drainage.

Recommended activities

Development of recreational nature management and eco-tourism on the basis of national parks.

Environmental requirements to economic activity

Environmentally sustainable forestry and farming.



12. Slobozhansky BNC

Conservancy characteristics

The BNC is situated mainly in the forest-steppe zone and is characterised by combination of various landscapes, among which cretaceous strata can be distinguished, holding original flora and fauna. Floodplain of Siversky Donets is of great interest as the habitat of desman, the species enjoying the international protec-

tion status. Important constituents of the BNC are the national park «Sviati Gory» and the division of the Ukrainian steppe nature reserve «Kreydiana Flora».

Negative factors

Large share of tilled land, economic use of land, pollution, man's impact on the environment, soil erosion.

Recommended activities

Non-exhaustive farming, light industry, tourism and recreation of all kinds, reintroduction and rearing of species from indigenous fauna (bustard, little bustard etc.).

Environmental requirements to economic activity

Environmentally sustainable industry and farming, reconstruction and building of sewage disposal plants, prevention from pollution of landscapes with industrial and municipal wastes.

13. Dniprovsko-stepovyi BNC

Conservancy characteristics

The BNC is famous for accumulation of relic and endemic species, of biodiversity in general, of its latitudinal and longitudinal migration paths etc. Features unique natural and historical landscapes.



Negative factors

Underflooding, man-caused pollution.

Recommended activities

Development of recreational nature management, historical tourism, and ecotourism on the basis of nature reserves and regional landscape parks.

Environmental requirements to economic activity

Environmentally sustainable farming, control over safe operation of nuclear power plants, industrial units, and hydro-constructions.

14. Skhidnoukrainsko-stepovyi BNC

Conservancy characteristics

This is the most destroyed BNC, however some areas of natural steppe ecosystems still persist and are of great value. These include Luhansky nature reserve and its affiliated reserves «Striltsivsky step» and «Provalsky step». Their unique and diversified flora and fauna resulted from characteristics of the relief and geographic position. They play a great role in preservation of biological diversity of south-eastern Ukraine and present an exemplar for restoration of steppe ecosystems in Ukraine and Russia.



Negative factors

Soil erosion, dry winds, droughts, lack of water resources.

Recommended activities

Non-exhaustive farming, horse-breeding.

Environmental requirements to economic activity

Environmental sustainability of agro-industrial complex, industrial wastes processing, elimination of the transport pollution of the environment, recovery of lands (restoration of steppe areas and limited, environmentally justified afforestation of territories), extension and improvement of the FNR network and creation of relevant econetwork.

4.2. Historical and cultural heritage

The territory of Ukraine is extremely rich in objects of historical and cultural heritage, which include town-planning patterns, architectural monuments, archaeological memorials, historical monuments, examples of monumental art etc.

Old parks of great historical and cultural value occupy a prominent place in the depository of cultural heritage of Ukraine. Such parks as «Sofiyivka» in Uman', «Olexandriya» in Bila Tserkva, «Trostyanets», Kachanivsky in Chernihivska oblast, Striysky in L'viv, parks in the Autonomous Republic of Crimea are well known far abroad and considered to be a gem of park architecture and dendrology.

As of 01.01.2002, parks that are the monuments of landscape architecture numbered 529, and dendroparks numbered 35, all these enjoying special protective status of reserves in Ukraine. 88 parks among monuments of landscape architecture and 19 - among dendroparks achieved the status of monuments of national importance.

Significant part of landscape parks is based on ancient parks created in 17th-19th centuries. Most of them are situated in the AR of Crimea, including famous Alupkinsky, Gurzufsky, Livadyisky parks etc. Nemyrivsky, Pechersky, Chernyatynsky parks belong to Vinnytska oblast; Maliyevetsky, Mykhaylivsky, Samchykivsky - to Khmel'nytska oblast. L'vivska oblast contains Stryisky and Pidhirtsiivsky parks, Zhytomyrska oblast - Ivnytsky, Novochoortoryisky, Troshchansky parks. Kyivska, Ternopil'ska, Kharkiv'ska, Cherkaska oblasts and city of Kyiv are also abundant in landscape architecture monuments.

Among dendroparks created on the basis of old parks from 17th-19th centuries, the most famous parks are «Olexandriya» (Bila Tserkva), «Sofiyivka» (Uman'), «Trostyanets» (Chernihivska oblast), «Veseli Bokoven'ky» (Kirovograd'ska oblast), «Askania-Nova» (Kherson'ska oblast).

Intensive and uncontrolled recreation causes damage to parks. Landscape parks of the southern coast of Crimea are exceptionally popular. Since they are situated in the resort area, their territories, especially of

late, are exposed to significant man's impact, which endangers both their integrity and further existence.

Maintenance of parks under conditions of intense recreational load and insufficient care of plants essentially changed the general structure of these natural- antropogenic complexes.

Investigation of the current state of green plantations in the landscape parks of national importance elicited the following tendencies:

- depletion of taxonomic structure (plantations lose, because of old age, lack of care and damage inflicted by people, primarily coniferous and ornamental shrubbery, conifers, ornamental forms of deciduous trees);

- change in landscape (clearings, cuttings and meadows are overgrown with self-sown plants; park type landscapes where the ratio between plantations of trees and grass-plots is 1:1, are substituted for forest landscapes; fruit gardens are overgrown, parterres before palaces are destroyed or degraded);

- replacement of the main park-formative species of plants. It is well known that most of old parks were created on the basis of natural oak woods, or oak trees were planted as a dominant species, around which appropriate landscape was created. Oak trees have been felled in many parks or are lost because of age and were replaced by companion plants: ash-tree, lime-tree, maple. The second layer is also different now, with prevailing hornbeam or naturalised introducents: locust and other species of maple.

Relevant funds are yearly appropriated from the State Budget of Ukraine and the Fund of Environmental Protection for upkeep of the cultural heritage objects of national and local importance, and recovery and conservancy work is conducted in reserved territories. However, many cultural objects are in poor condition and require renovation, reconstruction, permanent sanitation, and preservation. Such poor condition of cultural objects is due to many natural and man-caused factors.

One promising line of activity aimed at preservation of historical and cultural heritage is foundation of regional landscape

parks (RLP) as recreational reserves on the territories of particular environmental and cultural significance. These multifunctional objects are supposed to be subject to differentiated preservation and use of territory regulations; special administrations are to be created to manage them. Such measures can be the most helpful for preserving these lands. For instance, creation of the RLP «Heraclea» on the seashore of Herakliysky promontory in city of Sevastopol or RLP «Dermansko-Motivsky» in Rivnenska oblast would have good prospects in terms of land preservation.

In pursuance of Articles 4 and 14 of the Law of Ukraine «On Cultural Heritage Preservation», the Cabinet of Ministers of Ukraine adopted the Regulation #1761 of December 27, 2001 «On Entering of Monuments of History, Monumental Art and Archaeology to the Public Register of Immovable Monuments of Ukraine». This register counts 58 reserves, 10 of them enjoy the status of national reserve:

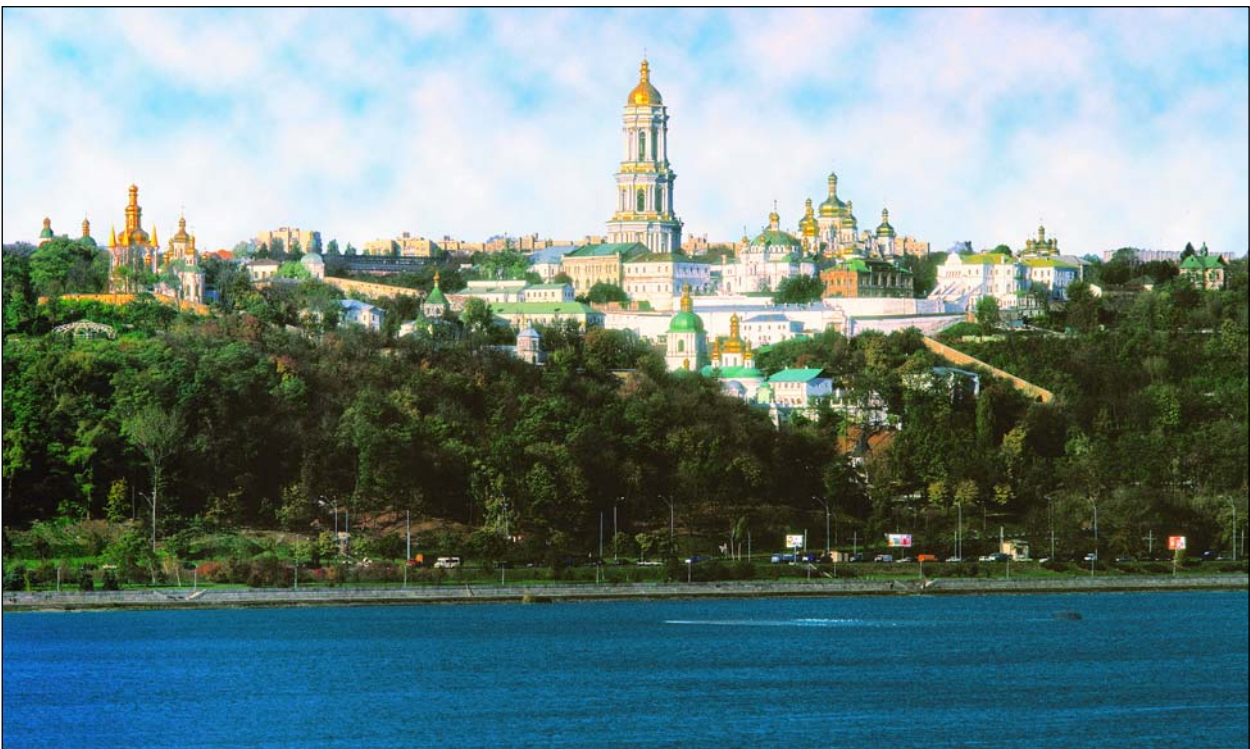
1. National memorial «Sofiya Kyivska» (Kyiv). Universal significance of Sofia cathedral's architectural ensemble was the reason for entering it on the UNESCO World Heritage List in 1990. This event was the first noticeable

instance of recognition of the Ukrainian national cultural heritage by the world community.

2. National historical and cultural memorial Kyivo-Pechersky (Kyiv).
3. National memorial «Khersones Tavriysky» (Sevastopol)
4. National park «Khortytsa» (Zaporizka oblast)
5. National memorial «Davniy Halych» (Ivano-Frankivska oblast)
6. National historical and ethnographic memorial «Pereyaslav» (Kyivska oblast)
7. National memorial of Ukrainian pottery in settlement of Oposhnia (Poltavska oblast)
8. National historical and cultural memorial «Chyhyryn» (Cherkaska oblast)
9. National architectural and historical memorial «Ancient Chernihiv»
10. National historical and cultural memorial «Kachanivka».

4.3. Global aspects of national cultural-environmental network forming

The process of national cultural and environmental network development is being



regulated, first of all, by the Convention on Preservation of the World Cultural and Natural Heritage, to which Ukraine is a party. Entering of a cultural or natural monument on the UNESCO World Heritage List implies its protection on the international level by way of providing financial, academic and technical assistance. To enliven activity in this sector, the National Committee of Ukraine on UNESCO Issues has developed the Action Plan on Preservation of Cultural Heritage in Ukraine.

In the last years co-operation of Ukraine with UNESCO in the domain of science noticeably revived. Concrete results were achieved, including establishing of National Oceanographic Committee of Ukraine, which is to be the co-ordinating body in the field of marine research, technologies and information exchange.

Activity of the National Committee of Ukraine on UNESCO Programme «Human and Biosphere» also yielded good results. The main efforts of the Committee were aimed at co-ordination and guidance with regard to elaboration of scientific grounds for transition to the principles of sustainable development, as well as at further development of the national network of biosphere reserves. Shatsky National Park was included in the UNESCO World Network of Biosphere Reserves by the Committee's proposition. Developed were the proposals to create the Ukrainian-Polish transborder biosphere reserve on the basis of Shatsky biosphere reserve and «Zakhidne Polissia» reserve; these proposals were submitted for consideration to the Bureau of Co-ordinating board of the Programme «Human and Biosphere».

Thus, development of the national cultural and environmental network, which has ardent support of the world scientific community, provides additional opportunities for extending of Ukrainian institutions' co-operation with international intergovernmental and non-governmental organisations, for intensifying of their activity. Concerning Ukrainian monuments presented in the UNESCO World Heritage List, we believe that Ukraine, with its rich cultural and natural property, cannot be satisfied with the fact that only two objects were

included in the UNESCO World Heritage List («Sofia Cathedral - Kyivo-Pecherska Lavra» and «Historic Centre of L'viv»). That is why vigorous work along this line should be regarded as a priority on national level.

4.4. State programme of forming of national ecological network in Ukraine

Natural landscapes are represented on nearly 2/5 of the territory of Ukraine. The least transformed natural landscapes can be found on lands under forests, bush, and marsh and on the open land, totalling 19.65% of the whole territory of Ukraine. Bearing in mind that only 44% of forests perform protective and conservative functions, we can estimate that the landscapes in nearly natural condition occupy 12.73% of the territory of Ukraine.

In 2001, the State Programme of Forming of National Ecological Network in Ukraine for 2000-2015 was launched. The first stage of the Programme (2000-2005) stipulates for expansion of the surface area of national econetwork's specific elements (Fig. 4.2), use of economic instruments to promote their creation on lands of all patterns of ownership, provision of relevant legislative base, conducting necessary research and making necessary arrangements.

The following conditions that emerged in the process of reforming economic relations in the domain of land use can be seen as favourable prerequisites to extension of the area of lands with natural landscapes:

- cessation of use of agricultural lands (first and foremost, degraded plough-land) due to unprofitableness of their agricultural use;
- cessation of industrial use (in extractive industry, construction etc.) of lands, which lost their natural state and are hazardous to environment;
- giving preference to recreation of natural landscapes as the most reasonable use of lands, which are out of agricultural use;
- establishing of water protection zones and shelter belts around water bodies;
- augmentation of the area of groves and

forest belts around farming lands, industrial and settlement zones;

- meticulous fulfillment of international obligations by Ukraine in the domain of environmental protection.

4.5. Fund of natural reserves

The structure of the fund of natural reserves (FNR) of Ukraine comprises 11 categories of territories and objects of national and local importance. These include natural and biosphere reserves, national parks, regional landscape parks, game reserves, natural monuments, reserved tracts, and artificial objects: botanical gardens, dendroparks, parks - monuments of landscape architecture, and zoos.

The fund of natural reserves of Ukraine includes (as of date 01.01.2003) 7,040 territories and objects totalling 2,715,400 hectares in area; it makes 4.5% of the whole area of Ukraine.

The share of area of specific categories of territories and objects in the FNR area is as follows: natural reserves - 6%; biosphere reserves - 8%; national parks - 22%; game reserves - 38%; natural monuments - 1%; regional landscape parks - 21%; reserved tracts - 3%; artificial objects of FNR (botanical gardens, zoos, dendroparks, parks - monuments of landscape architecture) - 1% (Table 4.1).

The share of the land area belonging to the FNR in the total area of an administrative district («percent of reservation») is very different in different oblasts. The least value (below 1%) was spotted in Vinnitska, Dnipropetrovska, Kyivska, Kirovogradska, Kharkivska oblasts, the largest (11 - 15%) - in Zakarpatska, Ivano-Frankivska, Khmelnytska oblasts, city of Kyiv; in Sevastopol this index nearly reached 30%. In Donetsk, Zhytomyrska, Zaporizka, Luhanska, Mykolaivska, Odeska, Poltavska and Cherkaska oblasts, and Autonomous Republic of Crimea reserved territories occu-

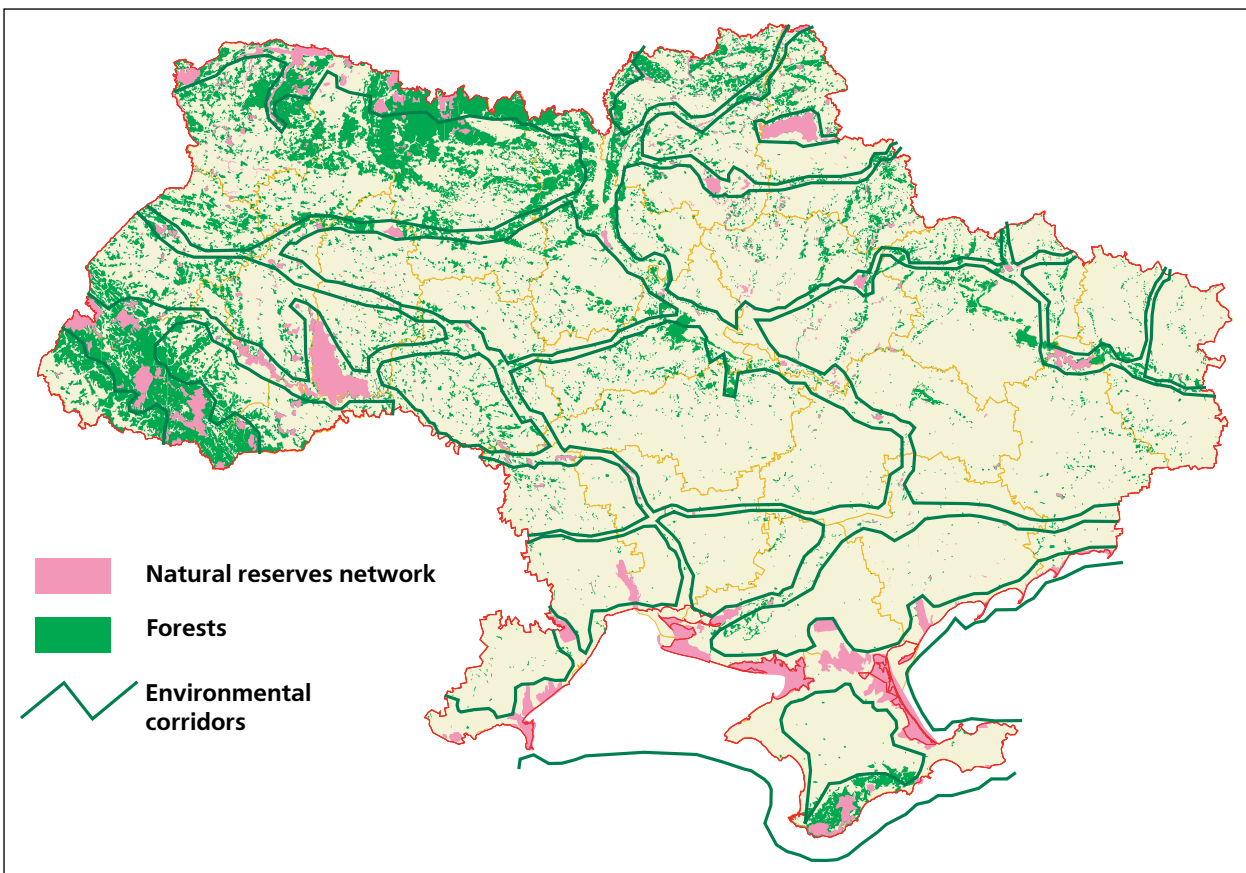


Fig. 4.2. National econetwork of Ukraine: Layout of design componentry of national importance.

py 2 - 4% of the total area, while in Volynska, Rivnenska, Sumska, Ternopil'ska, Kherson'ska, Chernivets'ka and Chernihiv'ska oblasts - 6 - 9%. In average across Ukraine, the share of reserved territories constitutes 4.5%. Since 1992, i.e. during the period of independence of Ukraine the total area of the FNR doubled.

The governing law with respect to natural reserves is the Law of Ukraine «On Fund of Natural Reserves of Ukraine». The Law approved the classification of territories and objects of FNR, settled the issue of owner-

ship of natural resources in their boundaries, stipulated the order of relevant institutions' operation, of control over natural complexes and nature management, over activity of the state preservation service. Designated were special authorised bodies in the domain of reserves management, defined the rights of citizens and civil organisations. For every category of reserved objects regulations regarding preservation and management are determined, as well as principal requirements to internal territorial layout of such multifunctional objects as national parks,

Table 4.1. Shift in number and area of objects of FNR of Ukraine by categories

Categories of objects of FNR	1992		2003	
	Number	Area (hectares)	Number	Area (hectares)
Natural reserves	15	207,500	17	163,700
Biosphere reserves			4	222,500
National parks	3	123,200	12	632,100
State game preserves	1	34,100		
Game reserves:	1711	746,700	2595	1067,400
of national importance	227	330,000	292	356,400
of local importance	1484	416,700	2303	711,000
Natural monuments:	2661	16,300	3000	24,400
of national importance	123	4,900	132	5,700
of local importance	2538	11,400	2868	18,700
Botanical gardens:	16	1,900	22	2,000
of national importance	16	1,900	17	1,900
of local importance			5	0,100
Zoos:	6	0,100	12	0,400
of national importance	6	0,100	7	0,10
of local importance			5	0,300
Dendroparks:	19	1,200	37	1,500
of national importance	19	1,200	19	1,350
of local importance			18	0,130
Parks monuments of landscape architecture:	497	13,100	536	13,600
of national importance	83	5,800	88	6,000
of local importance	414	7,300	448	7,600
Regional landscape parks	1	42,100	43	603,600
Reserved tracts	672	68,500	762	82,000
Total: (FNR actual area)	5602	1254,700	7040	2715,400*
% of the total area of Ukraine		2,1		4,5

Note: * - actual area of the FNR of Ukraine, without area of those FNR objects, which are included in other FNR objects.

biosphere reserves, regional landscape parks.

