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SUSTAINABILITY ISSUES AND RESOURCE MANAGEMENT

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Abstract. *Sustainability is the objective that many disciplines indicate as being essential to the resolution of environmental degradation, and thus, is increasingly becoming a key social, political, scientific, environmental and engineering issue. There are increasing signs that sustainability will become a major new paradigm influencing the society of tomorrow and the engineering it requires. In this paper, a particular attention is given to the concept of sustainability and investigation of how sustainable development can be related to industrial development, particularly in developing countries and Serbia. Environmental problems are defined as externalities, most of them spanning over generations. Traditional solutions for externalities do not work in the intergenerational context, and therefore the traditional methods for evaluating the costs and benefits affecting different generations should be improved. When external costs are extended over time, those who will suffer have yet to be born and the incentives are even fewer. Furthermore, an intergenerational redistribution of natural resource property rights is essential to guarantee equality of opportunities for all generations and therefore to ensure sustainability.*

Key Words: *Sustainability, Sustainable Development, Industry, Developing Countries, Externalities*

INTRODUCTION

The need for improvement in natural resource management can no longer be doubted. There are increasing signs that sustainability will become a major new paradigm influencing the society of tomorrow and the engineering it requires. The recent World Summit on Sustainable Development, held in Johannesburg, reminded us that issues such as poverty, consumption patterns among wealthy nations, demographic trends, climate change and access to clean water are universal concerns that play a major role in the quality of people's lives [3].

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Despite 50 years of work by development agencies, nearly half of the world's population still lives below the poverty line of two dollars a day. There are many reasons for this failure, including the confusion between means and ends, and policies motivated by political interests. In addition to this, poverty is both a cause and an effect of environmental destruction. In their struggle to survive the poor are compelled to live from hand to mouth. They are caught in a self-destructive trap in which their survival depends on overexploitation of fragile resources. Thus, reducing poverty is the key principle of ensuring an environmentally sound development [10].

There still remains a question of how to speed up the true socio-economic and environmental development through engaging in a positive sum game with nature instead of continuing the practices that deplete at an alarming rate the capital of nature and undermine the life-support systems. Sustainability presents a dynamic concept and equilibrium with all internal and external parameters that take into consideration the expanding needs of the growing world population.

It is easy to dismiss sustainable development as one more utopia, arguing that environmental protection is expensive and, therefore, should wait for better times; and that the present economic and social situation in many Third World countries is too critical to implement any such changes. Modern strategies seek to address the causes instead of the effects and are based on the 'polluter pays' principle, although in many cases it was rather difficult to determine who the original polluter was [2]. The conflicting interests around the choice of a development strategy and environmental protection should not be minimized and argued on the grounds of narrow micro-economic calculation. It calls for a political decision based on a long-term view of the country's interest, its share of responsibility in the global management of the planet, and an appreciation of the positive externalities (such as technological spillover, preservation of water recharge source, conservation of biodiversity, etc). The positive externalities are created for the population at large scale by restraining further environmental degradation which disappears in all the actions directed at resource conservation, reduction of wastefulness, recycling, and maintenance of vehicles, equipment and infrastructure. In macro-economics terms, the saved resources constitute a potential source of development, not to mention generated employment that pays for itself [9].

ENVIRONMENTAL EXTERNALITIES

The main problem with assigning natural resources is the presence of intergenerational and intragenerational external effects. Such externalities come about as a result of the environment or each natural resource, being an intergenerational commons. From the intragenerational point of view, the environmental management would be limited to a certain number of individuals. On the other hand, intergenerational externalities mean that the environment is a commons that is freely accessed by each generation, so that 'each generation is a successive dictatorship of the present' [6]. As in any type of externality, perpetrators of externality have no incentive to behave in accordance with what is the best for the whole, as they receive the full benefit in return for just a tiny part of the costs of their actions. Each agent is probably aware of the ultimate consequences of its behaviour, and what its attitude should be like with respect to achieving what is the best for society.

None will be willing to accept responsibility if there is no guarantee that others will do the same. Each agent effectively faces a situation in which the worst solution for society constitutes a dominant strategy for all participating in the decision [7].

Environmental contamination and degradation, that affect regions, may be local in nature as in water pollution in lakes, land degradation and air pollution. Contamination of large rivers and water bodies and degradation of forest ecosystems may affect many countries/regions. Greenhouse gas emission is such a global public problem that, regardless of where the pollutants are emitted, the aggregate emissions affect all persons in the Earth and the ecosystem as a whole. It should be noted that administrative boundaries and ecosystem boundaries may not match. Environmental problems of transboundary nature e.g. acid rain, green house effects, river pollution affecting more than one country while coastal degradation affects neighboring countries. For global environmental problems such as climate change, ozone depletion, biodiversity loss and pollution by very toxic and hazard organic pollutants (POPs) a collective action level is needed at the global level [9]. In all these cases the relative roles end responsibilities of developed and developing countries assume significance because they are at different stages of development.

The break-up of the Yugoslav Federation in 1991 led to destructive warfare, causing the destabilization of internal boundaries in the main Balkan region and the disruption of important internal trade flows. The sanctions and isolation imposed on Serbia and Montenegro in 1992 by the international community were damaging for the whole economy. Conflicts over a ten-year period and the poor management of the economy and the environment are largely to blame for the economic hardship of the country. In addition to this, there was little coordination between the various activities of the responsible institutions. Repetition and fragmentation led to the shifting of environmental problems to other media and the inefficient allocation of resources [1].

