

# **INSTITUTIONAL INCENTIVES AND OPPORTUNITIES FOR, AND BARRIERS TO, INDUSTRIAL ECOLOGY**

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## **Contents**

1. A state in the changing world
2. Formulation of state eco-development management strategy
3. Institutional prerequisites and deterrents of ecocodevelopment
4. Market and informational incentives, opportunities and restrictions
5. Business and financial incentives, opportunities and restrictions
6. Regulating incentives, opportunities and restrictions
7. Legislative norms and preferences
8. Standards and industrial ecology
9. Critical management and environment
10. World practices of the industrial ecology

Glossary

Bibliography

Biographical Sketch

## **Summary**

This chapter discusses in some detail the institutional requisites and restrictions of industrial ecology. The advanced experience of developed countries in terms of state regulation of industrial operations are also covered. Theoretical issues of environmental management in view of state eco-development management strategy development are analyzed. Institutional requisites and restrictions, focusing on the evolution of institutionalism, changed institutional conditions for extended reproduction, and changes in development mechanisms are reviewed. Influence of markets and informatization—distinctive features of the present globalization—and initial institutional reasons for the current contradictions are observed. Business and financial incentives regulating requisites and restrictions are reviewed. Legislative preferences and regulations, and changes in standard application while implementing industrial ecology are discussed. The increasing role of emergency response to minimize environmental damage is summarized. The expanding complexity of industrial ecology in the international sense is summarized and the need for further implementation of forms and methods of sustainable development in human activity is emphasized.

## **1. The state of the changing world**

The dynamics of the changing the role of the state over recent years is of great public concern, and has been analyzed by the World Bank.

Humankind has come to an understanding that survival and sustainable development is possible mainly through continuous development of state institutions.

The rate and volume of natural resource utilization prove that exhausted natural resources and the biosphere in particular are approaching a critical point.

Here is one example illustrating material production.

The growth of material production over the last two centuries is characterized by typical indicators (see Table 1). This has been accompanied by huge growth of machine-building, the chemical industry, construction materials and consequently changed domestic and work conditions for human activities on Earth. The safety of installations, equipment and armament has significantly increased. In an intellectual sense humanity has gained far greater understanding of atomic physics and, at the other extreme, space, as well as promoted and assimilated the development of information technologies and the high-tech sector. Hence, the increasing significance of intellect in public regulation of environmental management is evident.

	Non-refined steel	Cast iron	Welding iron	Cement	Plastics	Nickel	Tin	Copper	Aluminium	Lead
<b>1820</b>							13	51		
							1	64		
			5,370				15	83		300
<b>1860</b>	700		6,025				26	110		400
	2,951	12,000	5,623				56	200		600
	6,000	20,893	6,026				107	407		800
	12,000	26,303	8,318				151	575	13	900
<b>1900</b>	28,183	30,903	5,495	22,909	26	11	112	832	50	1,000
	40,000	48,978	692	32,359	47	33	190	646	120	850
	48,977	45,709		39,811	78	20	131	955	800	1,500
	70,794	64,565		53,703	758	47	169	1,120	850	1,000
<b>1940</b>	134,896	66,069		60,256	7,585	107		3,019	1,000	1,202
	74,131	87,096		51,286	35,481	204		5,128	2,000	1,413
	199,526	95,499		14,544	54,954	371		8,000	4,000	2,138
	537,032	251,188		389,045		724			8,318	3,548
	660,693	446,683		630,957		759			13182	
	691,831	512,861		758,577						
<b>2000</b>	851,138	588,844		932,254						

Table 1. World material production for industries from 1820 to 2000.

The Rio de Janeiro Earth Summit Conference in 1990 and to some extent further practical steps taken in all countries since then indicate how important it is that social communities adopt radical measures towards sustainable development.

In this respect international experience is becoming very important. It should be mentioned, however, that the three pillars of social, economic and environmental development adopted in Rio are still the agreed basis for development and environmental management.

“The golden billion” countries have greatly improved their environmental status in recent years. There are many forms of operation using new approaches to address environmental and resource-related problems.

Firms re-circulating their wastes are granted tax privileges. They have an advantage when suppliers are selected for state agencies (see Figure 1).