The Laws of Ukraine «On Wildlife Protection», «On Plant Kingdom Protection», «On the Red Book of Ukraine», and Statute of the Green Book of Ukraine occupy an important place among other legislative instruments, which are immediately aimed at preservation of biological and landscape diversity. A series of issues related to protection of natural habitats of animals and plants are regulated by the Land Code, Forest Code, Water Code, and Fossil Code, which were enacted during the period of independence of Ukraine.

Development and approval by Verkhovna Rada of Ukraine of the Programme of Prospective Development of Reserves in Ukraine in 1994 significantly contributed to resolving problems of preservation of biological and landscape diversity. The Programme worked out the development strategy for this important sphere of nature conservancy and determined means of scientific, legal, institutional, financial, and material and technical support for implementation of the strategy.

Augmentation of the area of lands, which are to be preserved, became the strategic objective in terms of securing environmental stability in the territory of the country.

The national environmental network of Ukraine covers territories and objects of FNR, forests, water bodies, water protection zones and littoral shelter belts of water bodies, other lands belonging to inventory of water resources, water - wetland lands, haylands, pastures, forest shelter belts, lands intended for recreational purposes, and lands of historical and cultural character. All these lands are of especial value for environmental protection and preservation of biological and landscape diversity, primarily of species of plants and animals entered into the Red Book of Ukraine, and plant formations entered into the Green Book of Ukraine. Stable environment is sustained on these lands through establishing, by administrative order, of specific rules of nature use.

Major natural regions of the eco-network are as follows: Carpathian Highlands, Ante-Carpathian region and Opillia, Crimean

Highlands, Western Polissia, Dnipro region, Polissia, Eastern Polissia, Podillia Hills, Mid-Dnipro region, interval of Siversky Donets River, Donetsky mountain-ridge and Azov coastal eminence, Dnipro-Molochansky interfluvium, Danube mouth, Azov Sea, and Northeast shelf of the Black Sea. Existing and prospective national parks, natural and biosphere reserves were assigned as the main constituents for these regions. The main natural passages are the rivers: Dniestr, Southern Boog, Western Boog, Dnipro, and Siversky Donets.

Natural reserves and reserved zones of biosphere reserves, of national parks, and of regional landscape parks, as well as other valuable natural territories of large area subject to strict reservation regulations, comprise the key regions of the ecological network (Table 4.2). The key regions are united into a single territorial system by connecting natural corridors, which include extra preserved territories and restorable, buffer and connective territories of the eco-network.

Restorable territories are delimited on the lands within natural complexes, which underwent changes produced by human-related factors or calamities and can be restored through taking relevant measures. Restorable territories also cover eroded lands and lands subject to reclamation and reforestation.

Buffer territories are delimited for the purpose of prevention of economical activity's negative impact on valuable natural complexes and objects. Connective territories are formed in the event that the territories of the eco-network's components are disconnected.

Restorable, buffer and connective territories legally enjoy the status of territories subject to strict reservation regulations.

In pursuance of the Programme, 29 national parks and 7 biosphere reserves are to be established, boundaries of 3 natural and 3 biosphere reserves, and of 5 national parks are to be extended before 2015. In general, the total area of the fund of natural reserves in Ukraine is to double and reach 10% of the total area of the country.

The state programme of the national eco-network forming stipulates submission of applications for acknowledging of the value

Table 4.2. Register of biosphere reserves, natural reserves, and national parks of Ukraine

No.	Name	Subordinate to	Year of foundation	Total area (hectares)	Area of land in permanent use (hectares)
Biosphere reserves					
1.	Askania Nova	Ukrainian Academy of Agricultural Sciences	1985	33307,6	11312,2
2.	Chornomorsky	National Academy of Sciences	1985	89129,0	70509,0
3.	Karpatsky	Ministry of Ecology and Natural Resources	1993	53630,0	31977,0
4.	Dunaisky	National Academy of Sciences	1998	46402,9	22662,0
Natural reserves					
1.	Krymsky	State administrative department	1923	44175,5	44175,5
2.	Kanivsky	T.G.Shevchenko National University	1923	2049,3	2049,3
3.	Ukrainsky stepp	National Academy of Sciences	1961	2768,4	2768,4
4.	Luhansky	National Academy of Sciences	1968	1575,5	1575,5
5.	Polisky	State Committee of Forestry	1968	20104,0	20104,0
6.	Yaltynsky highland forest	State Committee of Forestry	1973	14523,0	14523,0
7.	Martyn cape	Ukrainian Academy of Agricultural Sciences	1973	240,0	240,0
8.	Karadazky	National Academy of Sciences	1979	2855,2	2855,2
9.	Roztochya	Ministry of Education	1984	2084,5	2084,5
10.	Medobory	State Committee of Forestry	1990	10516,7	10516,7
11.	Dniprovsko Orilsky	State Committee of Forestry	1990	3766,2	3766,2
12.	Yelanetsky stepp	Ministry of Ecology and Natural Resources	1996	1675,7	1675,7
13.	Gorgany	Ministry of Ecology and Natural Resources	1996	5344,2	5344,2
14.	Kazantypsky	Ministry of Ecology and Natural Resources	1998	450,1	450,1
15.	Oputsky	Ministry of Ecology and Natural Resources	1998	1592,3	1592,3
16.	Rivnensky	State Committee of Forestry	1999	47046,8	47046,8
17.	Cheremsky	State Committee of Forestry	2001	2975,7	2975,7
National parks					
1.	Karpatsky	Ministry of Ecology and Natural Resources	1980	50303,0	38591,0
2.	Shatsky	State Committee of Forestry	1983	48977,0	18810,0
3.	Synevir	Ministry of Ecology and Natural Resources	1989	40400,0	27208,0
4.	Azov-Syvasky	State administrative department	1993	52154,0	52154,0
5.	Vyzhnytsky	Ministry of Ecology and Natural Resources	1995	7928,4	7013,4
6.	Podilsky Tovtry	Ministry of Ecology and Natural Resources	1996	261316,0	3015,0
7.	Sviati Gory	Ministry of Ecology and Natural Resources	1997	40589,0	11878,0
8.	Yavorivsky	Ministry of Ecology and Natural Resources	1998	7078,6	2885,5
9.	Skolivsky Beskydy	State Committee of Forestry	1999	35684,0	24702,0
10.	Desniansko Starogutsky	Ministry of Ecology and Natural Resources	1999	16215,1	7272,6
11.	Uzhansky	Ministry of Ecology and Natural Resources	1999	39159,3	14904,6
12.	Hutsulshchyna	Ministry of Ecology and Natural Resources	2002	32271,0	7606,0

of natural territories of Ukraine, primarily within Ukraine's fund of natural reserves, on the international level and compiling of the national list of the natural heritage objects. Applications for international acknowledgment of new biosphere reserves are to be prepared; propositions regarding additions to the Ramsar Register of water - wetland lands of international importance, to the Emerald Network of Europe and to the European list of biosphere reserves are to be made, and applications for awarding of nature conservancy territories with the European Award are to be submitted.

Ukraine is engaged in vigorous activity with respect to forming of the Pan-European Eco-Network, which is the core element of the Pan-European Biological and Landscape Diversity Strategy (Sofia, 1995). This activity is combined with implementation of international conventions and agreements of the world, European and regional level.

Ukraine's contribution to the Pan-European Eco-Network can be estimated through its participation in development of the following components:

- World Network of Biosphere Reserves
- Ramsar Register of water - wetland lands
- Emerald Network of Europe (Bern

Convention)

- Network of territories awarded with the European Award
- Intergovernmental agreements on preservation of migratory species of animals
- Network of transborder zones of nature conservancy and sustainable development, as well as transborder environmental passages.

The World Network of Biosphere Reserves already includes 6 objects in Ukraine: the biosphere reserves «Askania-Nova», «Chornomosky», «Dunaisky», «Karpatsky», Uzhansky national park including Nadsiansky regional landscape park within the Ukrainian-Polish-Slovakian biosphere reserve «The Eastern Carpathians», and Shatsky national park. Shatsky national park forms the basis of the Ukrainian sector of the prospective Ukrainian-Polish reserve «The Western Polissia» (materials were submitted for consideration to UNESCO). Materials are being prepared concerning creation of the Ukrainian sector of the Ukrainian-Russian biosphere reserve on the Desna River, which is supposed to be named «Briansko-Starogutsky Lisy». In the framework of TACIS programme, the Ukrainian-Polish biosphere reserve on Roztochka is in the process of establishing, which is to

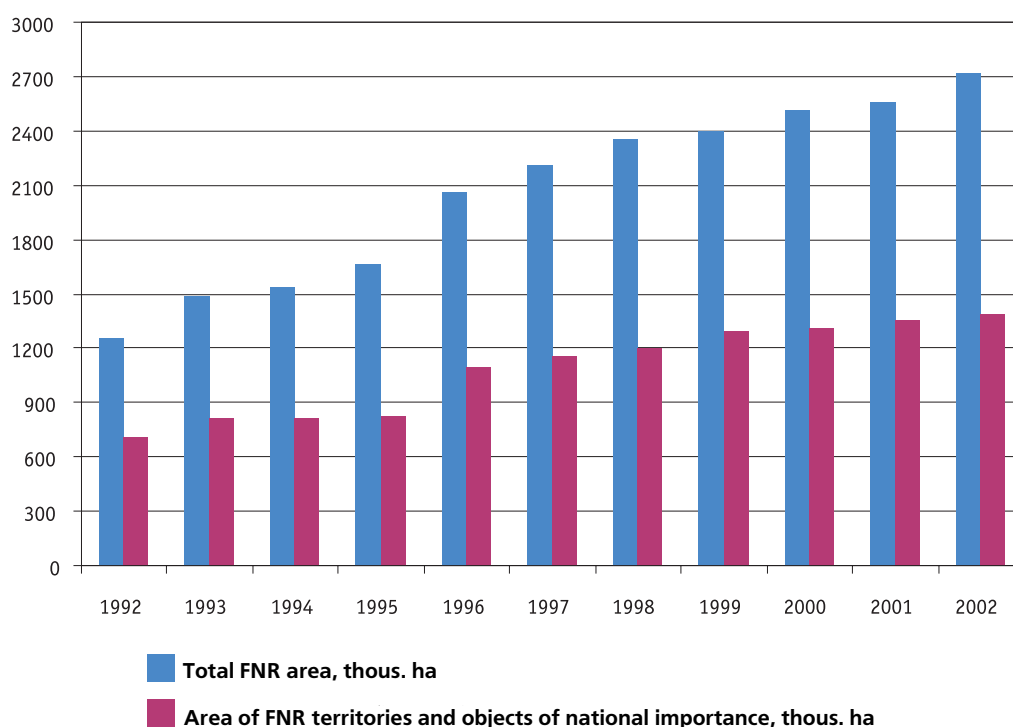


Fig. 4.3. FNR area increase

include, on the Ukrainian part, Yavorivsky national park, natural reserve «Roztochya» and two newly organised regional landscape parks. Ukraine is involved in creation of the following transborder biosphere reserves: in Maramoros mountains in the Carpathians - with Romania, in the mouth of Dniestr - with Moldova, on the Tyssa River - with Hungary, on the Prypiat' River - with Belorus, on the Siversky Donets River - with Russia.

The Ramsar Register of water - wetland lands already includes 22 water rights and marshes of Ukraine, and another 30 prospective enters to the Register have been approved by the Government of Ukraine.

Ukraine submitted application for including of 15 objects of the FNR to the Emerald Network of Europe (Bern Convention), which is the analogue of the EU Network «NATURE 2000». Proposals regarding another 20 prospective enters from the FNR of Ukraine are to be prepared in the nearest future.

4.6. Recreational resources

Ukraine is one of the leading countries in Europe in terms of recreational and health resort facilities. The most valuable are mineral water resources and natural therapeutic mud of nearly known balneal types. Availability of these natural resources was the environmental determinant for extensive development of spa and health resorts.

A hospitable climate all over Ukraine enables extensive use of climatotherapy as one method of cure and prophylactics. The Southern Coast of Crimea, Crimean and Carpathian Mountains feature the most favourable conditions over the year, having the air saturated with salts, ozone, phytoncides, and fragrant.

Sanatoria and health resorts department manages well-developed network of sanatoria and resorts of different types and levels; there are 3,200 sanatoria and spa in Ukraine. Nearly 3,000,000 persons receive treatment there over the year.

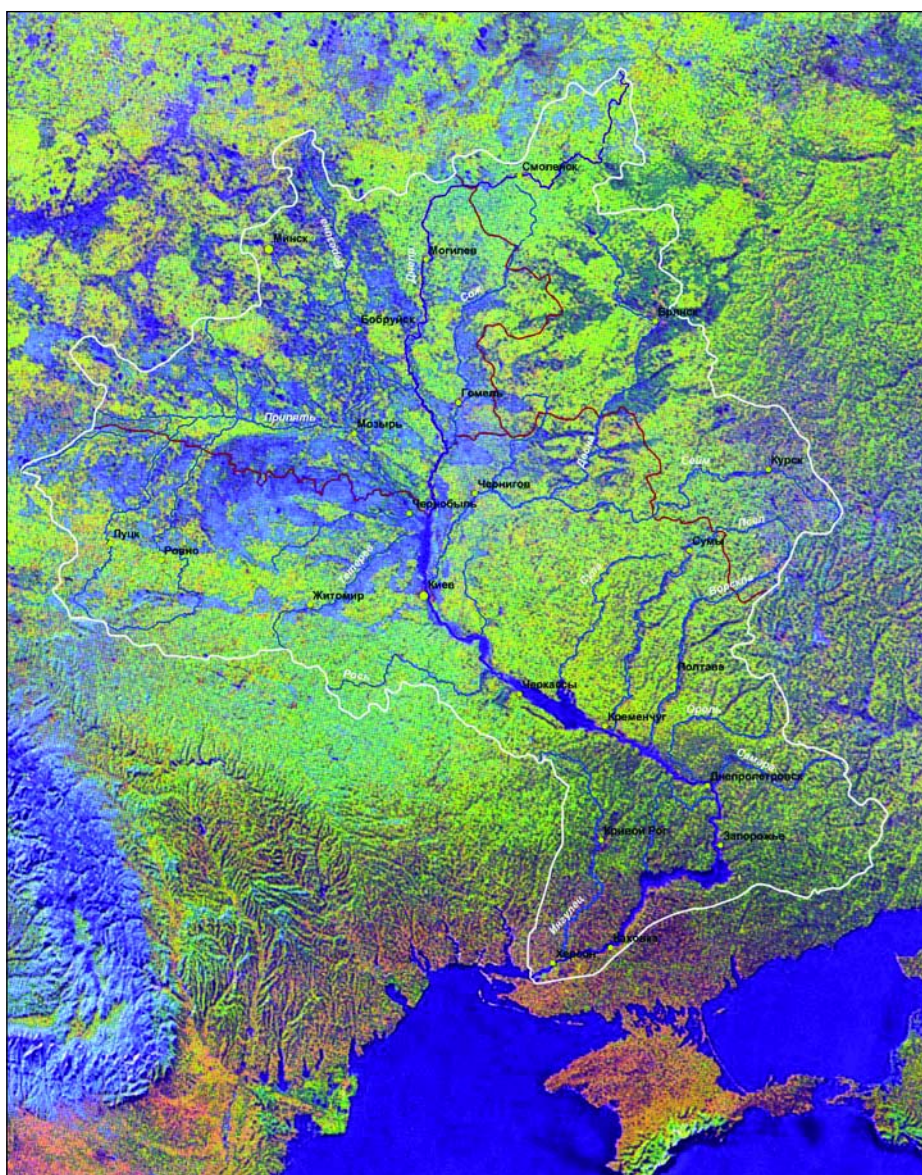
The strategic aim of the public policy in this domain is to provide conditions for health

improvement, increase of life span and active longevity of the population, promotion of healthy life-style, development of competitive, on the world scale, resort network, which would the best way support the effective reproduction of manpower resources and gene pool of the Ukrainian nation and ensure significant revenue from resort institutions to fill the budgets of all levels.

5. EFFECTIVENESS OF THE NATIONAL ENVIRONMENTAL POLICIES IN THE PAST DECADE

One of the prerequisites for achieving effectiveness in the national environmental policy is to adhere to the principle of comprehensive and systemic approach in implementing this policy. In the past decade this very prerequisite was not supported due to a variety of reasons, including those political and financial ones. This is primarily dealing with respecting the priorities in the national environmental policy as well as ensuring adequacy of economic and financial mecha-

nisms to acute environmental problems in the nation and its international commitments. At the stage of setting up the system of environmental governance administrative mechanisms and their legal support were prevailing. At the same time certain effectiveness was achieved along separate lines and in reaching some environmental policy that more or less matched the defined features. Herein below you will find samples of such effectiveness.



Layout of Dniro river basin

5.1. National Environmental Programs Implementation

The National Program for Rehabilitating the Dnipro River Basin and Enhancing Drinking Water Quality impacts Ukraine's harmonious development the most.

One of the most important places among economic and social development objectives and in the national environmental policy belongs to the issue of environmental condition of the Dnipro river with resources that make about 80% of Ukraine's water resources. This river provides water to 32 million Ukrainians as well as to two thirds of the national economy. Environment rehabilitation in the Dnipro river basin has become one of the most significant national priorities.

The major purpose of the Program is to ensure restoration and sustainable operation of the Dnipro river ecosystem, quality water supply, environmentally safe conditions for population life and activities as well as economy operation, water resources protection against contamination and depletion.

The national environmental program has been formulated and implemented in Ukraine for the first time. The basin principle in resolving the major issues made its foundation. The Program was developed with account of the global best practice in resolving environmental problems of large water objects: large lakes and the basins of the Rhine, the Thames, the Seine, etc.

Implementing tasks and measures with respect to the Program is to ensure that population living within the Dnipro river basin enjoys the right for ecological safety in using surface and ground waters.

The appropriate financial and economic support that is adequate to the level of formulated goals and tasks in the format of government decisions should be an indispensable condition for this basin rehabilitation. Herewith adherence to the principle of equity in attitude to the Dnipro river is to become the leading one: the river is earning for its maintenance in the form of natural resources charges as well as pollution charges and these amounts should come back to its environmental rehabilitation.

Implementation of the Canadian technical assistance program «Development of

Environment Management in Ukraine (the Area of the Dnipro River Basin)» contributed immensely to refining the basin management principle.



Ukraine lacked expertise in implementing environmental basin programs at such scale as well as experience in systemic environmental governance. That is why for the first time financial and methodology support of the Government of Canada resulted in the evolvement of the following:

- the methodology for comprehensive resolution of the Dnipro river basin issues at the ecosystem level in conditions of reforming the nation's social and economic system;
- the methodology for basin financial and economic mechanism to implement environmental programs and projects;
- the methodology for employing the cutting-edge instruments of environmental audit and environmental leasing in managing the environment followed by modernization of facilities in food processing, light and steel making industries polluting the Dnipro river basin with low level capital investment;
- environmental and economy effect from implementing new technologies in water purification and waste dumps neutralization;
- implementation of modern technologies

in rehabilitation of coastal areas effected by anthropogenic activities;

- implementation of systems to manage environment condition with employment of new information technologies;

- initiating environmental entrepreneurship development and establishment of the relevant civil society associations;

- initiation of training and education processes related to the above issues based on workshops, creation and incorporation into training process of the set of manuals and textbooks, methodology handbooks as well as the series of video- and TV films and broadcasts;

- consolidation of government, civil society, academic and business entities in the basin to prepare and implement strategic decisions on operation of the Comprehensive Basin Committee on managing programs and projects.

Thus, the whole complex of projects and works was implemented in the framework of Ukrainian-Canadian cooperation and their results fully meet the principles of harmonious development. They are unprecedented on the territory of Ukraine.



5.2. Efficiency of Government Ecological Control

Government control as to meeting the requirements of environmental Law, rational natural resources use, ecological and nuclear safety is one of the major lines in the natural environment protection carried out by the State Ecology Inspection and the territorial bodies of the Ministry of Ecology and Natural Resources.

Positions of inspection units were significantly reinforced with changes and amend-

ments made in Provisions on the State Department of Ecology and Natural Resources in the regions, in the cities of Kyiv and Sevastopol, approved by the Order of the Ministry of Ecology and Natural Resources of May 31, 2002 #205 and registered with the Ministry of Justice on June 17, 2002 #5-7/6795. Due to implementing these changes and amendments ecological inspections were set up as part of the territorial bodies of the Ministry of Ecology and Natural Resources (including town, district and interdistrict levels). They have their rights and functions clearly defined.

For the purpose of supporting inspection activities with legal acts and regulations, changes and amendments to the Code of Ukraine on Administrative Offences with respect to control of petrochemicals' environmental indicators were prepared for consideration.

As soon as the Cabinet of Ministers of Ukraine adopted the Resolutions of October 26, 2001 #1429 «On Performing Environmental Control in the Customs Operation Areas» the procedure for government ecological control over cargo and transportation means at the state border crossing points was made significantly simpler.

As of January 1, 2003 environmental control in customs operation areas was carried out at 87 state border crossing points with 131 state inspector on a payroll.

As of January 1, 2002 there were 2756 state inspectors on protection the natural environment. This number of employed inspectors as well as the level of their material, technical and financial support should be acknowledged as insufficient in terms of the number of business entities (217) making the Registry of Environmentally Hazardous Objects, availability of the great number of facilities making part of the high technogenic disaster risk list due to the obsolete equipment as well as the number of facilities subject to government control.

Operation of 1220 facilities was suspended in 2001 for their environmental law infringement. That resulted in cutting down polluted wastewater volume by 365.2 thousand m³ and decreasing pollutants' emission into the ambient air by 159.9 tons.

The growing number of officials made administratively responsible as well as increase in the number of filed claims can not serve the indicator for efficiency of government control accounting for the low level of levied penalties (this level did not exceed 72% in 2001) and payments related to the filed claims. In addition, the amount of charged penalties is not the factor stimulating new technologies implementation. Annual growth in the number of accident related contamination has served the evidence to the above.

