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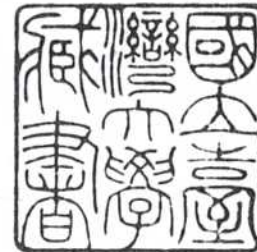
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# GLOBALIZATION AND THE RURAL ENVIRONMENT



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Published by Harvard University  
David Rockefeller Center for Latin American Studies

Distributed by Harvard University Press  
Cambridge, Massachusetts

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## The Impact of Globalization and the Information Society on the Rural Space: Conceptual Analysis and Some Policy Suggestions

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### **Introduction**

Nations are in the process of moving from the industrial society to the information society, also known—perhaps more accurately—as the post-industrial society. This shift can be equated with what happened two hundred and fifty years ago in Europe with the change from an agrarian to an industrial society. This socio-economic transformation of revolutionary proportions is impacting most communities around the world, albeit not always in the same way or at the same rate, nor are these changes necessarily seen as positive by all societies. As in any social transformation there are winners and losers. It is still too early to say whether eventually there will be more winners than losers, or vice-versa; yet in some quarters at this time there are more that are losing than not, which is creating resistance to the information society and its changes. However, a greater and more open flow of knowledge and information should represent an opportunity for gain and the expectation is that in the final analysis most individuals and societies will benefit. The industrial revolution was also preceded by a period in which poverty and misery increased significantly, especially among the urban proletariat, but eventually the situation was reversed (especially with the onset of the second industrial revolution at the end of last century, Deane 1979, Landes 1998). Yet for those that today find themselves trapped in poverty the promise of a better future is little consolation.

For three days in January 2000 –13 to 15—a group of 40 ecologists, agronomists, economists, and sociologists from universities, research institutes and the private sector, debated the impact on the rural environment of the economical and social changes that are currently taking place. The discussion centered on three areas with highly developed market agriculture: the southern cone of South America, the United States, and Western Europe. The general conclusion of the meeting was that industrial agriculture has been very effective in increasing production and helping alleviate hunger, but that questions remain regarding its environmental and social impacts. Nonetheless it is difficult to rigorously identify the extent and significance of these impacts and to design appropriate remedial policies. This chapter summarizes the conclusions of the meeting, and presents some policy proposals that were discussed.

### **General Background**

The information revolution is the result of the conjunction of three principal historical, but unrelated, events. First of all, great advances in science took place, particularly in two areas: microelectronics and biology. The invention of the transistor, of electronic computers on a chip, fiber optics, electronic switching and miniaturization, produced a large number of consumer and industrial products that increased the transmission of information, such as personal computers, transistor radios, and cellular phones. It also promoted a transformation in telephony and communications (fiber optics, electronic switches, satellite transmission, etc.) that very significantly reduced the cost of long distance communication and data storage and transmission (Hall and Preston 1988, Stephenson 1999).

The discovery of the structure of DNA in 1953 completely transformed the study of biology. Life systems that until then had been closed black boxes suddenly could be studied using the tools of chemistry and physics, and in the short span of fifty years biologists learned how to intervene in living system, from microbes and plants to human beings, to alter their properties. These advances are also creating a series of new products in pharmaceutical field (designer drugs), medicine (gene treatments), and agriculture (cloned sheep, genetically altered crops).

The second historical process was the restructuring of the world's economies (Drucker 1993, Friedman 1999). In response to the crisis of the welfare state and the economic stagnation of the 1970's, firms

reorganized and adopted a more flexible, networked organization. Simultaneously there was a movement to reduce the role that the state played in the economy, and a massive movement towards deregulation and privatization took place. Extensive reduction of tariffs, and especially the lowering of transportation costs, bolstered international trade (Yergin and Stanislaw 1998, O'Rourke and Williamson 1999). Markets for high value perishable products, such as flowers, are now global thanks to low air transport costs and reduced tariff barriers. Financial markets became integrated and now operate in real time worldwide, which dramatically increased the magnitude of financial flows. Every day one and a half trillion dollars are traded in the currency exchange alone (Friedman 1999). Money flows in and out of markets and countries in fractions of seconds and trade circuits that once took years to close now close in seconds. Stock markets boomed, and those with the skills needed to participate in the global economy enjoyed unprecedented gains in wealth.