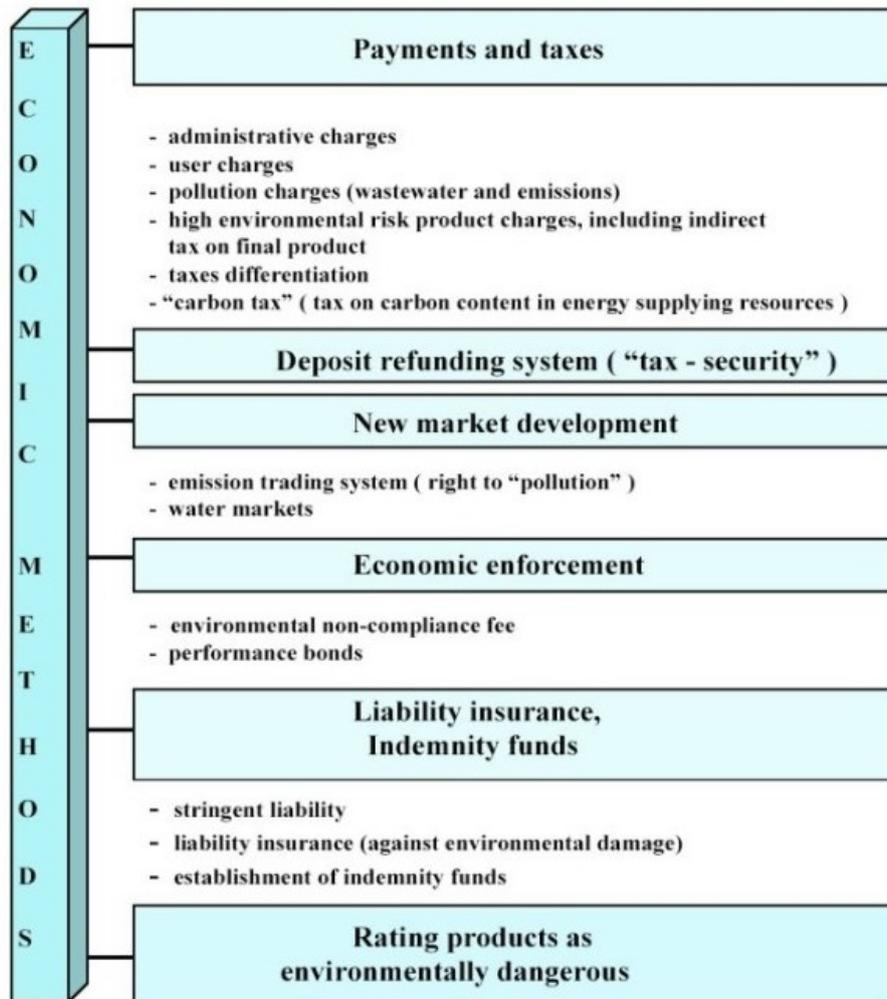


Figure 1. Economic instruments of environmental regulation

Interactions between the state and business is one of the major aspects of environmental management in industrially developed countries.

The So-called Keidanren Global Environmental Charter (Japan, 1991) states that any corporation should realize that addressed environmental problems are a pledge of its prosperity and successful operation. In general, the environmental behavior of industrial companies has considerably changed since the early 1990s. The following reasons can be recognised:

- Wise national policies promoting investment by private companies into treatment facilities and pollution abatement activities (soft taxation, etc.);

- Understanding that efficient resource use results in emission abatement and therefore can bring profit to a company;
- Greening of the market to promote environmentally sound products;
- Greater opportunities for producing treatment and measurement facilities, development of new cleaner technologies, and utilization of wastes.