Better coordination of activities with control bodies of other ministries and agencies as well as with civil society environmental organizations remains the emerging issue.

5.3. Overcoming Chernobyl Disaster Aftermath

The 17-th year expires since Chernobyl NPP disaster. It entered the history of civilization development as a sad and tragic page in scientific and technological progress in the 20-th century. Mankind did not know such technogenic and ecological disaster. The Ukrainian land became the epicenter of nuclear disaster.

Elimination of disaster aftermath forced government authorities to involve significant human and financial resources. However, the circle of related urgent problems is still extremely broad. This requires permanent analysis of priorities with respect to the major lines of activities and the specific objectives within the limits of every line as well as comparison of achievements with urgent needs.



Regard less economic difficulties the State does not forget its responsibility as to people who suffered from destructive effect of radiation. In the last 10 years Ukraine has been financing expenses to alleviate disaster aftermath on her own. These expenses make from 5% to 7% of total expenses of the State Budget of Ukraine. In the period 1991-2002 expenses to eliminate disaster aftermath made almost 6.5 billion US dollars.

In the first days after the disaster the major problems were caused by necessity to



tame nuclear elements and to prevent excessive irradiation of Ukraine's population. Presently we may be sure to say that radiation conditions in Ukraine have stabilized and is under reliable control of monitoring systems of the Ministry of Extraordinary Situations, the Ministry of Ecology and Natural Resources, the Ministry of Health Protection, the Ministry of Agricultural Policies as well as by radiology units of various institutions and organizations.

The major priority in the Government operation has been and still is a human being. All the efforts and actions in alleviating Chernobyl disaster aftermath are targeted at their protection. Presently the following are the three major in protection: social, medical and antiradiation ones.

Importance to overcome Chernobyl disaster aftermath has been defined in Article 16 of the Constitution of Ukraine: «...overcoming the consequences of the Chernobyl catastrophe - the catastrophe of global significance, - and the preservation of the gene pool of the Ukrainian nation is the responsibility of the State».

Fundamentals for legal support of effected population social protection are there in the Law of Ukraine of February 28, 1991 «On the Status and Social Protection of Citizens That Suffered as the Result of Chernobyl Disaster». This very Law defines the basic provisions for citizens that suffered from Chernobyl disaster to exercise their constitutional right for their life and health protection. The unified procedure was established for defining the status of effected individuals. Following the adoption of the above Law the broad range of activities was undertaken in the country to formulate and enact regulations to implement provisions and requirements stipulated by the Law, primarily as to defining the status of effected individuals and organizing their appropriate social project.

The complexity of financial and economic conditions was not the obstacle for financing social protection by the following priorities:

- provision of benefits and compensations for effected children;
- payment of compensations to the disabled due to loss of health resulting from Chernobyl disaster as well as financial support of their rehabilitation;
- monthly payment of compensations to families that lost their bread winner as the result of Chernobyl disaster;
- compensation payments for the value of foodstuff by medical norms to the individuals falling into 1-st and 2-nd categories as well as free of charge procurement with pharmaceuticals by physicians' prescriptions;
- payment of pensions on the regular basis;
- free catering for children at the educational institutions.

Since 1994 medical support of the effected population is annually performed in compliance with the Program of Measures to Organize the Comprehensive Medical and Sanitary Services for Individuals That Suffered as the Result of Chernobyl Disaster.

The above Program is targeted as follows:

- maintenance and evolvement of the State Registry of the individuals that suffered as the result of Chernobyl disaster;
- treatment of gravely sick patients at specialized hospitals and clinics of scientific and research institutions of the Ministry of

Health Protection, the Academy of Medical Sciences, etc.;

- resolution of motherhood and child protection issues, improvement of the demographic situation in the regions effected by Chernobyl disaster aftermath;
- evolvement of primary and secondary prevention of inherited pathologies by improving medical genetics services;
- support for the expert system operation to establish the causal link of diseases, invalidity and death to Chernobyl disaster aftermath;
- provision of additional treatment and diagnostic equipment to medical facilities providing servicing the effected population on the permanent basis;
- purchase of pharmaceuticals, disposables and substances for specialized hospitals, units and clinical laboratories, etc.;
- scientific follow up for research and design as well as implementing scientific development at treatment facilities that serv the effected population;
- social and psychological support and rehabilitation of the effected population.

In 1999 medical institutions received 26.8 mln hryvnas (2.07 times more than in 1998), in 2000 the amount was 35 mln hryvnas and in 2001 39.9 mln hryvnas were allocated to implement the Program.

5.4. Natural Resources Balanced Use and Reproduction

We may conventionally define two stages in the process of environmental and economic development of Ukraine between 1992 and 2002:

- general environmental and economic crisis (1992-1998) with simultaneous essential



contraction in use of major natural resources (water, mineral raw materials, partially land) as well as decrease in emissions in the air, etc.;

- relative stabilization and beginning of renaissance (since 1999) in industrial and agricultural production with growth in volume of wastewater and hazardous substance discharge in some regions, etc.

in the period of 1992-2002 use of water resources contracted from 28.6 billion m³/year down to 21.2 billion m³/year while annual extraction of basic mineral raw materials decreased as follows:

- coal - from 180 to 78.5 mln t/year;
- iron ore - from 110 to 56.0 mln t/year;
- manganese ore - from 5.6 to 2.7 mln t/year;
- oil with condensate - from 5.8 to 4.1 mln t/year;
- gas - from 18.2 to 17.8 billion m³/year.

Related to the above, implementing the policy of balanced use and reproduction of natural resources and objects within the limits of all industrial territorial complexes of Ukraine featuring high resource and energy consumption was linked to the necessity to overcome environmental and economic crisis phenomena.

Analyzing developments in natural and technogenic systems of «technogenic object-environment» provides the fact that transition to balanced use and reproduction



of natural resources is the most difficult task in the mining areas of Donbas, Kryvbas and Prycarpattyia.

Environmentally misbalanced termination of loss generating mines' operation with their complete or partial scuttling results in regional raise in ground water levels fol-

lowed by flooding and submerging of large areas. Preliminary estimates show that deterioration of environmental condition and more complicated conditions for using life support resources (land and water) and maintaining our traditional lifestyle is possible on 30% of territories in mining regions with there typical expanding urban features.

Current use of Ukraine's land resources requires accelerated implementation of rational nature use principles too. Significant specific weight of land resources (over 40%) in economic capacity of the nation as well as availability of highly fertile soils (up to 65% of soil cover being black soils) pre-determines further implementation of the following sustainable development mechanisms within agroindustrial sector of the national economy:

- further implementing measures with respect to decreasing areas of deteriorated lands;



- meeting environmental land conservation requirements in the process of regulating land tenure;

- achieving environmentally balanced division of arable lands in zones of land tenure as well as in water protection zones for surface and ground objects use;

- improving land law and formulating modern regulations on land conservation and their implementation mechanisms.

Stage by stage contraction of irrigation and optimization of ameliorated land structure is taking an important place in the system of measures to optimize land resources in recent years. At the same time, with account of water reproduction and other land functions, it is extremely necessary to undertake more active measures aimed at

reducing erosion intensity by 1.8-2.0 times and to introduce combined biological plant protection methods at 60%-65% of areas under crops.

Essential decrease in water use scope in 1992-2002 (from 28.6 km³/year to 21.2 km³/year), decrease in technogenic load so far did not result in expected effect - majority of surface water objects still belong to 4-6 quality grade (ranging from «polluted» to «very much polluted» water).

It is the regional geochemical contamination of watershed landscapes with heavy metals, petrochemicals and remaining mineral fertilizers, etc. that result in too slow improvement of surface water objects environmental condition even under decreased technogenic load. In recent years estimates of Ukrainian Institute for Environment and Natural Resources Research and the State Geological Service the Ministry of Ecology and Natural Resources showed increase in negative impact on environmental condition of surface water objects due to discharge of inadequately treated communal domestic as well as industrial waste waters. To our mind, relative slow down in the above trend can be supported by climate changes in recent years and related growth in precipitation amount and surface outflow.

Prevailing impact of drinking and household water on public health condition (the cause for 70-80% of diseases) determined recently the development of ground waters use as the most environmentally sustainable and protected drinking water source. Per capita use of drinking, table and medicinal mineral waters is also growing and reached 11.2 l/year in 2002 (up to 90-110 l/year in the developed nations). Hereto it is worth mentioning essential slow down in pollution of ground water at deep levels in the majority of ground water basins. This has mostly to do with decrease in agrochemical and technogenic loads on soil level (the one that is not protected from the surface). Coming into being of local pollution ground water areas is prominent mostly in mining regions resulting from impact of mineralized waters of mines in the process of terminating their operation as well as from impact of filtrating storages of industrial and waste waters.



The following are the major grounds for environmentally balanced water use as well as sustainable reproduction of water resources and objects in Ukraine:

- priority of social domain in water use, ensuring human rights for drinking water of adequate quality and beneficial water environment;
- introduction of water saving forms in economy development, including forms based on marginal permissible water environmental loads and changes in water objects condition;
- prevailing use of water resource objects in their natural condition;
- meeting the requirements of the international law, cooperation in the domain of use and protection of transborder water resource systems.

It is well known that ecological condition of the natural environment and its capacity to reproduce significant number of natural resources (water, land, air, biodiversity) depends on afforestation in the country's territory. Presently Ukraine's territory afforestation indicator makes 16%, that is no way meeting scientifically grounded norms (22-24%). Analysis of changes in the forests environmental condition gave evidence to the fact that prior to the turn of the 90-ies the major negative changes in forest structure were accounted for hydroenergy sector impact, for the processes of agricultural lands (1.7 mln hectares) and forested lands (0.3 mln hectares) amelioration in Polissya region as well as for radiogeochemical contamination from Chernobyl disaster aftermath involving over 3.5 mln hectares of forests.

Present slow down in pace of forest reproduction at the level of 5-7 thousand hectares with maintaining pace of timber stockpiling

at the level up to 12 mln m³/year (including up to 5-6 mln m³/year due to felling in areas of main use) was caused, on one hand, by decrease in scope of forest reproduction due to contraction of felling in areas of main use (by 2-2.5 times against the 60-ies). On the other hand, this was the result of decrease in financing due to deterioration of the national economy condition in the 90-ies.

For the purpose of establishing the minimal necessary afforestation as well as improving condition of lands and small rivers in recent years measures were undertaken to immediately afforest eroded lands, lands that are not good for crops, etc. (approximately, up to 3 mln hectares). Calculations show that this may provide for the possibility to stabilize environmental condition in the regions of steppe and forest-steppe with their lower afforestation level (4.0% and 12.6% respectively), as well as increase reproduction of timber resource in the country.

In the light of these trends traced along the ways of decrease in technogenic load on the natural environment and improvement in use of major ecology forming and life maintaining natural resources (soils, waters, mineral wealth, air, biodiversity), the possibility emerges to define the following targets for the balanced natural and resource development of Ukraine (Table 5.1).

Indicators of balanced use and reproduction of Ukraine's natural resources and objects are actually estimates based on trends in fluctuating nature and resource economic indicators in the period from 1992 till 2002. They also account for harmonization of Ukraine's ecological and economic development with both European and national sustainable development indicators.

At the same time, we should not underestimate the fact that the process of ecological and economic optimization in natural resources use significantly differs by environment reproduction capacity and by economic capacity of the nation to support this process. Let's say, the process of ecological recuperation in the mining areas of Donbas, Precarpattia and the other similar territories in this country is the most complicated process caused by disruption in the bowels of the earth and destruction of its balanced link with biosphere. That often results in

landscape fragmentation, decrease in biodiversity and evolvement of dangerous exogenous processes related to terminating operation of mines and quarries, etc.

In Ukraine the effective system for indicators assessing the natural environment condition and natural resources use is based mostly on statistic parameters of the 70-ies. Implementing decisions of the World Summit in Johannesburg (2002), of the Third Ministerial Conference «Environment for Europe» (Sofia, 1995) requires concerted efforts with respect to shaping the grounds for natural resources balanced use and reproduction along the following lines:

- establishing the scientific grounds for Ukraine's domestic needs in various types of natural resources;
- accelerated implementation of measures on preventing irreversible natural environment condition disruptions in the mining regions as well as in industrial urban conglomerates, ensuring sustainable environment enhancement and balance;
- performing environmentally grounded assessments for specific weight of various types of natural resources, including those supporting life, in public supply;
- perfecting economic levers in regulation of resources use and in the natural environment protection.

Ukraine is one of those countries whose development depends mostly on the balanced use of available natural resources, primarily those supporting life (land, water, mineral and raw materials). Research and analysis provide evidence to the fact that Ukraine has the national capacity to resolve the above issues in spite of inherited development problems. The first moves should be targeted at efficient use of all types of natural resources.

5.5. Reinforcing economic mechanisms of Kyoto Protocol in Resolving Climate Change Issues

Ukraine signed Kyoto Protocol on March 15, 1999. That was the evidence to consistent actions in resolving global environmental problems as well as commitment to sustainable development concepts.

Table 5.1. Indicative features of Ukraine's balanced nature and resource development for the period till 2020–2025 by basic natural resources

№	Natural resource type	Usage level		Balanced development measures
		current	optimum	
1.	Agricultural lands (area, mln hectares) including arable ones	43.5 32.9	36.5 37.5 26.7 27.2	Change in usage type; afforestation at eroded lands; use of progressive technologies.
2.	Water resources (water use structure): • ground waters (billion m ³ /year) • surface waters (billion m ³ /year); • percentage of water meeting requirements of the State Standard "Drinking Water" in systems of drinking and domestic water supply	4.4 21.0 40 50%	7.0 8.0 12.0 15.0 90 100%	Decrease in water consumption in industry, agriculture and housing sectors. Enhancement in environmental condition of surface and ground water objects; development of water preparation technologies and supply systems.
3.	Mineral resources and raw materials	Loss of water from 25 40% to 70% and irreversible disruption in bowels of the earth in all mining regions; soil condition and water resources deterioration, decrease in biodiversity	Introduction of technologies with higher level of raw material processing (up to 50 70%); comprehensive waste utilization and treatment; conservation of bowels of the earth and landscapes	Stabilization with stage by stage contraction in mining basic types of mineral resources and raw materials (coal, ferrous manganese and titanium ores), reduction in mining energy consumption.
4.	Forest resources (mln hectares): • environment protecting; • field protecting forest belts; • ecological network forests; • forests for prospective industrial use; • preserve vegetation stock.	4.00 0.45 0.9 5.7 2.4	6.5 1.1 7.0 9.9 6.5	Nursing forests at low productive and eroded lands; creation of holistic systems for field protecting forest belts; incorporation of environment protecting and recreation forests into ecological network next to preserves and genetic forests; creation of econetwork and biodiversity conservation.

Kyoto Protocol provided for the opportunity to apply international cooperation market mechanisms in resolving both national and global environmental issues. «Flexible mechanisms» stipulated by Kyoto Protocol, - trading in quotas for greenhouse gases emissions, joint implementation projects (JIP), projects of clean development mechanism, -

are being refined in Ukraine at the level of separate facilities and regions (Zaporizhzhya). Refining of the above mechanisms opens perspective to introduce the market mechanism of trading quotas with involvement of significant financial resources (both foreign and domestic) to modernize the national industry, to sustainably manage agriculture

and forestry, programs for efficient energy and resources use, etc.

Kyoto Protocol requires that Ukraine does not exceed the 1990 emission level within the period of 2008-2012. Accounting for the available estimates for the Ukrainian economy development, greenhouse gases emissions will not reach the 1990 level by 2012 or even by 2020. Thus, in Ukraine there is no urgent need to cut down the factual greenhouse gases emissions. That eliminates the need for financial resources.

Moreover, Ukraine will have excess quotas for greenhouse gases emissions and they will be sellable at the international marketplace. The volume of potential investment related to JIP mechanism can reach significant amounts, as Ukraine is capable to implement measures to reduce greenhouse gases emissions with less expenses than the European Union member nations, Canada and Japan. It turns out as impossible for these countries to meet their commitments as to gas emission reduction with involvement of internal efforts only. Thus, countries with high cost emission reduction are interested in implementing joint projects in Ukraine.

Economic estimates data based on international economy models show that the specific weight of reducing greenhouse gases emissions in industrialized countries falls into the range of 50 to 500 US dollars per a ton of CO₂. In Ukraine reduction by one ton of CO₂ involves only 5-20 US dollars in costs.

For the year 2010 the capacity of Ukraine to sell quotas for greenhouse gases emissions is estimated at the level of 257 - 367 mln t CO₂-equivalent, while in 2020 it can make 147 - 293 mln t CO₂-equivalent.

International research institutions assessed Ukraine's capacity to sell 50% of her excess quotas for greenhouse gases emissions for 3 - 6 US dollars per ton of CO₂-equivalent. That can provide for Ukraine's earnings from 500 million to 1 billion US dollars by 2012.

As to JIP mechanism, the Intergovernmental Task Force on Climate Change stipulated the following types of projects:

- energy sector: transition to use of fuel types with less carbon content, renewed and alternative energy sources, raising energy efficiency, decreasing attendant



Recultivation of Nikopol manganese ore open pit mining quarries.

emissions, etc.;

- industrial processes (excluding discharges from energy generation): materials processes or equipment replacement, improvement in waste management systems, waste utilization, etc.;

- agriculture: managing animal husbandry productivity, manure management systems, enhancing the structure of agricultural crops, optimal use of fertilizers and transition to other types of fertilizers, etc.;

- land use and forestry: reproduction, planting and conservation of forests as well as their optimal use, protection against fires, etc.;

- measures to decrease greenhouse gases emissions in transportation sector;

- waste management systems with respect to solid domestic waste and wastewater, waste dump gas utilization, etc.

On the basis of the National Comprehensive Energy Saving Government Program and some assumptions as to prospects of its implementation it is possible to conclude that estimates of energy saving capacity in Ukraine that may support potential JIPs make 51.2-63.2 mln t of conventional fuel in 2010. To make that a reality it is necessary to involve external financing at the level of 6.1-7.3 billion US dollars. Herewith, the capacity for reducing greenhouse gases emissions is 92 - 144 mln t CO₂/year. Average capital capacity in reducing emissions prior to the end of the first commitment term according to Kyoto Protocol (2012) is estimated at the level of 8.1 US dollars/t CO₂. Thus, emission reduction units in the JIP framework can be proposed at the compatible price that is dozens times lower than costs involved in reducing greenhouse gases emissions in the industrialized countries.



Full project capacity is much higher should we account for opportunity to implement the significant number of projects to reduce greenhouse gases emissions that are less attractive for their owners economy wise due to positive increment value compared to other alternative projects.

Apart from reducing greenhouse gases emissions, involving investment in the JIP framework shall promote gaining significant attendant benefits including as follows: decrease in pollutants emissions; resolution of domestic environmental problems; reducing risks for public health and ecosystems condition; revitalizing of investment climate, including the domain of environmental activities; prevention of «dirty» production and obsolete technologies move to Ukraine; business ecologization; emerging incentives to implement achievements of scientific and technological progress including domestic «know how»; promotion of energy resources economy; development of alternative environmentally clean technologies in energy generation.

5.6. Effectiveness of International Cooperation

There are none of the national environmental problems. When Ukraine meets challenges of its Polyssya region the renewal of «the green lungs» of Europe is scaled up. When we concentrate our efforts on environmental rehabilitation of the Dnipro river and its basin we strive as well at rehabilitation of water environment of Azov and Black Sea region to remove acute regional and global problems. Environmentally sound, democratic Ukraine with sustainable economy is not just our people's dream. It is the future full-fledged part of Europe and the whole global community.

Ukraine is actively expanding international cooperation in the domains of environment, trade and development both at bilateral and multilateral levels.

There are the following objectives in the policy for international cooperation:

- participation in the process of international law evolvement, designing sustainable development policies as well as cooperation

with international organizations;

- implementation of modern environmental policies, norms and standards, of science and technology achievements;
- international support involvement for the purpose of maintaining natural environment protection, nuclear safety and rational use of natural resources;
- resolution of the issues related to overcoming Chornobyl disaster aftermath;
- involvement of bilateral and multilateral cooperation.

Ukraine is the party of over 50 bilateral agreements and treaties in the domain of environment. Bilateral agreements stipulate the following major lines of cooperation:

- undertaking mutually agreed measures targeted to reduce the negative impact of global environmental and climate changes at both economy and a human being;
- mutual instant information as to the threat of significant transboundary contamination of the territory of one of the parties and estimates as to its expansion;
- organization of ecological training and education of population;
- information exchange in the domain of the natural environment protection;
- harmonization of environmental law, norms and regulations adjustment in the domain of natural environment protection and natural resources use;
- improvement of economic mechanism for managing the quality of natural environment and natural resources use.

Our nation is the party of 17 international conventions, 4 protocols and 1 agreement hereof. In addition 9 multilateral instruments are on their way to ratification. Among those there are the UN Convention to fight development of deserts, Rotterdam Convention on the procedure of a preliminary agreement with respect to individual hazardous chemical substances and pesticides in international trade, Stockholm Convention on enduring organic pollutants, Cartagena Protocol on biosafety to the Convention on Biodiversity, Kyoto Protocol to the UN Framework Convention on Climate Change.

The following was defined as the major lines in multilateral cooperation:

- biodiversity conservation;

- protection of transboundary watersheds and international lakes;
- climate change;
- ozone layer protection;
- ambient air protection;
- waste management;
- environmental impact assessment.

In 1994 Ukraine entered into Agreement on Partnership and Cooperation with the European Union. This Agreement defines targets for cooperation in 28 domains including industry, energy sector, transportation and agriculture, in investment protection and attraction, in science and technology, in education and training as well as in the natural environment protection. Ukraine performs the relevant work to harmonize the national law in the domains of environment, trade and development with the European norms and standards.

