

Prediction and Perception of Natural Hazards

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THE SOCIAL DIMENSIONS OF WARNING AND THE TRANSITION FROM FOLK WISDOM TO LAYMANSHIP

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When reflecting on appropriate IDNDR-strategies, we must seek relief programs that avoid dependency and inactivity To put it positively, we must seek programs that support indigenous efforts to prevent disasters and to overcome hazards without continuous outside support

In practice, better relief strategies are frequently limited by several characteristics These include their ad-hoc nature, narrow efficacy, and short comings in Integration with other programs (e g economic aid, IWF) Other characteristics include incompatibility with national policies/doctrines and international controls (terms of trade, protectionism, GATT) and the lack of empirical, theoretical, and political certitude Specific uncertainties are based upon the differences between so-called "developed" and "less/least developed" countries (LDCs/LLDCs), upon the high percentages of the international aid budgets that flow into the economies of the "givers" for producing and shipping aid-appliances and for maintaining their organizational and Professional frameworks, and upon the many international (disaster) relief programs that more often undermine the moral and independence of the afflicted populations instead of fitting for self-help initiatives and an appropriate development on the part of the "receivers."

Until today we lacked conclusive models of the interrelations between natural and human factors Most theories on large-scale, long-term change are still contested Thus, most relief-projects are contradictory in diagnosis and therapy and, as a consequence, mutually prevent improvement Often, the complexity and interdependency of problems, the plurality of scientific analyses, and the withdrawal from a distinct causality toward theories of probabilities will be utilized for exculpating perpetual misconduct

Many uncertainties are particularly based in our concepts of modernization and industrialization In the view of all the advantages and benefits, the disadvantages and risks are often overlooked, sometimes ignored The external costs of industrialization especially

are not taken into account. Nevertheless, the idea that underdevelopment will be surmounted by exporting the model of free market economy, Western technology, and private business is familiar. The idea that disasters will be avoidable by implementing sophisticated safety measurements, by modernizing the modes of production, transportation, and communication, and by intensifying education and training is familiar as well.

Case studies, retrospective analyses and other evaluation studies of economic aid and of past disasters prove these ideas to be myths. Despite all well-intentioned efforts, the gap between rich and poor has widened, the number and strength of disasters have increased all over the world. However, the type, size and effects of disasters seem to correspond with the distribution of wealth: two thirds of all people who will be killed annually by geophysical hazards are living in the poorest parts of the world (with a per capita income below 1000 US\$/year), whereas the material losses are preponderantly in the wealthier parts. Obviously, the reproduction of "modern" societies depends on the use of technology and commodity values whereas the reproduction of "pre-modern" societies depends upon the use of physical strength (i.e. human labor force, animals and natural energy sources) and agricultural products.

The conclusion, however, that fewer people would die if the poorest countries of the world industrialize is absolutely wrong (see Clausen/Dombrowsky 1987). Industrialization was and is accompanied by other, specific hazards that annually produce millions of victims as well. The distinction between "natural" and "man-made" hazards is a misconception because the use (or misuse) of nature is literally "man-made", regardless of the Standard of civilization. Thus, it is not an earthquake that destroys a city or a drought that destroys the harvest, it is a failure in land-use, settlement, building construction, agriculture, infrastructure, knowledge, and so on (see Dombrowsky 1989).

Historically, "hazards" have accrued from (grievous) experiences. The threats of nature and enemies required protection and defense. Errors and failures demanded remedy and durable betterment. Generally speaking, remedial measures and betterments are survived experiences and surmounted failures that are incorporated into the practical knowledge, into the conception of the world (animistic/magic/scientific), and into the material culture (new techniques, solid tools). Consequently, the Standards of civilization go hand in hand with an appropriate texture of knowledge, competencies, and capabilities.

Traditional knowledge about threats and dangers is based on the close contact with animate and inanimate nature. In contrast to "modern man", the "pre-modern man" is able to read and interpret the "signs" of fauna and flora, weather and waters. All over the world a huge body of folk wisdom can be found that hands down a variety of narratives on the "behavior of nature" in the face of danger (especially before earthquakes), on extraordinary changes or irregularities in plant behavior, in atmospheric lights and colors, in movements in air and waters, and on animal behavior (see Geenen 1990). This body of knowledge built the traditional "disaster culture", appropriate behavior pattern, reasonable

precautions and deducible adequate warnings

With industrialization, the accord between disaster culture and vulnerability is lost; the knowledge of dangers and threats is no longer appropriate. But in contrast to industrial societies, no direct or indirect substitutions are available. The advanced Instruments of direct disaster protection correspond with the technological Standards of production, transportation and communication in use. Both are beyond the understanding of the people who are living outside the industrial and commercial areas of LDCs/LLDs. The indirect safety and Insurance Systems of industrialized societies - protective labor legislation, environmental protection, social insurance, public health care and the System of public education - are only partly found or not found at all in LDCs and LLDCs.

In societies where entire families or clans are supported by a few members, (economical) rationalization is inevitably leading to pauperization and poverty. Without functional equivalents to modern social insurance Systems, people are forced to undersell their labor force, switch to semi-legal or illegal activities and exploit their females and children. Consequently, in pre-modern societies the Substitution of labor force by modern technology is leading to an "immiserizing growth" (Griffin 1974) on the societal level and a de-functionalization and depreciation on the individual labor-force level.