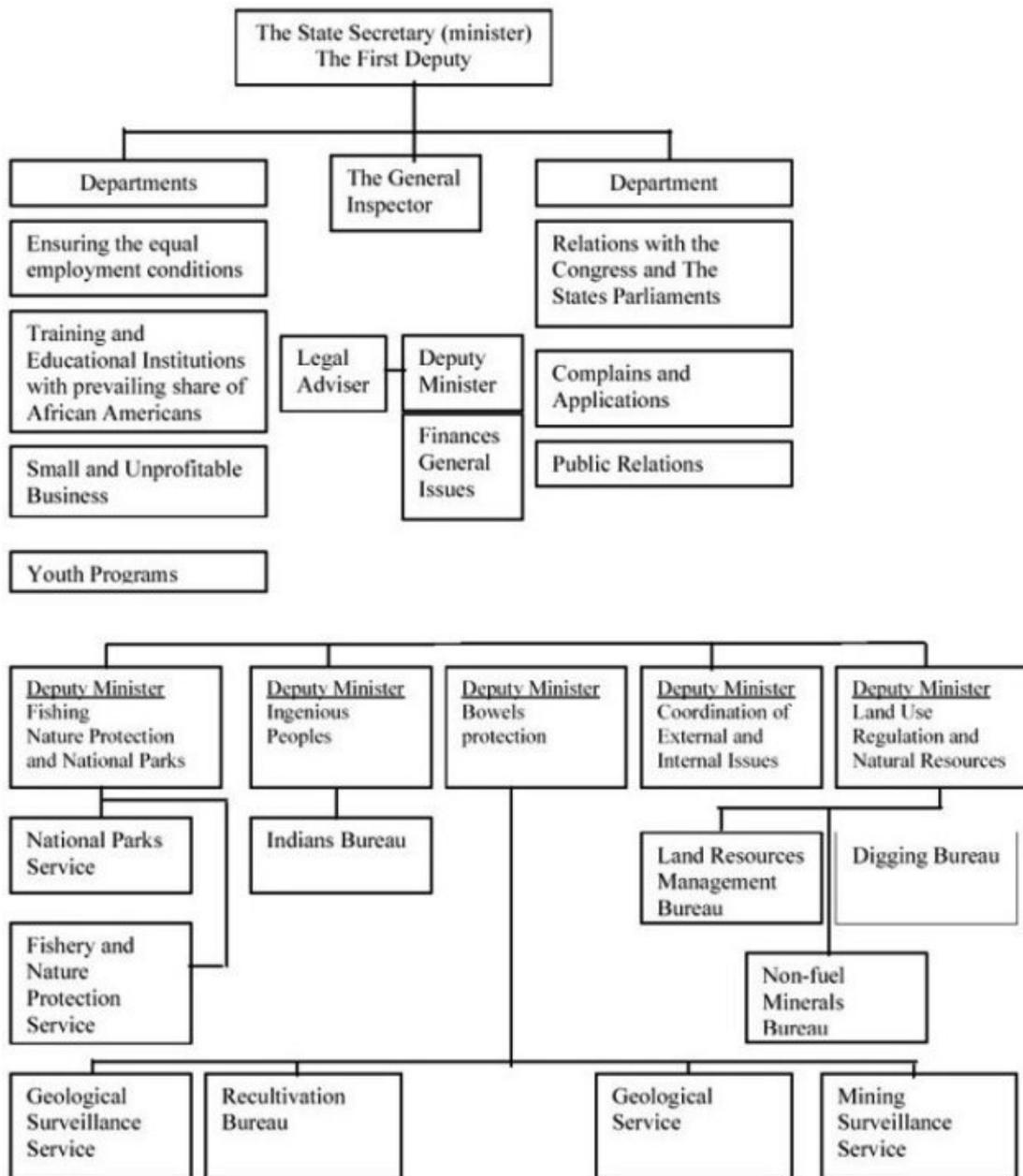


Figure 2. Organizational structure of the USA Department of the Interior

Today, there are many examples demonstrating both reduction of production costs and pollution abatement.

The key aspects that industrially developed countries put forward in their environmental policy are economic and technological models allowing combination of, as far as

possible, economic and environmental interests. In particular, the efforts are focused on reduction of material and energy consumption by production processes. Additional funds are being allocated to scientific research, including studies in the field of alternative energy.

Further extended application of economic enforcement instruments is regarded as an important aspect of advanced environmental policies in Western countries, and in particular, better use of market capacity for environmental protection.

