

considerable time. Another means to develop such an experiment is to institute a decree from the Cabinet of Ministers. A decree might be sufficient to satisfy some of the pre-conditions that would facilitate an experiment and real commercial transactions.

Starting the development of market-based environmental programs outside of the United States has proven to be a difficult process despite the great benefits that result for industry, regulators, and the environment.

One way to proceed is the development of pilot projects or programs.

## **ECOLOGICAL AND ECONOMICAL ASPECTS OF THE DEVELOPMENT OF THE SOCIO-AND-ECONOMIC SYSTEM**

*Y.V. Taranenko*, PhD student

Every country faces many choices in dealing with its development issues. Development is a comprehensive process involving economic as well as social and environmental changes. We attempt to describe and explain the complex relationships among various aspects of development, including population growth, economic growth, improvements in education and health, urbanization, and globalization.

According to the Human Development Report 1996, published by the United Nations Development Program, "human development is the end - economic growth a means".

It is also important to remember that many aspects of development cannot be accurately measured by statistics.

It is true that economic growth increasing a nation's total wealth. But instead growth was achieved at the cost of greater inequity, higher unemployment, weakened democracy, loss of cultural identity, or overconsumption of resources needed by future generations. Standard measures of wealth accumulation ignore the depletion of, and damage to, natural resources such as forests and oil deposits, on the one hand, and investment in one of a nation's most valuable assets - its people - on the other. The genuine saving

(investment) rate is designed to correct for this shortcoming by adjusting the traditional saving rate downward by an estimate of natural resource depletion and pollution damages (the loss of natural capital), and upward by growth in the value of human capital, which comes primarily from investing in education and basic health services.

## **VORTICAL TYPE GRANULATORS IN THE CHEMICAL INDUSTRY**

*A.E.Artyukhov*, PhD student; *L.P.Yarmak*

At present Ukrainian enterprises are specialized in the manufacturing of different granular products from solutions and fusions using granulation towers. This equipment requires great money input for its making, technical maintenance and repair. It is rather complex to be produced and maintained because of its dimensions. Setting up of new enterprises based on the manufacturing of granular products by means of false boiling vortex layer granulators is one of the ways expenses of decline for producing granular porous products and increasing their quality. To achieve this goal we must introduce the newest developments of modern science and technology.

A short description of tower type granulation equipment is given. The variants of granulation towers modernization have been considered. A new sample of a false boiling vortex layer granulator together with an experimental technological scheme of granular products manufacturing have been worked out. A number of experiments have been carried out to study the laws of granules distribution in the vortical granulators. The mathematical model and algorithm for the calculation of the involute gas stream movement in granulator are given. The article gives the grounds of application of involute symmetric to the axis gas stream for manufacture of the granulated products.

As the vortical granulators are not widely used the characteristics of a involute gas stream have not been studied well in research literature. The experiments to study the processes taking