One of the international cooperation priorities in the ecology domain is involvement in the process «Environment for Europe». Ukraine joined this process since the Second Ministerial Conference in Lucerne (Switzerland) in 1993. «Environmental Program for Central and Eastern Europe» adopted at this Conference served a good incentive to endorse the national action plan in the domain of natural environment protection.

In 1998 the European community appointed Ukraine to host the Fifth Pan-European Conference of the Ministers of Environment «Environment for Europe» (the 21-23 of May 2003, the city of Kyiv). On one hand it was the recognition of the national environmental policy, while on the other hand it provided strong impetus to public awareness of importance to protect the natural envi-



ronment, primarily by means of harmonizing society activities with its natural environment.

5.7. Effectiveness Assessment and Recommendations of the Committee on Environmental Policy of the European Economic Commission

1. Legal instruments and institutional grounds for environment protection

Assessment. Since declaration of the Independence in 1991 Ukraine exerted significant efforts to implement environmental law norms to regulate the key sectors of the natural environment protection. However, the obsolete regulations keep their legal force and this makes it difficult to understand what regulation is applicable in specific instances. In addition, some laws took effect prior to adoption of the new Constitution.

Recommendations:

- a) Laws formulated prior to adoption of the new Constitution should be subject to critical review. Efficient application of legal instruments should take a priority.
- b) The national environmental policy should be reviewed and made specific to set up clear cut priorities, targets and time frames in various environment protection sectors employing cooperation of other ministries and stakeholders from civil society.
- c) Environmental audit of industrial facilities should make grounds for the stage by stage development of the integrated permit system covering permits as to water, air and waste. Arrangement of the variety of inspection services should undergo review to improve their integral efficiency.
- d) The Ministry of Ecology and Natural Resources should increase its coordination efforts in the domain of environmental monitoring. There is the need to develop the integral coherent national monitoring systems based on agreed upon databases and data collection methodologies. Data should be systematic, integrated and readily available to

serve managerial decision-making. The European Environmental agency should get the integrated data. It is necessary to accelerate activities on developing the adequate information system to stimulate both government and civil society concern with environmental problems.

e) The Ministry of Ecology and Natural Resources is to improve public access to ecological information in compliance with Arhus Convention as well as to try and establish closer contacts with the whole spectrum of non-government organizations, particularly in the process of law, policy and program development.

2. Economic and regulatory instruments

Assessment. Integration of nature conservation economic instruments into development policy in Ukraine is a complicated issue. The first attempts of such integration were made back in 1993 in the framework of the annual national economy development plan with a chapter on «environment-oriented economic policy». Environment protection measures were to get the adequate financing as well as the economic instruments back up. The core of the problem in this domain is the relatively low priority of environment protection for many institutions. That is the reason for strengthening institutional capacity that is limited and points out to the urgent need for ecology entering all governance levels.

Funds allocated for environmental policy implementation are extremely insufficient. Revenue from payments and penalties could serve as financing source. The general strategy should embrace adapting the effective instruments to transition period realities in ways to optimize their efficiency.

More attention should be paid to studying and analyzing economic instruments efficiency. Environmental payments should be set up at the level to efficiently stimulate implementation of environment protection measures. There is the need to practice versatile application of the principle «the one who pollutes does pay».

Recommendations:

- a) Efficient economic instruments should be defined to introduce the prin-

ciple «the one who pollutes does pay». It is necessary to undertake research to prepare transition to the new clearly market-oriented fiscal and economic policy. The need is there to clearly define those feasible and efficient levels of environmental payments as well as their implementation timeframe.

b) The system for pollution standards that are the most essential health and environment wise as well as for ecosystems protection should be targeted at pollutants that can be traced. It should be made feasible to adhere to standards related to the above pollutants entailing Ukraine's international commitments. Standards should be simple, understandable and accessible for control.

c) Special mechanism should be designed to establish the secondary products market. Increase in payment for waste removal may pave the grounds

for introducing budget items for refinancing waste processing and reuse.

d) There is the need to enhance statistics data on environmental expenses, including financing sources.

e) There should be created targeted national and regional (oblast) environmental funds with clear and transparent management system. The purpose of these funds should be improvement in the complicated situation with financing environmental activities in transition period (accumulation, targeted usage, etc.).

Ukraine is fine-tuning in recommendations of the Committee on Environmental Policy of the UN for Europe Economic Commission and accounts for them both in the process of strategic planning and in nature conservation practice.

6. THE NATIONAL DRIVING FORCES FOR HARMONIZING AND ACCELERATING PROCESSES OF TRANSITION TO SUSTAINABLE DEVELOPMENT

6.1. Institutes of State Authority

Presidential-Parliament republic in Ukraine has been fixed in the Constitution. The President as the Head of the State has the strongest impact on harmonizing and accelerating the pace of political reform as well as economy innovation restructuring, meeting objectives with respect to the European integration as the foundation for both the new government strategy and the deeper nation's consolidation for achieving sustainability in the development of the society. The latter is the most important for the Ukrainian people. Decrees and instructions of the Head of the State have direct legal effect and in practice initiated comprehensive restructuring of governance system and transition to sustainable development. This serves the evidence to active operations of the presidential institutes (the Presidential Administration, the National Security and Defense Council, and its subordinated entity - the Ukrainian Institute for Environment and Resources Research).

The Head of the State Address to the Verhovna Rada of Ukraine mapped out the major national priorities in sustainable development: transparency and openness in governance, nature capacity restoration, poverty alleviation, European choice, economy development based on innovation, public health enhancement, access to and quality of education, national harmony, versatile implementation of human rights.



The Cabinet of Ministers of Ukraine, local authorities top management formulate the respective government and local action and development programs. Efficiency of administrative driving forces could be much higher if all the managerial personnel received appropriate professional training and were attested in compliance with the uniform curricula on sustainable development strategy and tactics accounting for the specific choices on the national path.

This paves the foundation for successful implementation of objectives on transition to sustainable society: its social and economic development, nation's wellbeing growth, and democratization of society life strengthening international position and raising authority of Ukraine globally.

As the highest legislature, the Verhovna Rada of Ukraine has immensely contributed to designing and passing environmental law that enjoys the reputation of one of the best in Europe. The Verhovna Rada impacts the processes of harmonization and balance through parliamentary hearings on problem issues of environment condition. Generally, significant political focus in People's Deputies' activities has negative effect on meeting urgent environmental challenges and international commitments with respect to implementation of sustainable development principles. Legal acts implementation monitoring had been far from the appropriate functional level. Financial support for their implementation remains similarly inadequate.

Availability of the full-fledge local self-government has been one of the determining features of democratic lawful state. Local self-government empowers population with additional opportunities to be part of the political process as well as promotes alleviating alienation between a citizen and a state.

This is the very institute of the democratic society in Ukraine that makes possible the efficient implementation of public power (power of the people) vested in the Constitution. Local self-government bodies are to reconcile divergences in the govern-

ment and specific community interests as well as to ensure protection of population interests and implementation of public interests in the civilized manner.

Local self-government in Ukraine is legally regulated by the Constitution of Ukraine (1996), the Law of Ukraine «On Local Self-Government» (1997) and by other legal norms complying with norms and directives of the European Local Self-Government Charter.

Rather a complex problem has manifested in recent years: division of functions and powers between local self-government bodies and local state administrations. This was caused by the fact that local self-government bodies exercise control and supervision functions with respect to local self-government, (the traditional function in the Western nations). They also enjoy the significant scope of authority in managing the respective territories. The issue of interbudget relations requires optimization too. Resolution of the above issues and establishment of really operational local self-government is possible through further legal basis refinement, clear-cut definition of functions and competencies of every local self-government body.

The Cabinet of Ministers of Ukraine ensures implementation of government environmental policy in the framework set up by the effective law. It exercises governance functions in the domain of environment protection. The National Commission on Sustainable Development of Ukraine was set up under the Cabinet of Ministers of Ukraine in 1997. It is a consultative and advisory body on the issues of designing the national sustainable development strategy. There was the variety of reasons that prevented the National Commission from being the integrating center for sustainable development driving forces. Definition of its status as consultative and advisory body does not match the tasks the National Commission is to fulfill. Its passive stand is fuelled with frequent change of the Government and commissioners as well as its inadequate placement in the strategic decision making system.

It is expedient to subordinate the National Commission to the President of Ukraine and to ensure the authoritative representation in its composition (governmental, political, civil

society, regional, academic, entrepreneurial), that might have capacity to impact strategic decision making at the national level. Decisions of that kind should take effect by Decrees of the President of Ukraine for their cohesive implementation by central and local executive authorities, by business entities of all forms of property without any delay.

The Ministry of Ecology and Natural Resources of Ukraine representing the environmental component in sustainable development, the Ministry of Economy representing the economic component in sustainable development as well as the Ministry of Labor and Social Policies representing the social component in sustainable development should play a special systemic, methodology and integrating role in public administration mechanism to ensure transition to sustainable development. But instability in management of these key ministries, weaknesses in their cooperation on issues of sustainable development have placed significant hurdles on the path to systemic implementation of sustainable development principles. The need is there to make these ministries legally responsible for cooperation in the domain of these principles systemic implementation. The Decree by the President of Ukraine on the Resolutions of the National Security and Defense Council of Ukraine «On the Condition of Technogenic and Natural Safety in Ukraine» (2002) meets this challenge. It is also necessary to mobilize local sustainable development administrative resources.

6.2. The National Academy of Sciences of Ukraine

The National Academy of Sciences of Ukraine plays the significant integrating role. In the period that expired since the World Summit in Rio de Janeiro (1992), the scientists of the National Academy of Sciences of Ukraine implemented the whole range of measures with respect to environment protection and conservation as well as dissemination of scientifically grounded information on the core of sustainable development. In 1994 the Scientific Council of the National Academy of Sciences of Ukraine on Biosphere was transformed into the Scientific Council of



the National Academy of Sciences of Ukraine on Environment and Sustainable Development. On April 15, 1998 Presidium of the National Academy of Sciences of Ukraine considered the issue of the scientific grounds for sustainable development in Ukraine at its extended session. The National Commission of Ukraine makes part of UNESCO Program «Human Being and Biosphere» (it operates under Presidium of the National Academy of Sciences of Ukraine). In June 1998 its session considered and approved the action plan related to «The Scientific Grounds for Conserving Biological and Landscape Diversity in the Context of Sustainable Development in Ukraine». For the purpose of implementing provisions «Agenda for the 21-st Century», the National Academy of Sciences of Ukraine passed the Resolutions «On the Scientific Council of the National Academy of Sciences of Ukraine on Environment and Sustainable Development». The above Resolutions approved lines in scientific research of academic institutions dealing in problems of sustainable development and environment conservation. Three editions of scientific reports collection «Challenges of Ukraine's Sustainable Development» came out under the auspices of the above Scientific Council. The last edition was dedicated to the tenth anniversary of the UN Conference in Rio de Janeiro. The UNESCO Secretariat management has highly appreciated materials of these collections and emphasized that their contents fully met requirements of the 19-th UN General Assembly Special Session.

The National Academy of Sciences of Ukraine initiated designing the Draft Strategy for Economic and Social Development of Ukraine for 2002-2011. The draft Concept on reform of the political system of Ukraine has been prepared too. The Basic Principles for

Energy Strategy of Ukraine till the year 2030 and further were formulated by joining efforts with the leading experts of other agencies. In fact, all the respective scientific institutions of the National Academy of Sciences, industry entities of the Ministry of Fuel and Energy, of the National Security and Defense Council of Ukraine, of the State Committee for Energy Conservation and the Ministry of Industrial Policy, etc. were involved in developing this important document.

Presently the Ukrainian academics work to develop the scientific grounds for the National Sustainable Development Strategy, for the theory of noosphere genesis and harmonious development as well as on issues of the national implementation of the resolutions agreed at the World Summit on Sustainable Development in Johannesburg (2002).

6.3. System of Training and Education

In the past decade Ukraine entered 72 inter-government and 37 inter-agency agreements on cooperation in the domain of education and science with 53 nations globally. Conditions were set up to integrate the national system of education into the European and global space (it goes about transition to the three levels in training: bachelor - specialist - masters).

The Constitution of Ukraine and the Law «On Education» backed up legal regulation of



the national education system. The following Laws with direct legal force have been passed: «On Preschool Education», «On General Secondary Education», «On Extracurricular Education», «On Vocational and Technical Training». The Draft Law of Ukraine «On Higher Learning» was formulated as well as the set of regulations on the issues of general schooling, or preschool, vocational, special technical and post graduate education.

The National Children Association «Environmental Guard» («Ecologichna varta») performs great education job among children and youth to involve their participation in various environmental research processes and nature conservation interventions.

These days «Environmental Guard» represents the whole system of public environmental education, the system of self-government and upbringing environmentally conscious leader. It equates with practical moves to protect the natural environment. In this organization framework thirty two thousand young people from Bukovyna and Slobodian Area, from the Transcarpathian region and the Crimea, from Kyiv and Sumy regions, from all other regions of Ukraine make friends with nature, take care of it, preserve its beauty and original set up.

Civil society environmental organizations play the significant role in the extracurricular environmental education. For many years



they have been engaged in developing environmental education and training programs for extracurricular activities oriented at transfer of theory knowledge as well as at practical and research work, at involving young people into the variety of environmental interventions.

6.4. Mass Media

Mass media make one of effective mechanisms to inform the public on social, economic and environmental conditions in the country.

The Constitution of Ukraine (Articles 15 and 34) stipulates that the life of society in the country is based on political, economic and ideological diversity; bans censorship and grants everybody with the right for freedom of thought and speech, for unrestricted promulgation of one's views and convictions; ensures the right to freely collect, store, use and disseminate information employing the variety of means to one's own discretion.

The fact that Ukraine ratified Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters serves the evidence for the State attributing great importance to mass media in the process of introducing the concept of sustainable development.

There are specialized civil society environmental associations operating in Ukraine. They deal in raising the level of public information on environmental issues. Among them there are such organization as Center for Ecological Education and Information, the information and publishing center «Green Dossier», the information foundation WETI (Lviv). They issue permanent bulletins as well as make periodical publications - «Native Nature» (the Society for Nature Conservation), «The Green World» (the Ukrainian Environmental Association «Green World»), «Oikumena» (the National Ecological Center of Ukraine), «Off-Spring» («Parostok») (the National Ukrainian Charity «Parostok»), «The Ecological Herald», etc.

Civil society environmental organizations disseminate environmental information electronically, placing it at their own web-sites. For the purpose of the most efficient information use some organizations create their own e-mailing lists. That is their way to disseminate environmental information. Time demands establishing permanent electronic information sources like «Environmental Library» in the Internet.

At the government level information provision to the population remains insufficient not just due to the lack of radio- and TV envi-



ronmental education programs for children and youth, or environmental headings in news on both radio and TV, but also due to incompleteness in the mechanism of advising the population on environmentally important decisions adopted in the country.

Press introduces environmental aspects of sustainable development to its readers too. It highlights condition in the domain of nuclear safety on the regular basis, in particular, the problems related to termination of Chornobyl NPP operation. It also informs on the condition of the Dnipro River as well as on the quality of drinking water. It raises issues of toxic waste accumulation and highlights both natural and technogenic disasters. From time to time it draws attention of readers to the global problems of conserving the ozone layer and climate changes. However, we understand that it is not always appropriately meets the challenges of existing environmental issues or fulfils the tasks of sustainable development implementation.

Mass media in the regions pay considerable attention to environmental topics. Environmental pages come out practically in newspapers of every oblast. Environmental radio- and TV broadcasts are aired on the regular basis.

6.5. Environmental Public Interest Groups and NGOs

The Public Council was established under the Ministry of Ecology and Natural

Resources of Ukraine and comprised national environmental public interest groups. This was an important step in the process of coordinating activities of the Ministry and the public.

The Public Council was set up for the purpose of expanding public involvement in the processes of making environmentally important decisions as an element in shaping up civil society in Ukraine.

The Public Council pursues the following major objectives:

- to stimulate the public taking a conscious and active stand with respect to further evolvement of environmental policy in Ukraine and support of public initiatives in the framework of this process;
- to organize exchange of environmental information between the Ministry of Ecology and Natural Resources of Ukraine and the Ukrainian citizenry;
- to promote legal basis evolvement as well as implementation of ecological control and monitoring of the natural environment condition.

Broad spectrum of issues is being discussed at the Public Council sessions. The issues of biodiversity conservation are getting more acute. Global and regional environmental problems need urgent resolution. Ecological safety as well as reinforced control of meeting requirements and norms of environmental law requires additional effort and funds, especially with respect to environment contamination effecting the public health. Discussions hereof result in decision-making and then the relevant letters are sent to the regions advising on resolution of these or other topical environmental issues.

The Public Council organizes «round tables» and workshops, it is active in organizing and holding the national contest «To Clean Wells».

The Public Council organized and held national conferences involving ecology-oriented public. The topic of the first conference was «Environmental Policy: Public Outlook» (December 15-16, 2000). This conference strived at assessing environmental policy in Ukraine in the most objective manner as well as at defining the real grounds to shape up its effective model, mechanisms for public par-

ticipation in making decisions that significantly impact environment. There were the following other objectives: to summarize the best practice of Ukrainian environmental civil society organizations related to control over meeting requirements of environmental law, to design a joint action program in the framework of preparing the Fifth Ministerial Conference «Environment for Europe» (Kyiv-2003), to promote their integration into the European network of civil society organizations.

The second conference topic was «Environmental Policy and Implementing Sustainable Development Principle in Ukraine: Public Participation» (December 14-16, 2001). This conference endorsed the set of documents and appeals reflecting successes and hurdles in environmental policy in Ukraine and proposals on public participation in formulating and implementing policies. It made assessment of sustainable development prospects in Ukraine and formulated proposals on the action plan for preparing civil society environmental organizations to the Summit «Rio+10» (Johannesburg-2002).

The third national conference of environment-oriented civil society organizations was held in December 2002. Its task was to involve the public into preparation of the Fifth Pan-European Conference «Environment for Europe» and the parallel public forum for the purpose of formulating, discussing and approving the document «Public Assessment of Environmental Policy in Ukraine».

Public interest groups have created the document «Public Assessment of Environmental Policy in Ukraine» with the following chapters therein:

1. Environmental policy and law
2. Environmental governance
3. Nature use and consumption models
4. Environmental contamination impact on public health
5. Civil society environmental organizations
6. Ecological education and information
7. Natural resources management
8. Financial and economic issues
9. International cooperation .

Well-known environmental public interest groups take the active leadership stand in Ukraine.

The National Environmental League has formulated the goal to dramatically change nation's environmental conditions, to shape up the new nature conservation mentality, to raise the level of environmental education and citizens' culture, to establish effective model and mechanisms of public participation in decision making of concrete environmental issues, and to provide free exchange of experience and information in the sphere of environment conservation. The National Environmental League brings together prominent scientists, public figures, the People's Deputies of Ukraine, teachers, businessmen and civil servants from all the regions of Ukraine.

National Environmental Center focuses its efforts on facilitating biological and landscape biodiversity conservation in Ukraine, on formulating sustainable state environmental policy, on conducting scientific researches and on implementing practical inputs aimed at the development of nature conservation in Ukraine.

The National Children Association «Environmental Guard» («Ecologichna varta») unites children, adolescents and youth that care about environment. Association's mission is to bring up environmentally conscious personality organizing interesting environmental work with children and youth as well as their involvement in scientific research and nature conservation interventions. It strives at helping the young generation to be aware of their belonging to the world we live in.

Regional Environmental Center REC-Kyiv is independent, self governed, non-profit and non-political organization, activities of which has international characteristics. The goal is to facilitate resolving of environmental problems in Ukraine and neighboring countries, to ensure civil environmental rights and in this manner to support the development the democratic civic society in Ukraine and other neighbouring countries.

Ukrainian Environmental Association «Zeleny Svit» (Green World) advocates environmental safety, protection of human rights on clean environment.

The National Ukrainian Charity «Parostok» («Off-Spring») is engaged in dissemination of ecological knowledge and skills as well as shaping up environmental awareness of chil-

dren and youth. It supports development of ecological education, science and culture.

National Environmental Civil Society Organization «MAMA-86» deals in education activities targeted at general population, women in particular.

The Ukrainian Society for Nature Conservation unites 24 oblast level, 480 municipal and district level organizations as well as 29.5 thousand grass-route organizations embracing almost 4 million nature fans. 15 thousand enterprises and entities of all property forms are collective members of the Society.

Presidium of the National Council has the volunteer panels for protecting mineral wealth, water resources and ambient air, vegetable and animal kingdoms, land resources, natural preserve territories and fisheries. It also has youth group and panel for nature use legal grounds. Panels target their work at reviewing important industry issues, assessing the impact of natural environment and resources condition on practical measures. They take part in public control over meeting

the environmental law requirements, in law-making and disseminating ecological knowledge among population, in formulating proposals as to rational nature use. Panels for protecting mineral wealth, water resources and ambient air, vegetable and animal kingdoms, land resources as well as youth group and panel for nature use legal grounds are very active.

All in all in Ukraine there are about 500 civil society organizations targeted at resolving the burning environmental issues through their operation.

According to our estimates, in addition to the above organizations almost every rayon center and in many rural settlements of Ukraine have public interest groups that are ready to set up new environment-oriented civil society organizations. Dozens and hundreds of volunteers and supporters are ready to be part of their activities in some settlements. From 10% to 30% of population feel ready to comprehend and follow their advice. These figures vary by region and quality of information on environmental problems.