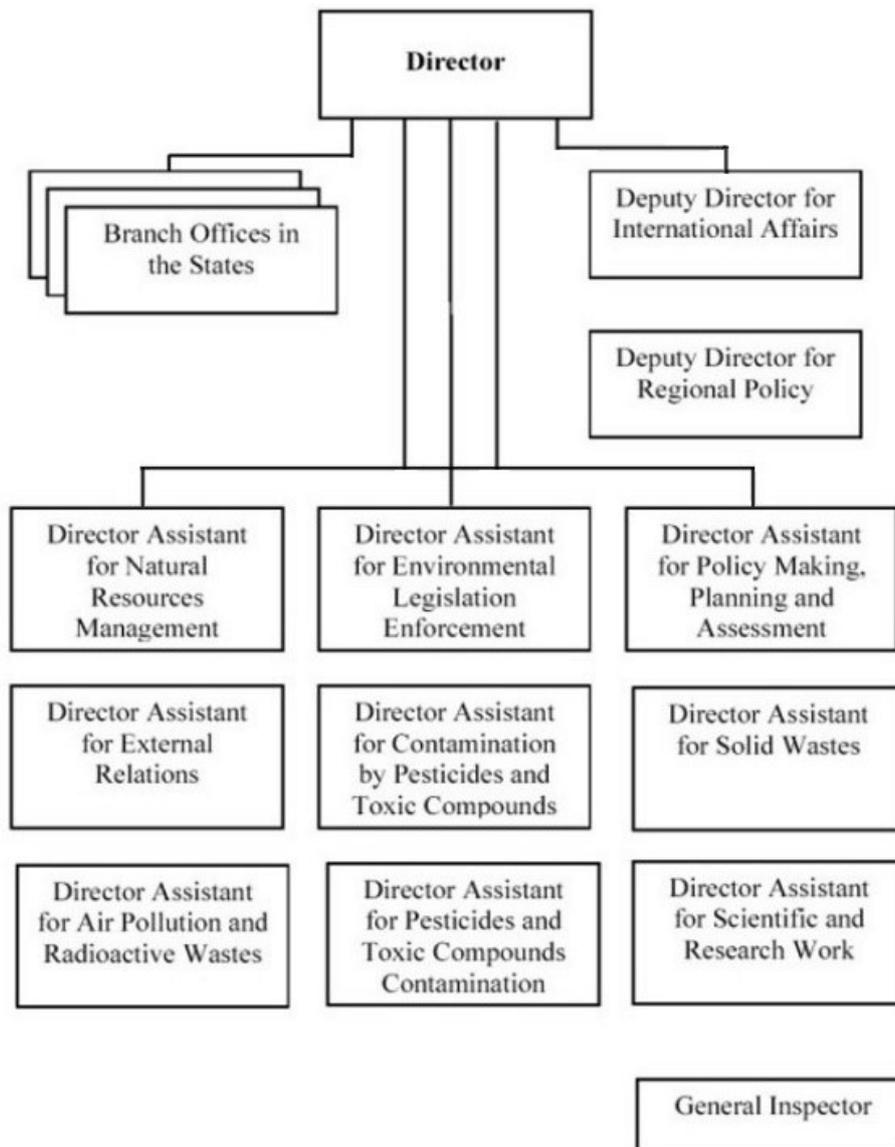


Figure 3. Organizational structure of the Environmental Protection Agency (EPA)

Strong emphasis is given to the revision of the whole environment protection system, so that priority is given to pollution prevention rather than clean-up activities. This is both environmentally friendly and, according to many American and European experts, less expensive.

Environmental issues fall under federal authority in all countries. The USA will be discussed below as an example (see Figures 2 and 3).

## **2. Formulation of state eco-development management strategy**

The well-known UN report “Our Common Future” and the Rio Earth Summit papers share a common objective of transition to sustainable development by means of a novel approach to the economy—environment correlation. The essence of this can be formulated as follows.

Positive results can be achieved only if mankind realizes that ecology is not an antagonist to economy, but an objectively existing system, and the functioning of any economy is not possible if the system requirements are not followed, since the economy can destroy the Earth—the primary fundament for human life.

Today the meaning and interpretation of “economy” and “ecology” is becoming wider, as the Greek word “ecos” means home and is the basis for the two sciences—ecology and economy. Environmental and economic activities and the related sciences jointly figure out forms, methods and limits for acceptable market management.

This idea has a huge and rich history. A few examples will be enough to illustrate.

The first Volume of Marks’s *The Capital* gives a quotation from the famous economist William Petty saying that a common wealth has two parents, Father Labor and Mother Earth. Fully supporting this 350 year old definition it can now be amended and the term “Earth” can be replaced by “Nature”, as both the Sun and space have a direct influence on humankind’s activity and targeted outputs.

The second example is quite fresh. At a Seminar on Economic Problems of Wasteless Production held in the Hague by UN ECE in 1989, two Dutch experts, L.B. Baas and G.P. Dailman assumed the existence of links between transition from scientific labor management to labor management focused on the human factor, on the one hand, and from the “end-of-pipe treatment” technology development to integrated environmental management on the other.