INDUSTRIAL DEVELOPMENT IN DEVELOPING COUNTRIES

The present development pattern in many industrialized nations is somehow similar to a kind of environmental oasis. It has resulted from solving many local and first generation environmental problems while environmentally unsound activity is often pushed (externalized) elsewhere. Not-in-my-backyard attitude also contributed to regional and global ecological problems and dwarf efforts towards integrated industrial and environmental management at the international level. Most of those problems are of industrial origin. Technologies are the centerpiece of industrialization. Being one of the most important factors in ensuring economic development and growth of many countries, industrial activity continues and will continue well into the future. It is evident that industry will have to take its own initiatives in protecting the environment [8].

For the developed countries the present life looks relatively secure and people are able to think about future and stricter environmental regulations. On the other hand, economic crisis in the developing countries is often an environmental crisis. It may seem paradoxical that market and centrally planned economies in their industrial development have given rise to such massive environmental degradation. Natural assimilating capacity and resources were considered mainly free and practically inexhaustible, with an unlimited capability of technological progress to solve emerging problems. Technological change

has largely been driven by profit motives of private companies, with environmental effects seen as externalities and their burden shouldered by human community at large.

The industrialization process affects the environment in several ways at:

- the input preparation stage through depletion, destruction or transformation of the natural resource base, lands and soils to obtain its raw materials,
- the processing stage through environmental pollution by environmentally unsound technologies,
- the product use stage,
- the product after-use stage through generating waste with its attendant problems of its disposal.

In addition to this, industries cannot exist without a huge infrastructure such as energy, transportation, communication and distribution systems, water and air supplies, systems for treatment of waste water and pollutants, human settlement and life style patterns [4].

There are special programs for capacity building and financial support in environmental management for the developing countries, but there is also a limited success in the transfer of environmentally sustaining technologies to developing countries. Many developing countries are concerned about the uses of environmental standards by certain developed countries as non-tariff barriers. Such attempts would erode the comparative advantage of the developing countries in export of labor-intensive manufactured products.

Despite sanctions, economic stagnation and conflict situation, in 2001 Serbia entered the transition process – changes of its the market economy and the creation of a modern, law-ordered society. The strengthening of a preventive, long-term approach to the protection of the environment, the principle "the polluter should pay", implementation of the international conventions and standards in the area of environment protection, as well as a sustainable utilization of natural resources, is one of the priority reform processes of the Government of the Republic of Serbia [5].

The additional costs of sustainable development pose a problem in market economies. Companies resist the internalization of costs that up to now have been externalized and they seek public subsidies to cope with stricter environmental regulations. The scope for a positive sum game, in which economic and environmental gains go hand in hand, could be increased through well directed research and experimentation. Furthermore, what appears in the short term as a trade-off between an environmental gain and more growth often amounts to a choice between a preventative action today and a much more expensive remedial action tomorrow.

CONCLUSION

The need for improvement in environmental management is becoming increasingly urgent. There are clear symptoms of a serious illness, such as the hole in the ozone layer, climatic change, and the disappearance of species and the exhaustion of renewable resources. All these symptoms are due to the same cause, namely, inefficient use. The inefficiency is mainly motivated by the strong and serious externalities, caused by free access to most natural resources from an intergenerational point of view.

Integration of environmental consideration into industrial policy raises a fundamental issue concerning the type of sustainable development that is envisaged. In this matter one

can avoid putting too much emphasis on economic, environmental and industrial growth indicators, and place the major accent on social and environmental goals and values. In this context technological change and sustainable industrial policies become significant driving forces of the socio-environmental development. It is essential that the developing countries should avoid investing in outdated and polluting technologies. The best way to spread the global application of environmental technologies is by promoting trade and responsible investments in the developing countries and the countries in economic transition.

Serbia is on the right track with the ongoing reforms in the environment and resource management, in the function of human health and struggle against poverty. The major challenges in the near future include the rehabilitation of the identified environmental "hot spots" and the remedy of the destructed natural resources, improvement of production, as well as the improvement of air and water management, accompanied by the development of an efficient waste management strategy for industrial and municipal solid waste and waste water. Furthermore, there is also a need for implementation of sustainable development in Serbia on the level of European Union, along with coordinated implementation of sustainable development on the Serbian level.

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ODRŽIVOST I UPRAVLJANJE RESURSIMA

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Održivost je cilj koji mnoge discipline identifikuju kao važan za rešavanje problema degradacije okruženja, i stoga, postaje ključna društvena, politička, naučna, ekološka i inženjerska tema. Postoje rastući pokazatelji da će održivost postati glavna paradigma koja utiče na društvo sutrašnjice i inženjerstvo. U ovom radu, posebna pažnja je data konceptu održivosti i istraživanju kako se može povezati održivi razvoj sa razvojem industrije, naročito u zemljama u razvoju i u Srbiji.

Problemi zaštite životne sredine su definisani kao eksternalije, pri čemu se mnogi od njih javljaju između različitih generacija. Tradicionalne mere za rešavanje ekoloških problema ne funkcionišu u međugeneracijskom kontekstu, i stoga se tradicionalne metode za evaluaciju troškova i benefita, koje pogađaju različite generacije, moraju unapređivati. Sa povećavanjem eksternih troškova tokom vremena, populacija koja će osećati posledice toga treba tek da se rodi, pri čemu će podsticaja za rešavanje ekoloških problema biti sve manje. Međugeneracijska preraspodela vlasničkih prava nad prirodnim resursima je od bitnog značaja kako bi se osigurala jednakost mogućnosti za sve generacije, a time i održivost životne sredine.

Ključne reči: *Održivost, održivi razvoj, industrija, zemlje u razvoju, eksternalije*