7. NATIONAL STRATEGIES FOR SOCIAL HARMONIZATION AND TRANSITION TO SUSTAINABLE DEVELOPMENT

The strategic planning of transition to sustainable development in Ukraine has not yet acquired the systematic policy characteristics. A complicated and intense process including building up the national institutions, development of environmental legislation and new social, political and environmental relations, social-economical reforming and choice of the sustainable development concept as national strategy for the 21st century prevailed at the first stage of the ten-years period (up to 1997). The first steps towards official approval of the global sustainable development strategy at the national level were taken in 1997- 1998: the National Commission for Sustainable Development of Ukraine was set up under the Cabinet of Ministers of Ukraine, the National Concept for Sustainable Development of Ukraine was drafted. The Verhovna Rada, in its turn, approved «The Major National Policy Lines in the Domain of Natural Environment Protection, Natural Resources Use and Ecological Safety Maintenance». This document clearly specifies the strategy for harmonious development of production and natural resources capacity, well-balanced use and reproduction of natural resources. This was the first official acknowledgement of strategic concepts of sustainable development and society vital activities harmonization.



On December 24, 1999 the Verhovna Rada of Ukraine approved the Concept for Settlements' Sustainable Development. This document identifies the main trends in the national policy as to promoting settlements' sustainable development as well as legal and economic ways for its implementation.

The practice of formulating sustainable development concepts of separate municipalities reflects fully gained popularity and growing informed acceptance of sustainable development ideology at both regional and local levels. Thus, at the end of 2000 the Draft Concept for Kyiv Sustainable Development was designed and, eventually, it was done for the town of Mariupol.

Topicality of formulating the national strategy for harmonization of society vital activities and sustainable development keeps growing.

7.1. Harmonizing Approaches for the Choice of Sustainable Development Strategies

In the aggregate of current motive powers in Ukraine embracing institutes of power, NGOs and public interest groups as well as businesses, government and civil society entities are the most active components. We can assume government and civil society approaches (concepts) to sustainable development and vital activities harmonization took their shape. In the meantime, businesses seem to follow fragmentary approaches with mostly market and economic components dominating in natural resources use.

The national strategy for sustainable development of Ukraine has not been approved yet - it is still at design and discussion stage. Discussions focus on two principal approaches: one proceeds from innovative, social and economic factors, while the other highlights the natural noospheric factors in transition to sustainable development. Numerous publications and presentations by Ukrainian scientists reflect these positions.

Public view on the reality and approaches to the choice of national development path were laid out in «Public Assessment of Ukrainian Environmental Policy». In a nutshell, it deals with acknowledging both legally and politically the parity role of civil society environmental activities as well as the priority of evolving population environmental awareness and culture, of ecological education and training. Therefore, it goes about harmonizing innovation, natural noospheric and humanitarian approaches. After all, this is common and totally normal outlines in meeting the challenge and choosing the national development path. Unfortunately, procrastination seems to have become the decisive factor hindering the very process of transition to sustainable development.

We live in the conditions featuring man caused depletion of nature capacity, ecological misbalance in the natural environment, significant technogenic load on it combined with the realities of explicit and pressing social stratification for the very poor and the very rich as well as hampering economic reforms and nation's business progress. Consolidation of government, academia, civil society and business efforts is badly needed for designing and implementing the Ukrainian national development strategy. Herewith we need to account for the following transition specifics.

The first group of transition specifics deals with neutralizing inertia and negative impact of historic legacy factors. There are the following basic instability factors: excessive technogenic load on the Ukrainian territory and depletion of the fixed assets; the critical condition of power, hydrotechnical, communal, water treatment facilities and networks; total negligence with respect to regional ecosystems that sometimes results in irreversible condition (in the areas of Donetsk-Prydniprovsk, Transcarpathia, Podillya, etc); land fertility reduction caused by erosion and deflation; environmental and resource misbalance of the Dnipro, the Siversky Donets and other river basins.

The second group of transition specifics is defined by «acquired negative factors» born by decade of political and economic reforms in Ukraine. Hereof fluctuations root into demographic crisis, mortality rate exceeding



birth rate, substantial social vulnerability and stratification of Ukrainian population into the poor and the rich as well as the lack of determining middle class impact. On top of that, the process of changing ownership (privatization, land sharing, etc.) has totally ignored its environmental aspects. The democratic institutions are not mature in the country and there is no practical civil society impact on military, legal and court systems. Lack of spirituality becomes a real danger.

The third group of transition specifics is of geopolitical nature. It covers the threat of international terrorism manifestations - political, military, environmental, information, transborder, etc. - as well as transnational monopolism and energy supply dependency.

Some other important considerations can be added to the list. First of all, it is a specific hindering factor of inertial «non-ecological» mentality of the majority of officials. To a large extent, they are oriented at formal respect of international commitments. So far the concept of safe sustainable development and society vital activities harmonization has not been appropriately rooted in mentality of decision-makers and public servants.

It is noteworthy, that harmonization of society vital activities and transition to sustainable development are systemically related to the national security of Ukraine, safeguarding its proper interests and strivings. Internal and external realities make us to wisely coordinate the national security strategy and the strategy for sustainable development.

Ecological crisis made us to acknowledge the new environmental/spiritual paradigm - environmental and simultaneously cultural-logical system of values, concepts and perceptions, which shapes up new vision of reality based on harmonizing relationships between a human being, society and Nature. Environmental paradigm, in its turn, provided impetus to shaping up the new life philosophy - noospherogenesis, - which is reasonable, mutually acceptable coexistence of a human being and nature.

Presently the need is growing to reanimate the concept of «wisdom» as a format for the outlook, to be precise, as means to comprehend reality and to resolve practical issues harmoniously combining expertise and reasoning.

The unity of physical (biological) and spiritual life is the objective law of Cosmic Harmony. This law infringement leads to both ecological and social crisis.

It is expedient for Ukraine, that is actually balancing on the edge of depleting its nature capacity, to consider sustainable development with Nature as life prevailing concept against treating it as a resource for economic growth. That is why the multifactor process of putting in good order (of harmonization) in compliance with natural laws of society operation should be perceived as the only reliable way to achieve sustainability in its development with priorities on balanced application of technological and biotic mechanisms in regulating life harmonization, regional modeling the ways and means to practically achieve harmony and complete transition to sustainable development.

Alternative critical levels for economic capacity of specific natural objects, ecosystems, regions, biosphere as well as optimal technogenic loads for specific timeframes can be established only through multifactor nationwide and regional modeling. Only scientific and theoretical definition of the original condition in natural, economic, technological, social and other systems can provide for application of theoretical principles of biotic regulation in the natural environment or in a system managing the process of achieving harmonious development through biotic, not technogenic priorities. It is about formulating some fundamental reference provi-

sions for strategic planning in the process of achieving live activity harmonization oriented at the final outcome - the harmonious sustainable society with marginal permissible norms for biosphere and natural ecosystems economic capacity.

One of the priority tasks, most topical today, is shaping up noospheric, environmentally oriented outlook of government officials, political and public figures in Ukraine as well as in business community.

7.2. Innovation Strategy for Harmonizing Society Vital Activities and Nation's Balanced Development

The innovation strategy has been formulated in the President's Address to the Verhovna Rada of Ukraine «The European Choice. Conceptual Grounds for the Economic and Social Development Strategy of Ukraine», in the Verhovna Rada Resolution «On the Concept of Scientific, Technological and Innovative Development of Ukraine» and in the draft «National Doctrine for Innovative Development and Modernization of the Ukrainian Economy».

The innovation strategy has considerable scientific, technological and intellectual capacity; that is why it was accepted as the fundamental national development strategy and the strategy for nature capacity reproduction.

The President's Address to the Verhovna Rada presents innovative development model as the basis for restructuring economy with the final goal of sustainable development and European integration. To that end, scientific, technological and innovation policy of the state should be reconciled with innovation strategy.

1. Financing science should be improved dramatically through increase in budget allocations (not less than 1.5 - 1.7 % of GNP at the first stage and up to 2.0 - 2.5% - at the second stage), and by off-budget funds involvement.

2. Reinforcing material and technological support of scientific institutions, equipping them with computers and state-of-the-art devices and machinery, establishing adequately equipped regional and industry cen-

ters for their joint use is presently relevant.

3. The level of scientific research results' commercialization should be enhanced; innovation risks for the high-tech industries and venture capital should be reduced with support of special funds; state order for innovative implementation should be the regular practice.

4. Institutional back up for the national scientific, technological and innovation policy is the priority task embracing as follows:

- improving the current and working out the new normative and legislative framework for activities in science, technology and research, providing scientific research with financial and logistic support;
- setting up modern patent and information database with appropriate reference and search system, using global computer science achievements in patent technologies;
- developing the national policy for privatization of institutions in the domain of science and technology;
- improving standardization and certification procedures as well as the state

statistics system to reflect progress in science and technology; bringing these systems in compliance with the European standards;

- implementing incentives, particularly through tax benefits for cooperation between science and production facilities, mechanisms of regional support for research and development as well as innovative workforce redistribution;
- developing and strengthening international cooperation in the realm of innovation, its information and consulting support, technology transfer, first of all, with the EU countries and Russia.

5. The legal framework for innovative activities, international research and technology cooperation requires improvement and expansion; same applies to the regulation of innovation market, intellectual property evaluation as well as export and import of produce manufactured with its employment; innovative facilities and organizations should enjoy tax, lending and insurance incentives.

6. All the appropriate measures should be taken to keep personnel capacity in scientific research institutions, to encourage youth



to participate in scientific, research and technology development, in particular, by staffing scientific institutions with specialists trained on the state order basis. Special grants for young scientists should be introduced; specialized boards to present candidate of science and doctor degree theses in new occupations should be set up; the practice of training highly qualified personnel at foreign educational institutions should expand.

7. It is also high time to reinforce the engineering system, which maintains its capacity and is the basic resource for the Ukrainian economy in the course of its transit to innovation development stage. It requires raising both engineering profession prestige and remuneration. The system of engineers retraining and advanced training should also be revived on the modern basis.

8. Integration of research and production, consolidation of industrial, banking and commercial capital into powerful structures, capable of manufacturing high-tech, competitive goods and services, are the predominant components in innovation development. Respectively, setting up financial-industrial groups, particularly the transnational ones, as well as horizontal and vertical holding companies, research and development centers, technopolices and technoparks will provide institutional background for innovation policy implementation. In future they will become the main gears for science, technology and innovation progress. Some of such entities can be set up and develop through the free economic zone mechanisms..

7.3.Replacement of Inefficient Production and Consumption Structures

Inefficient production and consumption structures are the main cause for crisis in the natural environment of Ukraine. They are responsible for poverty amidst population and for disproportion in economy. The national economy complex is still overcostly and focused at raw materials. Removal of this purpose is view, the relevant industries are restructured to improve their structure,

to renovate obsolete assets, to make technologies environment friendly, to introduce the variety in property types, to shut down loss generating facilities and to implement new innovation policy.

Fuel and energy complex of Ukraine is technologically obsolete, industrial and production assets have depreciation level of 65%-75%. There is essential lack of funds to modernize this sector. The scope of geological prospecting for oil and gas as well as commissioning of the explored deposits is not sufficient. The policy to diversify oil and gas supply is not much active.

For the purpose of resolving energy problems and reforming fuel and energy industries the Concept of Fuel and Energy Complex Development in Ukraine till the year 2010 was formulated in 1994.

The following priorities in energy policy of Ukraine were defined in the context of sustainable development and production and consumption structures improvement:

- active resources and energy saving;
- expanding use of safe non-emission (or low CO₂ emission) energy supply sources;
- reducing the hazardous impact of energy supply sources with high hydrocarbon contents on the natural environment;
- creating monitoring systems employing indicators to follow environmental aspects integration in fuel and energy sector;
- diversifying the sources of natural gas, oil, nuclear fuel imported into Ukraine;



- stabilizing and increasing domestic oil and gas production through more intense deposits prospecting;
- developing oil and gas transportation corridors;
- developing renewable energy sources;
- using alternative types of fuel.

The policy aimed at higher efficiency of energy use and energy saving is enshrined in the National Program for 1997-1999 «High Efficiency Energy Saving Technological Systems» as well as in the Comprehensive National Energy Saving Program of Ukraine for 1997-2010. The State Committee of Ukraine for Energy Saving was established, formidable organization work was performed, legislation and regulations were developed to support implementation of the national and regional policies in the domain of energy saving and efficient use.

Coal is the only self-sufficient fuel resource in Ukraine. The coal industry, however, is an extreme problem for Ukraine as enterprises lack proper working capital and suffer from significant depreciation of their production assets. That is why in 2000 the Government formulated the Draft Concept for Coal Industry Restructuring and Strategic Development.

The further building up of resource capacity in fuel and energy complex will be implemented according to the Draft Law of Ukraine «On Approving the National Program for Mineral and Raw Material Basis Development in Ukraine for the Period till 2010».

Non-conventional energy sources. Evolvement of alternative renewable energy sources takes place in the framework of the Program for Government Support of Developing Non-Conventional and Renewable Energy Sources and Small-Scale Hydro- and Thermal- Power Generation (1997).

Presently the use of renewable energy sources in Ukraine (except for the large-scale hydropower industry) accounts for about 0.5% of the total energy consumption. Technologically feasible aggregate capacity of non-conventional and renewable energy sources in Ukraine makes about 78 mln tons of oil equivalent per year (100%),

which split into the following categories by usage: wind energy - 24.6 mln t of oil equivalent (31.4%), small scale hydropower industries - 2.24 (2.9%), sun energy - 4.92 (6.3%), bioenergy - 21.2 (27.1%), chemical combustibles and coal mines' methane - 13.2 (16.9%); usage of other sources accounts for 12.03 mln t of oil equivalent (15.4%).

Usage of biogas energy, small-scale thermal power plants, wind energy, small-scale hydropower plants, coal mines methane and chemical combustibles, helioenergy and geothermal energy can be considered the first priority energy alternative sources for Ukraine.

Young innovation development domain of «fuel cells» technology is one of the Ukrainian reserves for alternative energy supply sources. This technology transforms the energy generated by organic fuel directly into electric power. Ukraine is the only country in Europe which has zirconium deposits that ranks third in the world. Zirconium is the raw material for fuel cells. These resources enable Ukraine to join international cooperation in building up new environmentally safe power industry and motorcars industries of the 21st century.

Agroindustrial complex. Sustainable development of agroindustrial complex in Ukrainian stipulates promotion of environmentally safe and economically balanced interaction between all the three spheres of its interbranch cooperation: manufacturing agricultural inputs for agriculture proper, for agriculture produce collection, building up stocks, processing, storage and transportation. Achieving optimal produce cost correlation in three components of agroindustrial complex is one of the main preconditions for its sustainable operation.



The state actively regulates agroindustrial complex operation through pricing, taxation, lending policy, subsidies to agriculture, incentives for agricultural products export, etc. Special attention is paid to agriculture produce storage, processing and sales. Poor storage conditions annually result in Ukraine losing about one fourth of the total produce.

Direction for agroindustrial complex restructuring was defined in the Presidential Decree «On Urgent Measures on Accelerating Reforms in Agrarian Sector of Economy» (1999), in the Resolutions of Cabinet of Ministers of Ukraine «Market Transformation in Agrarian Sector of Economy», «The System for Storage and Rational Use of Agroecological Capacity of Ukraine», «Zone Systems in Producing Fodder» and in other legal acts.

Reforms carried out in Ukraine's agroindustrial complex are aimed at transforming economic relations, primarily proprietary relations in agriculture. Adoption of the Law of Ukraine «On Land Lease» in its new wording in 1998 became an important step towards reforming agriculture and boosting entrepreneurship. This law established opportunity in Ukraine for developing the new agricultural entity type - private lease-based companies.

The Program to Manufacture Machinery and Equipment Technological Complexes for Agroindustrial Complex for the Period 1998-2005 stipulates improvements in manufacturing agricultural inputs and providing agriculture with modern machinery of domestic make. This purpose in view, 143 items of new machinery were designed and commercialized. In 2001 technological processes in agroindustrial complex employed 80% of domestically manufactured machinery against 27% in 1992.

Access to the world markets remains the most problematic issue for Ukrainian agroindustrial complex. The set of necessary legal acts enabling the effective Ukrainian Law to meet the World Trade Organization requirements makes the agroindustrial complex to carry not only legal but institutional and technological load.

Transport. Automobile transport remains one of the most significant sources of ambient air pollution in Ukraine. In 2000 it



accounted for 33% of all pollutants in the total emission volume in the country.

Over the period between 1991 and 2001 a number of the Laws of Ukraine were passed and created legal grounds for transport industry operation. Their implementation permitted to achieve certain stabilization in transportation volumes starting 1997, while further growth was registered in 1998-2000. Special attention was paid to implementing legal acts and regulations as well as to taking measures aimed at safe transportation of hazardous cargo (toxic chemical substances, waste, plants protection means, fertilizers, radioactive materials) and reducing their negative impact on environment in the course of transportation.

Setting up of the transport corridor in Azov-Black Sea region, putting into operation «Pivdenny» oil transportation terminal brought to life new task for Ukraine - to establish efficient entities in transportation industry capable of ensuring safe hydrocarbons transportation.

To ensure compliance with environmental requirements on mobile pollution sources the Concept for Reducing Heavy Metals' Emissions into the Ambient Air was approved. The Program for stage by stage termination of ethylene gasoline use in Ukraine is implemented too.

In 1997 Ukraine approved the Concept for Establishment and Operation the National Network of International Transportation Corridors. This Concept laid foundation for adoption of the Government Program (1998) for setting up and putting into operation the national network of the international transportation corridors by the year



2005. The Program declared transition to implementing international transport policy principles approved by the European Commission.

Consumption by population. In the period after 1995 the rates of decrease in consumption started to slow down. In 1999 certain positive changes were registered in consumption of some types of produce. The year 2000 was marked with further increase in consumption of almost all the basic foodstuffs.

To ensure the guaranteed consumption level and higher living standards the Law of Ukraine «On Protecting Consumers' Rights» was passed in 1993. It set up the legislative framework for the state guarantees in the structure of Ukrainian population consumption. One of priority draft laws aimed at increasing consumption safety is the Draft Law of Ukraine «On Changes and Amendments to the Law of Ukraine On Processed Foodstuff and Raw Food Quality and Safety».

Majority of the Ukrainian population keeps living in much smaller and less comfortable apartments compared to housing norms in the developed countries. The need for reforms in the government housing policy was reflected in the Concept for Government Housing Policy (1995) that defined legislative framework and lines of operation for government housing programs.

One of the national policy trends in shaping efficient consumption structures that

became popular in Ukraine in 1991-2001 was marking food products and disseminating information on their quality and nutrition facts through mass media. Openness promotes reconciling of manufacturers' and consumers' interests, thus harmonizing, to the certain extent, social relations.

7.4. Modern Ukrainian School of Noospherogenesis and Harmonized Development of the Society

The scientific school of harmonized development became popular in Ukraine in recent years. Due to its operation, a number of new original, scientifically justified theories built on various concepts, scientific, philosophical and research approaches came into being. The main concepts are based on biotic, social, innovation and technology as well as economic approaches.

The noospheric trend is worth a special mention. It was introduced in due time by renowned Ukrainian scientists S. Podolinsky (the sun nature of added value) and V.Vernadsky (the dominance of reason, live matter in vital activities). These two pioneers actually set up theoretic foundations for the research tools and methodology of harmonizing society vital activities.

The collection of scientific papers of the National Academy of Sciences of Ukraine «Sustainable Development Problems in Ukraine» (third amended edition, Kyiv, 2001) deals with the concepts of balanced development. Academician I.Loukinov draws attention to the destabilizing factors (both



of objective and subjective nature) recently being active in Ukraine, to imperfection of transition economy model imposed on our country; to the necessity of reviving investment and innovation activity on the whole and in the natural environment protection domain in particular; to the fact, that modern society should function in compliance with environmental laws (having in mind the reproduction basis for harmonizing human vital activities).

Professor V.Shevchuk defines 5 major goals: social justice, economic progress, environment rehabilitation, efficient use of natural resources and demographic stability and provides justification for each of these goals.

In the same collection academician V. Geyets clarifies the characteristic features of economic restructuring within the framework of Ukrainian transition towards sustainable development. The corresponding member of the Academy S.Doroguntsov and O.Ralchuk made an effort to identify the gist and tasks of sustainable development taking into account components of environmental and economic safety in their interaction.

The corresponding member of the Academy L.Rudenko pays due attention to the biological and geographical aspects of sustainable development, dwells upon four basic principles in designing sustainable development models, presents comparative characteristics of processes and stages involved in sustainable development model implementation in Ukraine, Russia and Germany.

The specific characteristics of transition towards sustainable development in Ukraine are given also in the presentations by professor B.Danilishyn, academician M.Dolishny, the corresponding member of the Academy B.V.Burkinsky, professors V.Stepanov and S.Kharichkov, academician V.Tregobchuk, scientist and science manager V.Voloshyn.

Professor L.Melnik (Sumy State University, 1998-2000) employed the results of his research of processes and phenomena in inorganic nature, biosphere and society and identified the regularities in functioning and characteristics of open permanent systems as uniform evolution of nature revealed the

linkages between energy and information characteristics in transformation processes, peculiarities in development of natural and social and economic systems. The author offers his vision for management of social and economic development, which will ensure its coordination, progress and avert the disaster. He claims that only by learning the lessons and laws of nature the humanity will be able to get to the new level of efficiency in social and economic systems reaching the fundamentals of sustainable development (biotic approach).

Approach in presentation by professor M. Bilopolsky (Institute of Industrial Economy, the National Academy of Sciences of Ukraine, 1997) is different from that of Mr. Melnik's research. It deals with summarized, theoretical, philosophical, historical, social and economic analysis of the role performed by organization processes in social life and development looking for possible ways of improvement in social structures (production, economy, specific countries and world as a whole). The author endeavors to prove the necessity for integration between all the technical, natural and social sciences to research the ways of optimizing social systems with due consideration to environmental component, the necessity for formulating the scientific concept for civilization development and improvement «to avoid cataclysms in the future».