Most famous economists believe that environmental protection and natural resource management issues were poorly elaborated by Soviet science. This is probably due to the fact that Russia owned such a wealth of resources. In view of current environmental considerations, the major resource is living space and natural (non-reclaimed) areas of Russia. These are a key part of the wealth of the country and they are constantly increasing in value.

The environment is still unfairly man-impacted in every country. Humankind became more concerned about the environment in the second half of the twentieth century. This considerably changed the public thinking, but also resulted in modifications to international legislation, as well as reduced environmental damage in a number of the richest countries of America, Europe and Asia. Local legislation, existing policy, and high-tech development of production and services have become more environmentally

sound. The Great Lakes in USA, European rivers, and the natural environment in Japan are in much better condition now and thus life expectancy is higher. To our mind, neo-spheric thinking and human co-existence on the basis of priority of common values are the way ahead, as advocated by Academician Moiseev, who further developed the fundamental ideas of Vernadsky.

The principles and methods of eco-management are developing. It is interesting that their formulation is a simultaneous process in different countries. In 1996, an Eco-management Workshop was held in Moscow. The ideas discussed at the workshop should undoubtedly be practically applied.

There are several principles that should be considered as fundamental for environmentally friendly economic policy development:

- Continuous development
- Precaution
- Active introduction of advanced technologies
- Effective use of natural resources
- Environmental and economic liability
- The polluter pays principle

<b>Grouping criteria</b>	<b>Thesis of the concept</b>	<b>Brief description of the concept</b>
1. Interpretation of the main factor for the environmental crisis	<ul style="list-style-type: none"> <li>• Gaps in production forces development</li> <li>• Imperfect institutional system of a society</li> <li>• Limited development and dissemination of market relations</li> </ul>	<ul style="list-style-type: none"> <li>• Technical determinism</li> <li>• Institutionalism</li> <li>• Neo-classicism</li> </ul>
2. Attitude towards possibility of environmental crisis overcoming	<ul style="list-style-type: none"> <li>• Negative: the crisis can not be overcome</li> <li>• Positive: the crisis can be overcome</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental pessimism</li> <li>• Technological optimism</li> </ul>
3. Attitude towards compatibility of economic growth and nature protection	<ul style="list-style-type: none"> <li>• Negative: the economic growth should be stopped</li> <li>• Positive: the economic growth has a chance to develop</li> <li>• Sustainable development of countries, continents and the Planet as a whole</li> </ul>	<ul style="list-style-type: none"> <li>• Theories of antidevelopment</li> <li>• Theories of “quantitative” and “modified” growth</li> <li>• Novel theory of the institutional economics</li> </ul>
4. Means to implement environmental policy	<ul style="list-style-type: none"> <li>• Direct state regulatory methods</li> <li>• Indirect market methods</li> <li>• Combined methods</li> </ul>	<ul style="list-style-type: none"> <li>• Dirigism</li> <li>• Neo-classicism</li> <li>• Neoclassic synthesis</li> </ul>

Table 2. Grouping of environmental management theories

Practical implementation of the environmental strategy in Russia is rather specific. It involves all layers, groups and communities of society. However, we suggest focusing on the following five areas:

1. Environmental awareness (from kindergarten to academies, from top-managers to presidents).

2. Economization and informatization of social and environmental development.
3. Improvement of all basic activities and authorities (executive, legislative and legal) through implementation of target programs.
4. Creation of low-waste operations followed by wasteless production.
5. Health protection activities all over the world.