The last historical transformation is in the social area. Following the student uprisings in Western Europe in the 1960's and similar simultaneous social upheavals in the United States in reaction to the Vietnam war, a diversity of lifestyles and social movements have sprung up especially in Europe and the United States. This phenomenon is increasingly spreading to the rest of the world (Castells 1996). Examples are the environmental movement, the human rights movement, and especially the women's movement, that is in great part a response to the incorporation of women into the workforce. In turn this change is related to the trend toward smaller families, longer life expectancies, and increased need for health services. New family styles, from single parent to same sex families have emerged. In the United States, for example, only 30% of families are traditional, i.e. father, mother and children under the same roof (Castells 1997).

These and other movements have attracted a great deal of activism and led to the formation of an enormous diversity of non-governmental organizations (NGO's). For example, consumer movements, especially in Europe, are demanding certain characteristics in the food chain, such as humane treatment of farm animals, food grown without the use of pesticides, hormone free milk and meat, non-genetically altered crops, etc. The recent demonstrations against the WTO (World Trade Organization) in the name of opposition to

child labor and environmental protection, is one example of mobilization by NGO's.

One of the greatest recent changes is in labor relations and the structure of the workforce (Drucker 1993, Castells 1997). The information society makes much more use of temporary and part time labor, and the subcontracting of specific tasks. Close to 50% of the labor force in some countries is now formed by part-time, temporary workers and independent contractors. The result is the individualization of labor and a decline of traditional labor organizations along with the traditional welfare state social safety net that has been weakened in many countries.

These and other changes are impacting all aspects of industrial and post-industrial society and creating a justified collective anxiety. Nowhere are these more evident than in the rural sector. By rural sector we refer not only to agriculture but also to all activities that take place in the countryside, including but not restricted to agriculture. Although these changes are not confined to regions with market agriculture, they are more dramatic and potentially more impacting there than in areas with self-sufficient peasant farming.

### **The Impact of the Post-industrial Society on the Rural Environment**

The rural environment, especially in areas where commercial agriculture prevails, has been affected significantly by the changes that are taking place. These have impacted the production process, the economy of farming, and the rural social structure.

#### *The Production Process*

Didactically we can distinguish three sets of technologies that have affected the production process: (1) input technologies (also referred to as "green revolution" technologies), (2) process technologies, and (3) knowledge technologies (often encompassed under the broad umbrella of biotechnology).

In the early 1960's, in response to increased demand from a fast growing world population, new production technologies were introduced, commonly known as "green revolution" technologies (Ruttan 1977). Basically they consisted in the development of cereal varieties (wheat, rice, maize) that were very highly responsive to the addition of chemical fertilizers, especially nitrogen. The use of herbicides and pesticides and the use of tractors and self-propelled ma-

chinery complemented this technological production package. Green revolution technologies increased yields and production augmented at a rate that was higher than population growth. However they had some negative environmental effects primarily due to the significant increase of chemical inputs (fertilizers, herbicides, and pesticides). Yet their favorable effect on yields led to the wide adoption of these technologies.

A decade later, in order to reduce some of the negative effects of green revolution technologies and to conserve resources, management operations known as process technologies were introduced, such as measures to reduce soil erosion, integrated pest management (IPM), and drip irrigation (Loomis and Connor 1992). These technologies were designed primarily to reduce input use, but they also minimized some of the negative environmental impacts of the green revolution.

Knowledge technologies are a direct consequence of the advances in molecular biology in the last fifty years and their application to agriculture. The major impact comes from biotechnology, especially gene technologies (Marx 1989). In a first wave of biotechnological developments, new crop varieties were produced that are resistant to broad-spectrum herbicides (e.g. "round-up ready"). This permits the use of general herbicides with low toxicity that lead to a better control of weeds, reducing their negative effect. Since these general herbicides are toxic only to some plants and much less so to animals, and are readily decomposed by microorganisms, their use should have a reduced negative environmental impact compared to those in general use now. Furthermore, the number of herbicide applications is reduced from three to one. The introduction into crop species of genes that produce toxins that decrease insect damage (so far only taken from *Bacillus thuringensis*) reduces the use of insecticides. The effect of these toxins on vertebrates, especially humans, is not clear, and there has been social resistance to the use of genetically altered crops, especially in Europe (Rifkin 1998). Yet the use of these toxins as spray has been practiced since 1938 by organic farmers with no noted side effects. In a second wave of biotechnological techniques, crops are being designed to produce specific chemical compounds, from unsaturated oils to polymer molecules for use in the plastic industry (Moffa 1999). Although still in their infancy these developments are particularly interesting from an environmental point of view since these molecules are biodegradable