The renowned Ukrainian biologist V.Merezhin offered profound systemic analysis of a huge scope of scientific information (from Bible and writings of the ancient thinkers to the most recent studies in biology, geology, philosophy, astrophysics,



mathematics and political science). His goal was to draw an objective picture of the World and the Biosphere, to show their integrity and development through inter-linked natural and civilization processes, the ways of studying the Nature, environmental disasters causes in the former geological periods and in our times, to clarify the human role in pulsating Biosphere as well as the strategy for human survival.

Y. Marchuk's study «Ukraine: New Paradigm for Progress» (2001) is the most innovative and pragmatic among the whole range of Ukrainian studies analyzing the most significant modern tendencies and trends in the global progress, formulating this progress strategies and potential opportunities for Ukraine's transition to balanced social and economic development.

Y. Marchuk's study significantly differs from the others not only due to the well-justified practical recommendations which can be implemented even in the nearest future, i.e. within the next 3-5 years, but also due to profound objective analysis of modern social and economic realities in Ukraine, of globalization processes specific nature and consequences, of broad characteristics of the main factors in the fourth epoch of civilization - the technological epoch. It is most important that it provides detailed substantiation of conceptual provisions for Ukrainian progress and new strategy for regional policy in social and economic development. The author is certain that implementation of «the 'sociopolicy' idea will enable resolving the best capacity use in modern social tendencies in the condensed timeframe as well as targeting the internal transformation of our society in such a way that Ukrainian integration into community of developed countries will be natural and partners will desire it».

In December 2001 another scientific paper dealing directly with the innovation paradigm for Ukrainian sustainable development in the 21st century and with its scientific and technological component in particular was published in Ukraine. It is the research of academician M. Zgurovsky «Systemic Forecast Methodology». The author studies a new approach in designing future event scenarios in various areas of human activity

using qualitative and system analysis methodology to develop new innovation policy of the country. The author proves convincingly that the universal forecast methodologies, especially those for technological forecasts, will have significant impact on future society progress. Presently innovations play the key role of society economic development engine.

Studies on technological forecast methodology are related to the search of new innovation activity areas in which Ukraine stands a good chance of entering the world markets as well as to further development of balanced development scenarios.

The following papers on philosophy and economy published in 1997-2002 in Ukraine are noteworthy: «National Being in Environmental Realities» by the Ukrainian scientists M. Kiselyov and F. Kanaka; «Environmental Culture» by V. Krysachenko and «Environment, Culture and Politics» by V. Krysachenko and M. Khilko; «Harmony of the Dnipro River Vital Forces» (environmental/spiritual essays) and «Noosphere Genesis and Sustainable Development» by V. Shevchuk, Y. Satalin, G. Bilyavsky, V. Navrotsky and O. Mazurkevich; «From Biosphere to Sociosphere» and «Ecosystemology» by M. Holubets; «Ecologically Safe Development: Search for Stratagems» by A. Tolstoukhov and M. Khilko.

The above incomplete list testifies to the fact that the natural principles of harmonized development eventually find more and more broad and diverse scientific and theoretical justification in Ukraine, namely in the fields of philosophy, environmental science, culture, innovation, spiritual life. The ideas of harmonized development appeal to the Ukrainian people, first of all, due to predominant role of nature with its objectively existing environmental laws of harmonizing the coexistence between human society and nature. The approaches and concepts of human activity biotic regulation become more and more popular as they reflect the objective laws of the Universe in the best way.

7.5. The National Strategy for Harmonizing Society Vital Activities and Sustainable Development within the Context of the World Summit Decisions (Johannesburg, 2002)

Economic and social strategy for transition to sustainable development is defined in the package of official documents the most important being the President's of Ukraine Address to the Verhovna Rada of Ukraine «The European Choice. Conceptual Grounds for the Economic and Social Development Strategy of Ukraine for 2002-2011» and the Presidential Decrees «On Poverty Alleviation Strategy», «On the Concept of Public Health Care Development», «On the Main Trends in Land Reform», etc.

In its turn the ecological strategy is defined by the official documents with the fundamental one being «The Major National Policy Lines in the Domain of Natural Environment Protection, Natural Resources Use and Ecological Safety Maintenance» (approved by the Resolution of the Supreme Rada of Ukraine of March 1998, #188/98-BP). Of no lesser importance are «The National Program for Rehabilitating the Dnipro River Basin and Enhancing Drinking Water Quality» (approved by the Resolution of the Verhovna Rada of Ukraine of February 27, 1997) as well as the other national and governmental environmental programs.

The important outcome of the designed and approved strategies is their compliance with the sustainable development principles:



- Alleviating poverty and enhancing living standards for the residents of Ukraine;
- Ensuring stable resource-saving economic growth, building up competitive market economy;
- Improving the national economy structure through innovation development model;
- Integrating into the European structures and the global economy system;
- Ensuring environmental balance, reducing the technogenic load on natural environmental systems;
- Biodiversity conservation.

From the philosophical point of view and proceeding from the sustainable development principles which deal with the global challenge of stage by stage increase in the national capacity to enhance life quality in all areas without damaging the nature and generations to come, the last decade (years 1992-2002) turned to be the preparatory stage in transition to the sustainable development for Ukraine. This stage is not over yet, as at least five years of active operation are needed to stabilize and reproduce the natural capacity for sustainable development harmonizing all the aspects of life, consolidating and putting in motion all the gears.

At the same time, the last three years have shown that Ukraine has a considerable national capacity for accelerating the transition to sustainable development.

The major components of this capacity are, first of all, the availability of highly qualified specialists as well as the general education level of population that is important for accepting sustainable development concepts and principles as well as significant support for strategies to harmonize vital activities and sustainable development by the public. Second, Ukraine managed to demonstrate considerable potential for growth regardless its obsolete production assets. Third, our nation has achieved significant successes in environmental policy implementation.

And, finally, the significant «critical mass» of implementing reforms has been accumulated in Ukraine, particularly in agrarian sector, to support the irreversibility of the cho-

sen course for further building up and reinforcing the nation.

As of today, the major objective for both the country leadership and the society is to re-orient the national policy and strategy at concepts and principles of harmonizing vital activities and sustainable development, at providing the legislative, institutional, educational and financial framework for their implementation.

The Program for transition to sustainable development in our country is presented in the President of Ukraine L.Kuchma Address to the Verhovna Rada of Ukraine. This Program stipulates the European choice, Ukraine's commitment to the general human values, to ideals of freedom and guaranteed democracy, to ensuring economic stability based on innovation model of sustainable development. This sets up the solid foundation for the further progress of the country.

Change in orientation of the economic policy to social issues has been the main goal of reforms implemented in Ukraine

The following strategic priorities for sustainable development in the domain of economy have been identified:

- strengthening the mechanisms which are to ensure reliable guarantees not only for final economic stabilization, but also for setting up the necessary preconditions for its rapid growth;
- implementing scientific and technological innovations, mastering and applying new managerial methods as the main factors for sustainable economic development (change in production and consumption models);
- implementing the active agrarian policy;
- reinforcing the economic premises for profound restructuring in social domain;

in social domain:

- growth of nation's intellectual capacity, intensive development of education, of environmental knowledge, in particular;
- preventing pauperization of population through social domain restructuring, introducing reforms in labor compensation, reducing unemployment, improving the system of government social support, introducing the manda-

tory social security system;

- enhancing condition of children, youth, women, family;
- taking coherent steps aimed at improving public health protection, reducing mortality and expanding longevity;
- reinforcing position of the middle class;

in environmental domain:

- safeguarding ecological safety of nuclear objects as well as protection of the population and the natural environment against radiation; minimizing the negative impact of Chernobyl NPP accident aftermath and the hazard level at the other NPPs;
- enhancing ecological condition of Ukraine's rivers, of the Dnipro basin in particular, and drinking water quality;
- stabilizing and improving ecological condition in the cities and industrial centers of Donetsk-Prydniprovsky region;
- erecting new and restructuring the operating communal sewage treatment facilities;
- preventing contamination of the Black Sea and the Azov Sea, improving their ecological condition;
- forming the balanced system for use of natural resources and making manufacturing, energy, construction, agriculture and transportation technologies environment friendly;
- conservation of biological and landscape diversity, development of natural reserves, improvement of agrolandscapes ecological condition.

The basic gist of the current government strategy for Ukraine's national development presented in the Presidential Address and the Government Action Program comprises implementing the clear cut course for sustainable development principles adoption through deep structural changes and intensification of market reforms; through active and consistent environmental and social policy. Naturally, it requires adjustment in the context of decisions of the World Summit on Sustainable Development in Johannesburg (2002).

To mobilize and grow the capacity for transit to sustainable development the

comprehensive program for national implementation of decisions made at the World Summit on Sustainable Development (Johannesburg, 2002) was formulated in Ukraine for the period of 2003–2015 and approved by the National Commission on Sustainable Development under the Cabinet of Ministers of Ukraine.

The Program was devised in compliance with commitment of the President of October 9, 2002 #1-1/1300 according to the agreements reached as the result of bilateral meetings at the highest level in the framework of the World Summit. This work was guided by the Ministry of Ecology and Natural Resources of Ukraine with support from the International Dnipro Foundation involving participation of the Ukrainian Institute for Environment and Natural Resources Study as well as the other stakeholders - the executive authorities, other institutions and organizations.

Implementation of the Program tasks (see Table 7.1) will make an important compo-

nent in the strategic plan for Ukraine's transition to sustainable development and integration into the European and global community. Formation of scientific, methodology, organization and institutional support for introducing the sustainable development grounds is stipulated to achieve that basic goal and to implement the Program tasks.

Implementation of the Program will provide for comprehensive systemic approach in designing the government policy in Ukraine based on sustainable development principles. This policy will be focused at ensuring economic growth, social progress, creating safe human habitat and the natural environment reproduction.

Efficient implementation of the Program tasks will lead to the reduction in the scale of poverty, increase in living standards and ensuring productive population employment, social condition stabilization and consent in the society, enhancement in energy efficiency of manufacturing processes, dramatic economy restructuring, technological renovation of equipment, development of



high tech industries, expansion in renewable energy sources use, reproduction and maintenance of environmental balance in the territory of Ukraine.

Implementation of sustainable development principles should be performed under

this Program with account for the other national, industry, regional and local programs within the limits of funds allocated in the State Budget as well as in oblast and local budgets with employment of funds provided by business entities of every property form.

Table 7.1. Main Interventions Stipulated by the Comprehensive Program for National Implementation of Decisions of the World Summit on Sustainable Development

No	Decisions of the World Summit on Sustainable Development	Implementation Measures	Responsible Implementing Agencies	Time frames
<i>In Social Domain</i>				
1.	By year 2015 to halve the specific weight of citizens with daily revenue less than 1 US dollar.	Implementing the Strategy for Poverty Alleviation approved by the Presidential Decree of July 15,2001 #63 will provide for reducing by 2015 the specific weight of citizens which daily consumption cost does not exceed 4.3 US dollars based on the purchasing power parity.	<i>The Ministry of Labor, the other central executive bodies</i>	2003 – 2015
2.	To establish the joint global fund to alleviate poverty and promote social and human development in developing countries.	Formulation of proposals for Ukraine to participate in setting up the joint global fund to alleviate poverty and promote social and human development.	<i>The Ministry of Labor, the Ministry of Finance, the Ministry of Foreign Affairs, the Ministry of Economy</i>	2003

3.	By year 2015 to halve the specific weight of population that has no access to safe drinking water sources.	Implementing provisions of the Comprehensive Program for priority central water supply of rural settlements using imported water in 2001 – 2005 and the estimates till 2010. (the Resolutions of the Cabinet of Ministers of November 23, 2000 #1735) in compliance with the National Program for Water Supply Development in Ukraine.	<i>The State Committee for Water Resources, the State Committee for Housing and Communal Services</i>	2001 – 2010
4.	By year 2015 to halve the specific weight of population that has no access to sanitary services.	Implementing provisions of the Program for development of water supply and sewage systems (the Resolutions of the Cabinet of Ministers of November 17, 1997 #1269 and of June 1,,2002 #721).	<i>The State Committee for Housing and Communal Services, the Council of Ministers of the Autonomous Republic of the Crimea, oblast state administrations; Kyiv and Sebastopol City Administrations</i>	2003 – 2010
5.	By 2015 to implement programs and initiatives for reducing infant mortality, mortality of children under 5 and maternal mortality by 75% against the benchmark of 2000.	Further implementation of measures to reduce children and maternal mortality stipulated by the Presidential Decree of January 24, 2001 "On Additional Measures to Ensure implementation of the National Program "Children of Ukraine" for the period till 2005", by the Decree March 26, 2001 #203 the National Program "Reproductive Health 2001 2005" and by the Order of the Cabinet of Ministers of March 29, 2002 #161 "On Approving the Safe Motherhood Concept" which will permit to reduce infant mortality by 12% and maternal mortality by 18% by 2006 against the benchmark of 2000.	<i>The Ministry of Health, the Academy of Medical Sciences of Ukraine</i>	2003 – 2005
6.	By 2005 to reduce the spread of HIV/AIDS in the age group of 12 15 by 25% in the most affected countries and globally by 2010.	Implementing measures stipulated by the Program for HIV/AIDS Prevention in Ukraine for 2001 2003 (the Resolutions of the Cabinet of Ministers of July 11, 2001 #790). Drafting the relevant Program for years 2004 – 2008. By 2005 stabilizing the spread of HIV/AIDS in the most vulnerable population groups (IDUs, in particular) and by 2010 reducing the HIV/AIDS spread by 25% among young people of 15 24.	<i>The Ministry of Health, the Academy of Medical Sciences</i>	2003 – 2010

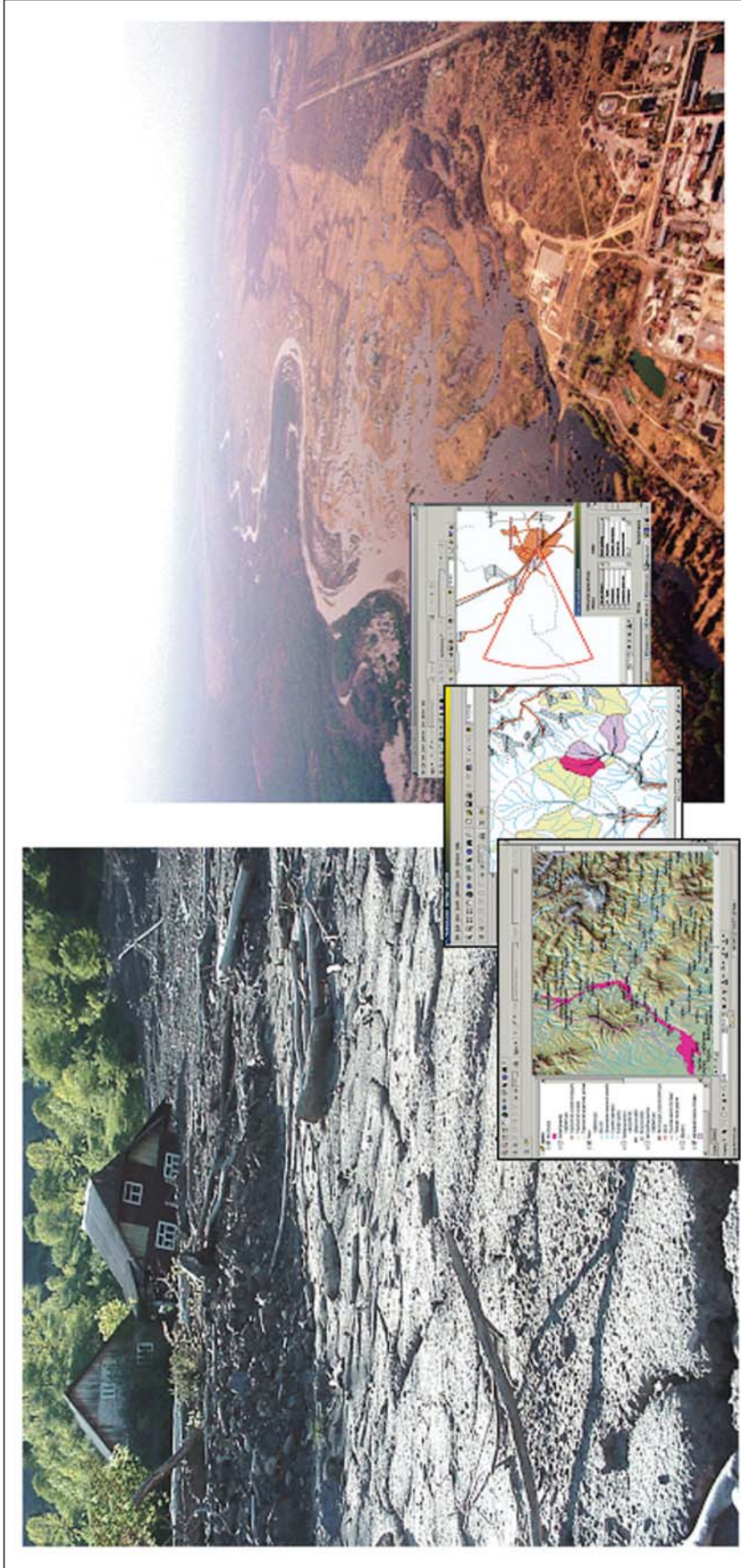
7.	Strengthening the links between science and education to promote sustainable development at all the levels through knowledge, experience and best practices sharing.	Providing institutional and legal framework for setting up research and education centers.	<i>The National Academy of Sciences of Ukraine, the Ministry of Education and Science</i>	2003
8.	To support the national scientific and research entities in developing new, "cleaner" types of produce and manufacturing technologies.	Implementing the national programs in science and technology domain on priorities in scientific and technological development for 2002–2006 (the Resolutions of the Cabinet of Ministers of December 24, 2001 #1716).	<i>The Academy of Sciences of Ukraine, the Ministry of Education and Science, the Ministry of Economics, the Ministry of Finance</i>	2003 – 2006
9.	Promoting equal participation of women in decision making processes at all levels and integrating gender aspects into the national programs and strategies.	Implementing the National Action Plan to improve womens situation and to contribute to introducing gender equality in the society (the Resolutions of the Cabinet of Ministers of May 06, 2001 #479). Drafting and passing the Law of Ukraine "On State Guarantees for Equal Rights and Opportunities for Women and Men". Implementing the Presidential Decree of April 25, 2001 #283 "On Enhancing Women's Social Status in Ukraine".	<i>The State Committee for Family and Youth</i>	2003 – 2005
10.	Promoting productive employment opportunities with account of the Declaration on the Fundamental Principles and Rights in Labor by the International Labor Organization.	Reaching the targets of the National Population Employment Program for 2001–2004 (the Law of Ukraine of March 7, 2002 #3076) and the National Program for Professional Rehabilitation and Employment for People with Limited Physical Capacity for 2001–2005 (the Presidential Decree of June 13, 2001 #519).	<i>The Ministry of Labor</i>	2003 – 2005
11.	Promoting tourism sustainable development by setting up the appropriate local infrastructures.	Implementing measures stipulated by the National Program for Tourism Development for 2002–2010 (the Resolutions of the Cabinet of Ministers of April 29, 2002 # 583).	<i>The State Tourism Administration, the other central executive bodies, the Council of Ministers of the Autonomous Republic of the Crimea, oblast state administrations, Kyiv and Sebastopol state administrations</i>	2003 – 2010

<i>In Economy Domain</i>				
1.	Expanding access to modern energy supply systems for the population lacking such access.	Developing "The Energy Strategy for Ukraine till 2030 and further on" (the Instruction of the President of Ukraine of February 27.2001 #42, the Resolutions of the Verhovna Rada of May 24, 2002 #2455).	<i>The National Academy of Sciences of Ukraine, the Ministry of Fuel and Energy</i>	2003
2.	Putting into operation programs aimed at energy efficiency increase and expanding the use of renewable energy sources.	Implementing the Comprehensive National Program for Energy Saving in Ukraine (the Resolutions of the Cabinet of Ministers of February 05, 1997 #148), designing and implementing measures targeted at the use of biological sources for renewable energy.	<i>The State Committee for Energy Saving, the Ministry of Economy, the other central executive bodies, oblast state administrations, Kyiv and Sebastopol city administrations</i>	2003–2010
3.	By 2015 to reproduce fish resources productivity up to their maximum sustainable level.	Implementing the Concept for Fisheries Development in Ukraine (the Resolutions of the Supreme Rada of July 13, 2000 #1885);	<i>The Ministry of Agriculture Policy, the Ministry of Ecology and Natural Resources</i>	2015
4.	Providing assistance and mobilizing resources for enhancing industry productivity and competitiveness, promoting transfer of environmentally clean technologies on mutually acceptable preferential terms.	Drafting and passing the Law of Ukraine "On State Regulation in Technology Transfer" and the respective regulations.	<i>The Ministry of Education and Science</i>	2003
5.	By 2020 to achieve the level of utilizing chemicals and hazardous waste to enable minimization of their hazardous impact on the natural environment and human health.	Implementing "The National Program for Toxic Waste Management" approved by the Law of Ukraine of September 14, 2000 #1947.	<i>The Ministry of Ecology and Natural Resources, the State Committee for Construction, the National Academy of Sciences of Ukraine, the Ministry of Health, the Ministry of Industrial Policy,</i>	2003–2020