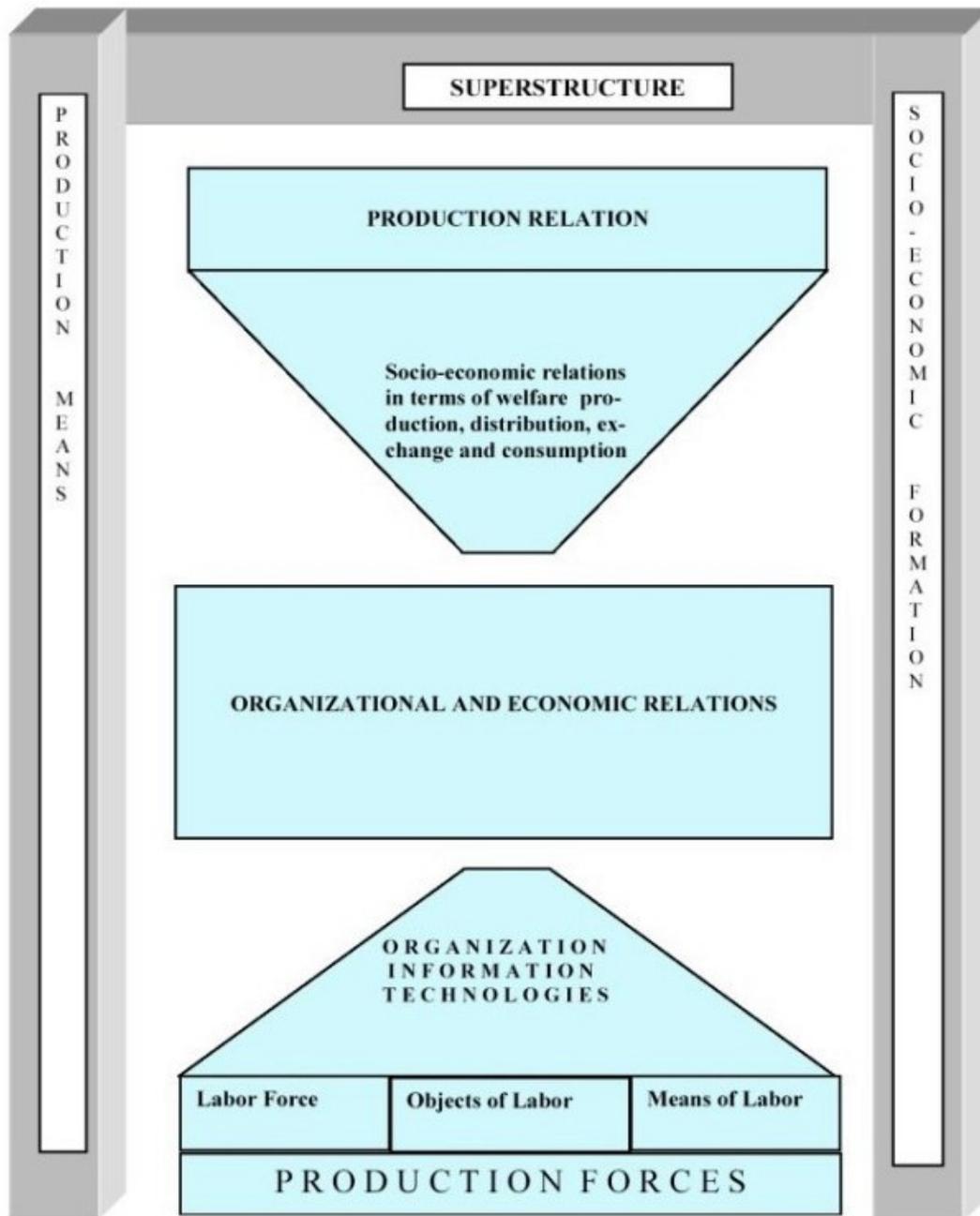


Figure 4. Production methods and socio-economic formation

It is important that these are implemented through constructive co-authorship.

However, it must be taken into account that there are many contradictions between the demands of people, society, the state, and environmental potentialities.

This situation is reflected in new theories focused on effective “people–nature” interrelations. Current environmental management theories are presented in Table 2.

At the same time, ideas on production and social activities through understanding of production methods and socio-economic formations are still very important (see Figure 4).

Countries in transition to post-industrial development, are seeing subtle but significant changes in production priorities.

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### **Biographical Sketch**

**Vladimir I. Chalov** was born in July 1938. By background he is an Engineer-Metallurgist of non-ferrous metals (in 1961 he graduated from the Mining and Metallurgy Institute in Ordzhaniukidze). He is also an economist (he graduated from the postgraduate course at the Academy of Public Sciences under the CC CPSS). He obtained his Ph.D. (Economics) in 1979 and DSc. (Economics) in 1988. He is the author of over 250 scientific publications, including 12 books, over 30 brochures, several inventions, articles in

magazines, and in various article collections. He publishes regularly, often together with his post-graduate students and doctors. He worked in Norilsk for 12.5 years, and for 3 years in Krasnoyarsk. For the last 25 years he has been busy in Moscow. He worked for 6 years at the Nickel Factory, Smelting Workshop of the Norilsk Plant. He was recruited by various scientific and research institutions over 17 years. Today he is a professor at the Russian Academy of Civil Service under the President of the Russian Federation. His scientific interests involve forecasting industrial distribution in the national economy, efficient environmental management, eco-development, and informational support to sustainable life support activities.