6.	Financing the measures within the framework of the UN Convention "On the Control of Desert Development" through GEF.	Implementing the Comprehensive Program for land melioration improving environmental condition of irrigated and ameliorated lands in 2001–2005 and forecast till 2010 (the Resolutions of the Cabinet of Ministers of November 16, 2000 #1704).	<i>The Ministry of Agriculture Policy, the State Committee for Water Resources</i>	2003–2010
7.	Increase GEF to the level of 2.92 bln US dollars.	Formulating proposals on possible Ukraine's participation in GEF.	<i>The Ministry of Ecology and Natural Resources, the Ministry of Economy, the Ministry of Finance</i>	2003
8.	Introducing environmentally clean, effective and efficient methods of increasing soil fertility and fighting pests in agriculture.	Designing and approving the Comprehensive Innovation Program for Increasing Soil Fertility and Fighting Pests in Agriculture.	<i>The Ministry of Agriculture Policy</i>	2003–2005
<i>In the Domain of Environment</i>				
1.	By 2005 to introduce the integrated water resources management and implement the plans for effective water supply, supporting the activities of developing countries in this domain.	Promoting implementation of the National Program for Ecological Rehabilitation of the Dnipro River Basin and Enhancement of Drinking Water Quality (the Resolutions of the Verhovna Rada of February 27, 1997 #123), introducing the basin management for using, protecting and rehabilitating the water resources in Ukraine.	<i>The Ministry of Ecology and Natural Resources</i>	2003–2005
2.	By 2005 ensuring the national and local implementation of the international action plan on fisheries management and the international action plan on preventing, curbing and eliminating illegal fishing by 2004.	Implementing the Comprehensive Program for Activities to curb illegal fishing by foreign vessels in the territorial sea and the exclusive (sea) economic zone of Ukraine for 2002 – 2006 (the Resolutions of the Cabinet of Ministers of September 12, 2002 #1353).	<i>The Ministry of Ecology and Natural Resources, the Ministry of Agriculture Policy</i>	2003–2005
3.	By 2012 to set up a sample network of protected sea aquatories.	Implementing the National Program for Protection and Rehabilitation of the Azov Sea and the Black Sea Environment (the Law of Ukraine of March 22, 2001 #2333).	<i>The Ministry of Ecology and Natural Resources</i>	2001–2010

4.	By 2004 to initiate under the UN auspices the permanent process of global reporting and assessing the sea environment condition including current and estimated social and economic aspects using available regional data.	Setting up the national regular ecological reporting system to assess condition of the Black Sea and the Azov Sea aquatories in the context of balanced ecological development.	<i>The Ministry of Education and Science, the Ministry of Ecology and Natural Resources</i>	2003 – 2004
5.	Renovating of municipal wastewater treatment facilities between 2003 and 2010 within the framework of the Global Program for sea environment protection from ground pollution sources.	Implementing the Program developing water supply and sewage systems (the Resolutions of the Cabinet of Ministers of November 17, 1997 #1269 and of June 1, 2002 #721).	<i>The State Committee for Housing and Communal Services, the Council of Ministers of the Autonomous Republic of the Crimea, oblast state administrations, Kyiv and Sebastopol city state administrations</i>	2003 – 2010
6.	Fulfilling the obligations under the UN Framework Convention on Climate Change.	Preparing ratification of Kyoto Protocol to the UN Framework Convention of Climate Change.	<i>The Ministry of Ecology and Natural Resources</i>	2003
7.	By 2010 to improve access of the developing countries and countries with transition economies to environmentally efficient substitutes for substances destroying the ozone layer.	Preparing and implementing the new wording of the Program to halt production and use of ozone destructive substances in Ukraine for the purpose to meet the requirements of the Montreal Protocol.	<i>The Ministry of Ecology and Natural Resources</i>	2003
8.	To implement urgent measures to control observance of forestry legislation and international timber trade.	Implementing the National Program "Forests of Ukraine" for 2002-2015 (the Resolutions of the Cabinet of Ministers of April 29, 2002 #581).	<i>The State Forestry Committee, the Ministry of Agriculture Policy, the Ministry of Ecology and Natural Resources, the Ministry of Defense, the Ministry of Emergencies, the Council of Ministers of the Autonomous Republic of the Crimea, oblast state administrations, Kyiv and Sebastopol city administrations</i>	2003 – 2015
9.	By 2010 to slow down the actual rates of decrease in biological diversity.	Implementing the National Program for setting up the national environmental network in Ukraine for 2000-2015 (the Law of Ukraine of September 14, 2000 #1989).	<i>The Ministry of Ecology and Natural Resources</i>	2003 – 2010

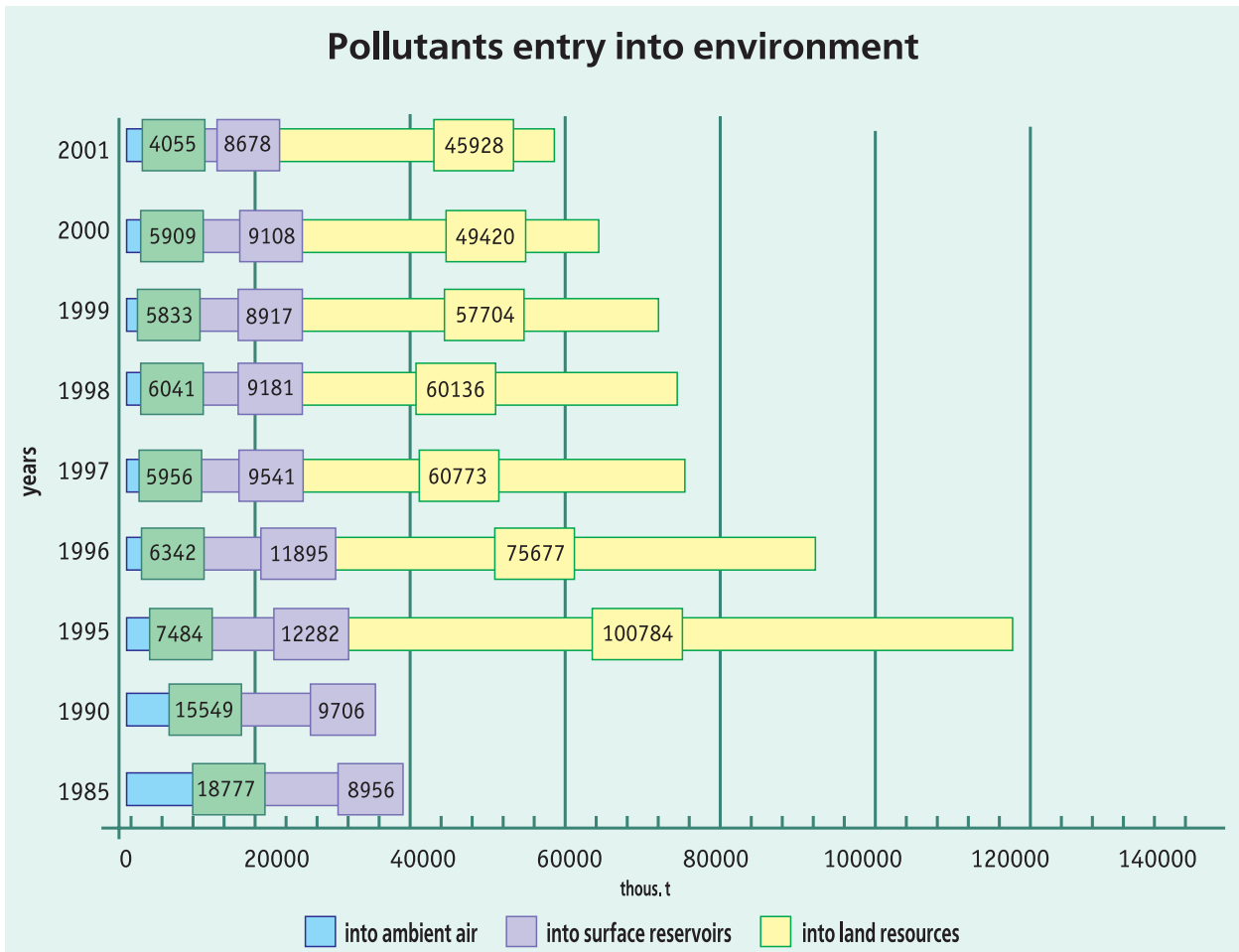
GENERAL OVERVIEW OF ANTHROPOGENIC INFLUENCE ON ENVIRONMENT IN UKRAINE



Example of GIS usage in governmental informational and analytical system of emergency situations prevention.

Pollutants entry into environment

	1985	1990	1994	1995	1996	1997	1998	1999	2000	2001
Pollutants entry, thousand t										
into ambient air	18777	15549	8347	7484	6342	5966	6041	5853	5909	4055
into surface reservoirs	8956	9706	12386	12282	11895	9541	9181	8917	9108	8678
into land resources	...	...	75670	75605	75677	60773	60136	57704	49420	45928
Pollutants entry, per capita, kg:										
into ambient air	369	300	161	145	124	118	120	117	119	83
into surface reservoirs	176	187	239	238	233	188	183	179	184	178
into land resources	...	...	1457	1956	1481	1186	1195	1156	998	944



**Total Land Area and Distribution of Agricultural Lands
by Landowners and Landusers as of January 1, 2002 (thousand hectares)**

(thousand hectares)

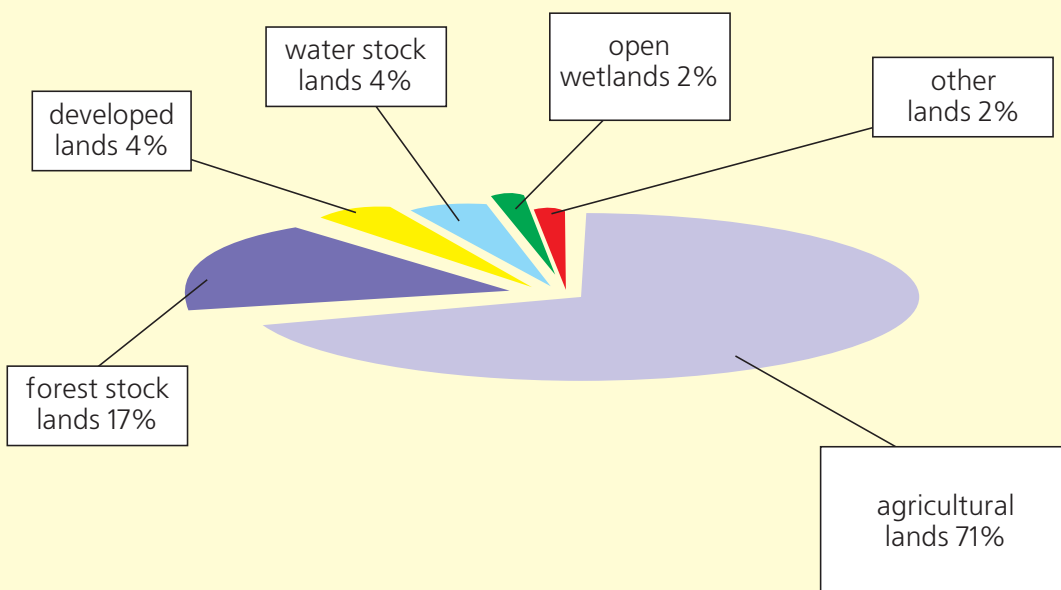
	Total of land area (territory)	Total of agricultural lands	Including:		
			Arable lands	Hayfields perraneals	pastures
Total of lands	60354.8	41817.0	32537.1	924.4	7924.3
including:					
lands of agricultural enterprises and farms	27207.3	25660.6	21838.3	375.5	3181.9
citizens that, got land as property And to use it	12958.6	12489.7	9521.1	485.9	2396.7
establishments, institutions, organizations	733.4	158.2	143.2	4.3	10.7
industrial and other facilities	665.6	191.1	172.1	3.0	16.0
facilities and organizations intransportation and communication	664.0	60.1	24.1	0.8	34.9
military units, facilities, organizations, institutions, defense educational establishments	451.2	59.7	15.4	0.1	43.8
organizations, facilities, institutions dealing with environment, rehabilitation, recreation, history and culture	414.1	17.0	1.4	0.2	15.3
forest industrial facilities	8173.5	125.7	34.1	2.1	89.5
water industry facilities	456.0	16.1	6.4	0.1	9.6
joint ventures, international associations and organizations involving participation of Ukrainian and foreign legal entities and individuals	53.0	50.5	48.5	0.3	1.7
facility that are fully owned by foreign investors	1.5	1.0	1.0		
reserve lands and lands that were not given to be owned or permanently used within the limits of settlements (those that are not provided for temporary use)	8576.6	2987.3	731.5	52.1	2124.2

Distribution of Land Resources of Ukraine

(as of January 1, 2002)

	Area, thousand hectares	The specific weight in the total of resources, %
The total of lands (territory):	60354.8	100.0
Including		
agricultural lands	43039.5	71.3
forest stock lands	10426.2	17.3
developed lands	2449.4	4.1
water stock lands	2425.7	4.0
open wetlands	948.5	1.6
other lands	1065.5	1.7

Distribution of Land Resources of Ukraine (as of January 1, 2002)



**Area of Agricultural Land Exposed to Water Erosion
Crimea Autonomous Republic and oblasts
(as of 01.01.1996) (thousand hectares)***

(th hectares)

	Total area (as of January 1, 1996)	Including surveyed area of soils	Exposed to the joint impact of water and air erosion	Exposed to water erosion (washed out)			
				total	including		
					weak	average	strong
Ukraine	41495.6	38310.7	2056.2	13284.2	8833.7	3218.1	1232.4
Crimea							
Autonomous Republic	1770.7	1683.0	47.9	247.2	181.3	52.8	13.1
Vinnyska	2017.0	1807.9	-	743.8	570.6	135.1	38.1
Volynska	1051.3	968.1	-	105.2	59.0	32.0	14.2
Dnipropetrovska	2493.2	2243.0	0.3	1000.8	792.7	163.0	45.1
Donetska	2038.1	1892.1	1355.9	1355.9	810.8	366.6	178.5
Zhytomyrska	1544.4	1307.2	-	63.6	39.3	16.7	7.6
Zakarpatska	456.8	387.5	-	37.6	25.1	9.0	3.5
Zaporizka	2239.4	2085.8	106.0	799.0	378.8	238.8	181.4
Ivano-Frankivska	627.6	485.4	-	135.9	72.1	42.7	21.1
Kyivska	1670.3	1494.4	-	173.9	98.5	38.4	37.0
Kirovogradska	2027.1	1887.0	-	1029.1	701.7	250.1	77.3
Luganska	1915.3	1809.4	506.7	1215.3	960.8	207.8	46.7
Lvivska	1256.7	1239.0	0.5	300.6	168.9	92.1	39.6
Mykolajvska	1991.9	1907.0	-	938.3	569.4	294.1	74.8
Odeska	2560.6	2425.8	0.4	1241.1	807.6	314.6	118.9
Poltavska	2174.2	2015.4	38.3	355.6	267.3	67.2	21.1
Rivnenska	915.3	878.4	-	159.6	70.2	44.2	45.2
Sumska	1703.9	1595.9	-	305.1	241.2	54.8	9.1
Ternopil'ska	1054.4	947.3	-	391.2	235.1	111.6	44.5
Kharkiv'ska	2410.0	2259.6	-	1121.4	853.1	217.3	51.0
Kherson'ska	1957.2	1890.6	-	264.3	180.1	60.3	23.9
Khmelnyska	1560.8	1461.5	-	664.2	380.7	244.7	38.8
Cherkaska	1451.5	1288.2	0.2	361.9	219.4	87.0	55.5
Chernivetska	471.2	402.8	-	200.3	103.5	57.2	39.6
Chernigiv'ska	2105.6	1927.0	-	65.3	41.7	16.9	6.7
City of Kyiv	5.6	0.9	-	0.4	0.2	0.2	
City of Sevastopol	25.5	20.5	-	7.6	4.6	2.9	0.1

*According to the State Committee of Land Resources

**Area of Stony Agricultural Lands and Lands Exposed to Air Erosion
Crimea Autonomous Republic and Oblasts
(as of 01.01.1996) (thousand hectares)***

(th hectares)

	total	Including:				Lands exposed to air erosion	of which		
		little stony	moderate stony	much stony	too much stony		weak erosion	average erosion	strong erosion
Ukraine	574.8	323.7	164.3	77.6	9.2	1662.8	1411.7	189.7	61.4
Crimea Autonomous									
Republic	206.8	117.0	69.5	18.2	2.1	190.2	173.3	15.1	1.8
Vinnyska	2.2	0.3	0.8	1.0	0.1	0.1	-	0.1	-
Volynska	-	-	-	-	-	1.7	1.1	0.5	0.1
Dnipropetrovska	0.3	0.3	-	-	-	16.8	9.0	6.5	1.3
Donetska	42.5	23.2	10.5	8.1	0.7	-	-	-	-
Zhytomyrska	13.0	5.3	4.6	2.7	0.4	3.9	1.9	1.6	0.4
Zakarpatska	87.9	58.7	26.5	2.2	0.5	-	-	-	-
Zaporizka	2.5	1.3	0.4	0.8	-	413.7	307.2	92.4	14.1
Ivano-Frankivska	55.5	32.4	14.9	7.1	1.1	-	-	-	-
Kyivska	-	-	-	-	-	72.6	40.9	16.7	15.0
Kirovogradska	0.5	-	-	-	0.5	-	-	-	-
Luganska	41.7	28.0	11.7	1.9	0.1	386.8	350.4	15.7	20.7
Lvivska	11.9	7.1	4.0	0.3	0.5	41.9	20.3	19.3	2.3
Mykolajvska	27.7	24.7	2.2	0.7	0.1	45.8	45.1	0.7	-
Odeska	14.5	1.3	1.8	9.5	1.9	1.2	0.4	0.4	0.4
Poltavska	-	-	-	-	-	-	-	-	-
Rivnenska	13.1	10.5	1.8	0.8	-	6.1	4.5	1.4	0.2
Sumska						26.7	21.5	4.3	0.9
Ternopil'ska	19.1	2.4	1.5	14.4	0.8	-	-	-	-
Kharkivska	0.8	0.8	-	-	-	70.7	70.6	0.1	-
Khersonska	2.6	1.7	-	0.9	-	366.4	348.1	14.2	4.1
Khmelnyska	10.7	4.6	5.4	0.6	0.1	-	-	-	-
Cherkaska	0.1				0.1	3.1	2.3	0.7	0.1
Chernivetska	15.7	1.2	7.0	7.5	-				
Chernigivska	-	-	-	-	-	15.1	15.1	-	-
City of Kyiv	-	-	-	-	-	-	-	-	-
City of Sevastopol	5.7	2.9	1.7	0.9	0.2	-	-	-	-

* According to the State Committee of Land Resources

Main Indicators of Water Supply and Allotment (million cubic meters)

(mln cubic meters)

	1990	1995	1997	1998	1999	2000	2001
Water intake from natural water objects total	35615	25852	21091	19027	19748	18282	17577
including for use*	31293	19174	15491	13935	14561	13302	12558
Used fresh water (including sea water)	30201	20338	15623	13836	14285	12991	12168
of which for:							
industrial needs	16247	10421	7666	6794	7304	6957	7033
household drinking needs	4647	4404	3929	3812	3566	3311	3041
irrigation	6959	3469	2444	2168	2327	1699	1158
agriculture needs	1697	1331	949	635	641	513	381
General allotment	20261	14981	12534	11040	11488	10964	10569
including:							
polluted return waters	3199	4652	4233	4228	3920	3313	3008
of which without treatment	470	912	763	813	748	758	746
treated within norm	3318	1936	1798	1644	1743	2100	2188
Volume of circulating and stage by stage used water	67661	51054	45927	42220	40969	41523	41334
Capacity of treatment facilities	8131	8419	8271	8284	8018	7992	7790

* water intake for use does not account for water from canals.

**Discharges of Untreated Polluted Recycle Wastewater
into Surface Water Objects in Crimea Autonomous Republic
and oblasts (million cubic meters)**

(mln cubic m)

	1990	1995	1997	1998	1999	2000	2001
Ukraine	470.5	911.8	763.3	813.0	748.2	757.7	745.9
Crimea Autonomous Republic	2.7	3.0	4.8	5.3	6.0	10.4	9.9
Vinnytska	4.6	1.0	1.4	8.0	1.7	1.6	6.5
Volynska	0.0	0.3	0.2	0.1	0.1	2.7	0.3
Dnipropetrovska	238.2	178.2	191.9	182.4	165.5	201.4	207.2
Donetska	30.2	210.9	209.5	258.6	246.6	239.3	270.1
Zhytomyrska	2.9	0.7	0.1	2.4	0.2	0.0	0.1
Zakarpatska	2.0	0.3	0.2	0.3	0.2	0.7	1.7
Zaporizka	61.5	98.0	75.1	104.2	83.6	76.9	53.8
Ivano-Frankivska	7.2	2.1	3.4	3.3	4.9	5.8	5.4
Kyivska	0.4	0.5	0.7	3.1	2.5	9.3	5.8
Kirovogradska	0.1	0.3	0.9	0.0	0.1	0.0	-
Luganska	43.3	112.1	69.5	56.1	58.2	43.2	45.9
Lvivska	4.2	4.8	4.6	5.4	3.3	4.0	2.2
Mykolajvska	4.5	23.3	42.3	35.3	38.6	43.9	36.1
Odeska	2.6	129.7	76.5	71.6	75.1	66.6	39.9
Poltavska	0.3	0.1	0.1	0.1	0.0	0.0	0.5
Rivnenska	0.2	0.1	0.0	0.9	0.1	0.7	1.5
Sumska	0.7	0.8	0.6	0.5	0.4	0.0	0.2
Ternopil'ska	2.2	2.3	1.8	1.1	1.5	1.4	1.5
Kharkivska	5.9	33.5	20.5	11.2	11.9	9.3	19.3
Khersonska	41.4	58.5	7.6	10.0	1.3	2.1	0.3
Khmelnitska	0.1	0.1	0.0	-	0.3	0.7	0.0
Cherkaska	9.4	5.2	3.8	4.0	3.4	3.5	5.4
Chernivetska	0.5	7.1	6.5	8.6	8.6	6.0	6.2
Chernigivska	1.3	0.0	0.0	-	0.0	-	0.0
City of Kyiv	0.4	32.9	37.5	34.7	28.8	23.3	25.4
City of Sevastopol	3.7	6.0	3.8	5.8	5.3	4.9	0.7

***Number of Facilities that Discharged Recycle Wastewater
into Surface Water Objects in Crimea Autonomous Republic
and oblasts (units) ****

(units)

	1990	1995	1997	1998	1999	2000	2001
Ukraine	2607	2678	2606	2351	2283	2255	2196
Crimea Autonomous Republic	100	122	116	111	137	141	147
Vinnytska	173	134	136	122	112	113	110
Volynska	73	75	71	58	55	52	54
Dnipropetrovska	111	125	109	104	94	98	91
Donetska	255	262	257	254	252	250	249
Zhytomyrska	72	84	79	78	79	85	92
Zakarpatska	104	95	82	78	77	72	68
Zaporizka	81	109	149	125	120	116	109
Ivano-Frankivska	148	146	104	100	100	95	97
Kyivska	82	116	199	129	121	114	99
Kirovogradska	75	75	75	66	63	63	61
Luganska	162	167	160	150	146	135	133
Lvivska	118	118	110	105	102	108	109
Mykolajvska	30	24	22	19	17	22	24
Odeska	86	95	85	82	79	71	63
Poltavska	32	45	47	45	46	45	41
Rivnenska	102	113	101	88	93	94	102
Sumska	73	77	70	77	73	69	67
Ternopil'ska	156	148	139	102	102	95	82
Kharkiv'ska	97	107	91	97	101	108	102
Kherson'ska	61	28	31	31	33	29	28
Khmeln'ytska	153	152	129	83	83	74	72
Cherkaska	95	97	98	80	64	75	73
Chernivetska	85	71	61	64	60	60	57
Chernigiv'ska	47	54	52	51	49	48	45
City of Kyiv	19	23	17	17	17	15	14
City of Sevastopol	17	16	16	35	8	8	7

*including sea water, underground sources and mining water

**Research of water used for household purposes to determine
its conformity to the hygiene norms**

	1990	1995	1997	1998	1999	2000	2001
Sanitary/Chemical Indicators:							
Number of samples examined - total including those inconsistent with norms:	245572	412001	422310	493675	485890	506347	602996
number of samples	35418	61011	61075	70382	69560	67216	81437
% of those examined	14	15	14	14	14	13	14
Microbiological Indicators:							
Number of samples examined - total including those inconsistent with norms:	379414	577289	715398	724032	724260	700979	827403
number of samples	39350	62500	57273	58651	50515	47445	66744
% of those examined	10	11	8	8	7	7	8

**Research of water bodies being used by people to determine
their conformity to the hygiene norms ***

	1990	1995	1997	1998	1999	2000	2001
Sanitary/Chemical Indicators:							
Number of samples examined - total including those inconsistent with norms:	25253	31600	26472	28860	29548	30616	28248
number of samples	7299	8128	5824	5919	6121	5988	5043
% of those examined	29	26	22	21	21	20	18
Microbiological Indicators:							
Number of samples examined - total including those inconsistent with norms:	40573	48582	39961	45571	47148	46265	40922
number of samples	10134	12254	8050	8547	9196	8061	7393
% of those examined	25	25	20	19	20	17	18

*According to data provided by the Ministry of Health of Ukraine

**Emission of Harmful Substances into the Ambient Air
from Stationary Sources
by Types of Business Activity in 2001**

	Number of facilities, having emissions units	Emission volume, th. t		Emission volume 2001 prior to 2000, %	Emitted on the average by one facilityt
		total	of which gas type and liquid		
All types of business activity	15414	4054.8	3290.9	102.4	264.3
Agriculture, hunting services related to them	775	7.0	5.5	94.0	9.1
Forestry and services related to them	139	3.0	1.3	103.2	21.4
Fisheries	39	0.3	0.2	141.5	7.9
Mining industry including:	546	918.5	823.9	96.6	1685.4
Mining energy materials	313	726.8	692.4	95.2	2322.1
Mining non energy materials	233	191.7	131.5	102.4	826.3
Defense industry including:	6571	1491.0	1279.4	104.3	227.8
Food industry and agriculture produce processing	2178	63.2	56.0	99.3	29.1
Textile industry and manufacturing clothing	348	4.2	3.6	95.7	12.1
Leather and leather footwear production	89	1.0	0.9	90.5	10.7
Timber and timber goods production	194	3.3	2.1	146.3	16.9
Cellulose and paper industry; publishing	171	4.8	3.8	107.7	28.3
Coke, petrochemicals and nuclear fuel production	43	146.8	131.7	110.2	3413.8
Chemical industry	215	63.7	57.4	97.3	297.7
Manufacturing rubber and plastic goods	119	3.2	3.0	109.0	27.2
Manufacturing other non metal mineral goods	756	61.0	33.6	99.6	81.0
Metallurgy and metal processing	420	1096.3	952.4	104.9	2635.3
Manufacturing	1025	21.1	16.5	92.3	20.7



a)

b)

Pollutants release from stationary sources into atmosphere (a - Kryvyi Rig, 6 - Zaporizhzhia. Data obtained from Landsat satellite).

**Emission of harmful Substances into the Ambient Air
from Motor Transport in Crimea Autonomous Republic
and oblasts (thousand tons)**

(th t)

	1985	1990	1995	1996	1997	1998	1999	2000
Ukraine	6613.9	6110.3	1796.5	1578.5	1433.0	1884.5	1747.0	1949.2
Crimea								
Autonomous Republic	362.3	335.2	67.2	60.8	55.3	99.0	92.4	89.9
Vinnitska	281.3	248.5	74.4	67.5	58.3	80.7	71.4	65.5
Volynska	142.9	134.5	33.6	38.4	36.1	41.9	37.5	24.9
Dnipropetrovska	273.1	358.3	75.5	66.7	58.5	152.4	156.8	155.9
Donetska	570.3	550.9	157.8	135.5	119.9	205.6	197.2	205.3
Zhytomyrska	205.9	192.4	37.2	52.3	46.7	61.0	55.0	49.5
Zakarpatska	132.9	106.3	23.5	20.4	18.0	38.9	37.7	33.0
Zaporizka	305.9	299.6	77.3	67.1	56.7	52.7	46.6	102.1
Ivano - Frankivska	101.1	146.2	54.0	41.7	41.1	47.1	48.3	43.8
Kyivska	358.2	289.2	86.5	85.7	64.5	72.9	53.6	86.7
Kirovogradska	204.5	166.3	49.4	42.1	36.2	55.9	54.6	35.7
Luganska	174.5	308.2	92.4	78.6	72.5	103.1	93.8	100.2
Lvivska	320.7	295.4	115.0	74.7	107.1	97.5	88.1	84.3
Mykolajvska	222.5	201.7	50.7	41.7	36.1	32.8	26.7	42.8
Odeska	354.2	297.1	84.2	72.2	70.0	103.5	98.8	90.3
Poltavska	324.9	279.8	107.4	99.9	89.4	106.3	101.0	91.5
Rivnenska	161.2	141.4	39.3	35.1	30.5	24.0	20.6	35.6
Sumska	183.5	179.6	57.8	52.7	46.2	42.2	35.4	54.8
Ternopil'ska	183.0	148.6	43.4	37.1	31.3	26.4	20.5	34.1
Kharkivska	434.7	318.6	126.2	108.5	92.4	147.6	134.9	124.9
Khersonska	236.9	189.1	51.9	47.0	44.4	60.5	55.1	52.7
Khmelnitska	214.6	183.4	57.0	49.8	43.7	37.9	30.1	51.6
Cherkaska	286.0	213.2	69.3	62.5	52.4	47.3	40.1	64.3
Chernivetska	121.4	107.3	24.7	20.3	17.6	15.0	27.4	31.0
Chernigivska	186.8	174.7	63.2	55.2	46.3	62.9	56.8	44.0
City of Kyiv	231.3	218.3	69.8	57.0	55.1	54.7	52.3	137.8
City of Sevastopol	39.3	26.5	7.8	8.0	6.7	14.7	14.3	17.0

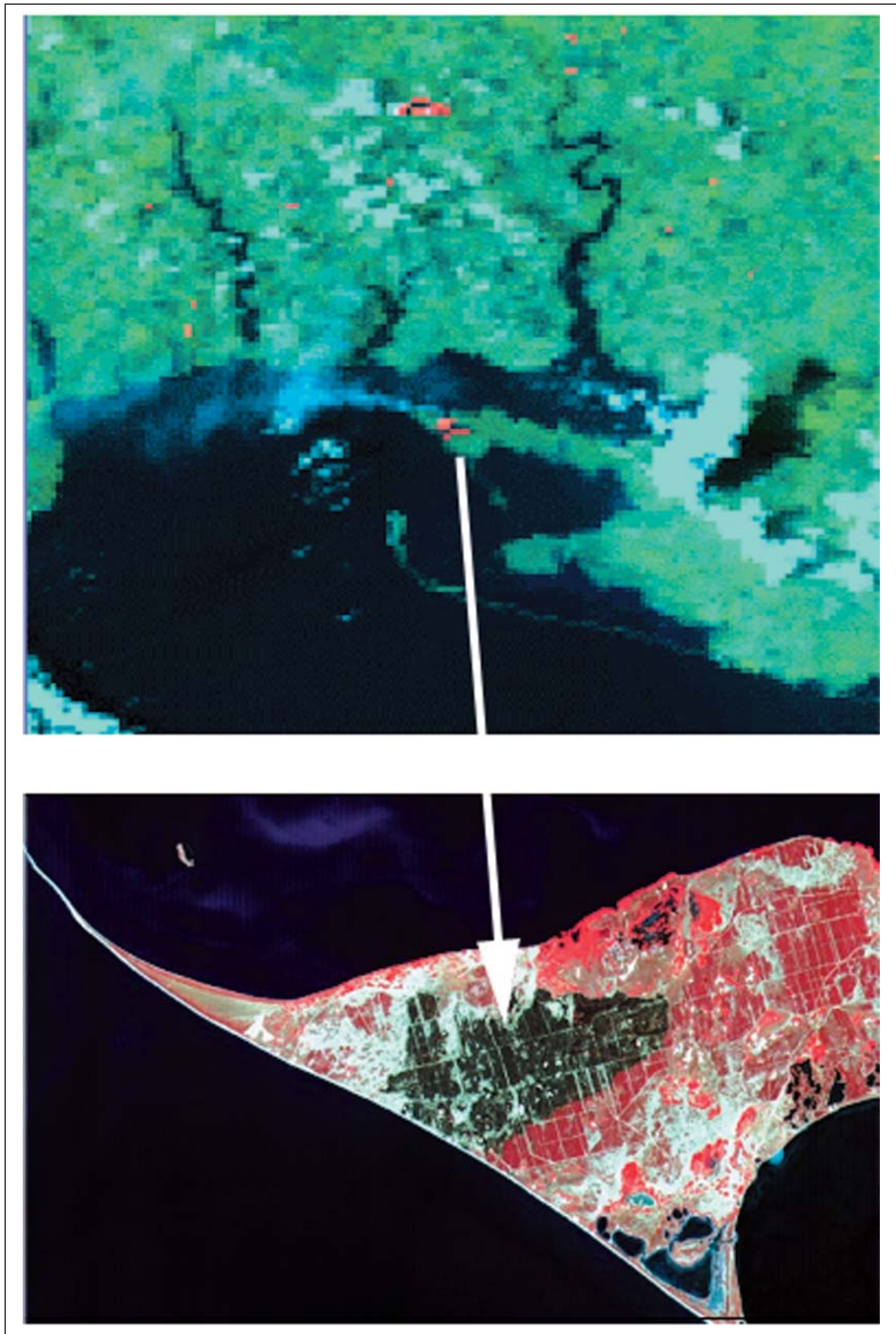
Main indicators of forestry management

	1990	1995	1997	1998	1999	2000	2001
Volumes of forestry production, works and services total, mln ha	...	...	373,0	396,6	521,3	744,4	824,2
Forest reproduction on the territories of forestry fund - total, thousand ha including :	37,5	38,4	38,5	36,7	38,6	37,8	42,6
Forest planting and sewing	35,4	33,9	33,5	30,2	29,9	29,8	34,3
Nature renovation	2,1	4,5	5,0	6,5	8,7	8,0	8,3
Forest cultures removed to covered with timber lands, thousand ha	32,8	36,0	29,8	27,2	26,5	26,9	27,2
Major use forest hewings:							
thousand ha	27,8	20,3	21,7	21,2	21,4	22,2	23,2
Liquid timber, thousand dense m ³	5755	4574	4761	5139	4880	5236	5507
Hewing connected with forestry management, other hewings and forest cleaning from litter (cluttering), thousand ha	508,6	483,9	381,4	414,2	413,2	432,9	547,1
Liquid timber , thousand dense m ³	6887	5167	4147	5410	5429	6025	6515
Forest regulating, thousand ha	1229,3	1671,3	2466,0	1226,0	1675,1	1186,0	1264,0
Turpentine, t	...	...	7061,0	6545,4	4902,7	4416,2	3921,9
Creation of protective plantings, thousand ha	17,2	14,2	7,9	4,7	5,9	5,2	4,3
Creation of field protective forest shelter-belts, thousand ha	4,5	2,0	0,9	0,4	0,4	0,3	0,4
Rest of uncleaned territories, thousand ha *	4,8	4,4	5,3	2,4	4,2	4,1	3,4
Rest of undressed wood of conifers, thousand m ³ *	26	39	93	114	76	69	43
Aviation protection of forests from fires, thousand ha	4000	4845	4069	1171	1229	996	1014
Number of forest fires	2714	3758	2309	3915	6070	3696	3205
Forest territory affected by fires, thousand ha	2,4	3,5	1,5	4,4	5,5	1,6	3,8
Damage, caused by fires**	1,1	178,5	615,4	4555,7	5822,3	1367,6	6204,3

Area of the country forest fund comprises 10782,2 thousand ha (percentage of forest land 15,6 %), including covered with plantings lands - 9400,2 thousand ha (according to data of the state forest fund stock-taking as of 1 January 1996)

* Of 1 May of corresponding year

** In actual prices: 1990 - mln. krb., 1995 .- bln krb., 1997 - 2001 -thousand hrn



Forest destruction by fires.
Kinburzka split, 22 July 2001 (data obtained from NOAA satellites, Terra).

**Afforestation loss owing to unfavourable weather conditions
in Crimea Autonomous Republic and oblasts (hectares)**

(ha)

	1990	1995	1997	1998*	1999	2000	2001
Ukraine	2024	3484	6803	2944	3462	6421	4187
Crimea Autonomous Republic	-	101	-	342	3	34	-
Vinnnytska	29	18	4	8	1	2353	18
Volynska	-	91	4401	534	708	346	360
Dnipropetrovska	16	-	24	122	29	9	5
Donetska	113	-	42	37	-	-	-
Zhytomyrska	69	132	114	540	285	197	317
Zakarpatska	31	157	393	173	227	490	169
Zaporizka	17	36	42	-	5	-	10
Ivano-Frankivska	12	318	188	96	137	180	71
Kyivska	66	21	4	-	5	2	277
Kirovogradska	120	2	12	18	72	26	7
Luganska	-	7	-	23	755	378	1422
Lvivska	1179	243	295	276	184	158	207
Mykolajvska	-	189	49	57	16	69	150
Odeska	-	269	138	-	-	680	0
Poltavska	47	30	32	19	108	49	19
Rivnenska	131	844	562	350	210	345	510
Sumska	6	-	-	2	20	38	55
Ternopil'ska	38	104	47	28	71	426	140
Kharkiv'ska	-	21	5	-	-	-	4
Kherson'ska	55	544	194	51	352	8	57
Khmeln'ytska	-	211	167	166	146	402	243
Cherkaska	-	27	12	7	6	-	21
Chernivetska	95	40	7	75	45	154	83
Chernigiv'ska	-	35	56	20	77	77	42
City of Kyiv	...	44	15	-	-	-	-
City of Sevastopol	...	-	-	-	-	-	-

*Moreover, in 1998 30 ha of forest plantings perished along Ukrainian railways (Mintrans) because of unfavourable weather conditions influence.

Afforestation loss in Crimea Autonomous Republic and oblast (hectares)

(ha)

	1990	1995	1997	1998*	1999*	2000	2001
Ukraine	4020	7468	9552	6569	8377	8908	8861
Crimea Autonomous Republic	168	101	16	379	11	42	27
Vinnyska	-	30	12	17	9	2354	18
Volynska	155	293	4803	751	920	686	672
Dnipropetrovska	18	111	34	170	83	63	12
Donetska	41	5	42	116	281	26	118
Zhytomyrska	234	597	375	751	643	430	631
Zakarpatska	69	407	1054	731	490	814	706
Zaporizka	40	49	42	52	79	5	51
Ivano-Frankivska	84	398	235	503	166	208	422
Kyivska	53	59	56	27	126	190	360
Kirovogradska	66	6	24	48	106	98	46
Luganska	218	194	5	503	1087	541	1486
Lvivska	1226	450	625	534	509	437	485
Mykolajvska	14	237	49	96	208	143	1298
Odeska	9	270	140	78	29	683	20
Poltavska	215	137	114	98	179	68	166
Rivnenska	139	1102	753	448	286	426	587
Sumska	63	46	96	78	114	38	64
Ternopil'ska	73	291	176	202	166	526	238
Kharkivska	5	712	8	43	41	8	42
Khersonska	797	1058	199	266	2091	13	630
Khmelnyska	11	262	193	284	173	485	252
Cherkaska	27	152	74	19	198	30	39
Chernivetska	105	54	30	105	71	210	101
Chernigivska	190	346	353	264	309	342	325
City of Kyiv	...	100	44	-	-	-	31
City of Sevastopol	...	1	-	6	2	42	34

* Moreover, in 1998 32 ha of forest plantings perished along Ukrainian railways (Mintrans), in 1999 - 34 ha.

**Industrial Toxic Waste Generation, Placement and Accumulation
in Crimea Autonomous Republic and oblasts in 2001 (thousand tons)**

(th t)

	Production of industrial toxic waste, total	Of this placed at dumping sites		Availability of organized dumping at storage and in the territory of facilities as of the year end
		organized	spontaneous	
Ukraine	77513.5	45801.0	127.4	2849145.2
Crimea Autonomous Republic	264.9	179.0	0.0	10205.5
Vinnitska	29.4	0.4	16.1	441.8
Volynska	1.6	0.0	0.0	1.3
Dnipropetrovska	38231.5	26505.5	18.4	1759568.6
Donetska	23452.0	10851.8	21.5	564296.0
Zhytomyrska	0.2	-	0.0	1.0
Zakarpatska	6.4	2.0	0.5	5.5
Zaporizka	4833.6	1991.9	-	103473.1
Ivano-Frankivska	1051.4	720.1	0.4	45371.3
Kyivska	555.1	515.2	0.3	20896.4
Kirovogradska	855.8	852.6	-	53046.9
Luganska	4536.0	2202.6	29.0	119760.6
Lvivska	966.8	786.6	0.2	81262.4
Mykolajvska	386.9	91.9	-	2485.7
Odeska	8.2	0.6	5.2	1281.8
Poltavska	284.3	161.1	12.2	5294.2
Rivnenska	51.9	15.2	-	16910.9
Sumska	468.0	294.1	3.2	28111.0
Ternopil'ska	62.8	-	0.0	61.1
Kharkiv'ska	1211.6	579.3	19.5	32820.2
Kherson'ska	8.7	1.5	0.6	254.5
Khmelnitska	1.6	0.1	0.0	6.2
Cherkaska	135.5	23.6	0.1	1276.1
Chernivetska	18.1	0.0	0.0	172.6
Chernigiv'ska	51.2	25.9	-	1968.1
City of Kyiv	39.4	0.0	0.2	171.2
City of Sevastopol	0.6	0.0	0.0	1.2

Industrial Toxic Waste Accumulation in Manager Dump-Sites and on the Territory of Facilities by Grades (as of the year end, thousand tons)

(as of the year end, thousand tons)

	1995	1997	1998	1999	2000	2001
Total	4706880.1	4158636.6	4210564.5	4366206.0	2969939.1	23008.3
including:						
I danger grade	28.9	34.5	35.3	147.8	149.1	157.3
II danger grade	16499.1	1382.7	1398.1	1386.4	1685.2	1851.7
III danger grade	38313.0	32576.9	32904.0	35564.8	24409.8	20999.3
IV danger grade	4652039.1	4124642.5	4176227.1	4329107.0	2943695.0	

Industrial Toxic Waste Generation at Ukraine's Facilities by Grades (thousand tons)

(th t)

	1995	1997	1998	1999	2000	2001
Total	129645.3	91796.0	84032.7	88475.7	81374.9	0.0
including:						
I danger grade	25.5	28.7	18.7	20.4	13.9	
II danger grade	524.7	923.6	183.2	183.8	176.0	
III danger grade	3012.7	2209.1	2252.2	2616.2	2423.4	
IV danger grade	126082.4	88634.6	81578.6	85655.3	78761.6	

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**NATIONAL REPORT OF UKRAINE
ON HARMONIZATION OF SOCIETY'S ACTIVITY
IN NATURAL ENVIRONMENT**

Responsible Head of elaboration - PhD in Economics, Professor
V.Y.Shevchuk.

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FOR NOTES

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