Moreover, industrialization without a mitigating, sociable embedding in public education, vocational training, and general adjustments to science & technology will also lead to the de-functionalizing and depreciating of traditional skills, knowledge, and kinship. In contrast to modern societies, in pre-modern societies knowledge originates predominantly from learning by doing and from imitating what is done by the older people. However, the skills and capabilities required by the process of industrialization are not at hand and, consequently, cannot be transmitted to the growing generation. On an objective level, the traditional knowledge, the social structures of age and relationship, and the modes of socialization become inappropriate for mastering the new demands of an industrial society.

Without adequate competencies and organizational structures, most families try to maintain their traditional settings and routines, although they lose their original functions. Urban settlement and the slums around industrial areas (like Bophal) demonstrate that the ties of kinship and traditional living are more durable than the exigencies of markets, mobility and flexibility. On the individual level, however, the dilemma still remains and becomes a vicious circle. The traditional family is no longer capable of preparing the growing generation for getting a Job, but without earned income, the survival of the traditional family is endangered.

Focused on the Support of their families, most people are concerned with the direct, daily survival. In the cities and the industrial areas, their traditional knowledge is almost worthless. Without adequate education only a Job as casual- or day-laborer is available. Mostly, people have no insight into the significance of their Job or in its risks. In contrast to the knowledge of their rural life and its threats, people are blind to urban and industrial

dangers A and, consequently, part of the danger Conclusively, the industrialization of LDCs/LLDCs may not only cause an "immiserizing growth" but also the miserizing of unsafety. The idea that "safety" foremost depends upon the immanent conditions of technology is a typical misperception of engineers and technicians More failures, accidents, and disasters are prevented with handy, smart, improvised, circumspect, prospective, clever, and socially responsible interventions of "normal people" than with instructions, automatic controls or redundant Systems.

From this point of view, developed and underdeveloped countries are looking into the same abyss The social competencies to avoid damage, harm and failures are an important part of the "human capital" Modernization in terms of progressive division of labor is leading toward a radical specialization and, consequently, toward the dependency from specialists Similar to the de-functionalizing and depreciating of traditional competencies in LDCs/LLDs, the human capital in industrialized societies is going to be devaluated by professionalism In each special field everybody knows more than ever before, but in an emergency, when general capabilities and social capacities are required, the lack of knowledge, know-how, and adequate information will aggravate the peril.

Another misconception is the definition of "disaster" as an event especially concentrated in time and space Epidemiologists, for example, know that disastrous plagues may be under way but view them as chronic diseases A serious outbreak will be called a disaster, although the illness has been present for some time. This is obviously true for AIDS, for desertification, and for nuclear melt downs All these events are unexpected, because their precursors are seldom recognized as warnings

In science-based societies, many attempts are made to identify precursors rationally. Sophisticated surveillance and control Systems (satellites, remote sensing, TA) have been implemented to foresee dangerous situations. In this respect, every warning System is an endeavor to be faster so that the future will become the present. Thus, time is the most important variable when people try to avoid failures

The severity of a disaster is related to the speed of preparation for the disaster. If the danger is faster than any protection, wreckage is unavoidable, if readiness is as fast as the onset of danger, withstanding is possible, and if readiness is faster than the onset of danger, even precautionary measures can be utilized or safer grounds can be reached. Hence, disaster may be defined as result of interfering periods of time, or, in other words, as proportion of correlating speeds The speed which people need to analyze their Situation is the first factor that will influence the rapidity of an upcoming danger Stunned people "accelerate" the onset of danger, fast reactions "decelerate" the onset of danger. Consequently, threats have no speed of their own, no absolute, unevadable velocity. Thus, it is the human reaction to risk and danger that makes the choice from the spectrum between total failure and total safety

The loss of sovereignty of time is equivalent to pressure: Without the time to weigh one's

chances, deciding is at random and therefore far below Optimum. The loss of sovereignty of space is equivalent to narrowness Without the chance to maintain distance from danger and threat, fear takes command and makes people feel literally trapped and driven into a corner. In terms of decision-making theory, this is known as "deciding under stress and incomplete Information" Although (tolerably) incomplete Information is normal in every-day life, under stress the time to react and, consequently, the speed to reach o t her places is additionally diminished Conversely, sufficient Information may enlarge time and space because intellectual sovereignty procures internal (emotional, psychological) distance and instantaneous readiness Thus, Information is a "functional equivalent" of time and space.

The speed of a warning depends on the cultural Standard of alertness, and the significance of signals depends on the risk-perception and the risk-taking behavior of all people. Therefore, warning-signals need a specific receptivity, an auditory that is instantly and autonomously capable of interpreting the contextual meaning of a warning Consequently, the most important aspect of warning is not the warning itself but the societal Standard of general alertness Only the acquaintance with the risks and threats of one's civilization, a competent risk-perception and risk-assessment and an appropriate stockpile of knowledge and protection-measures led to a permanent alertness and an operative preparedness Both are preconditions to realizing warning-signals and to surviving dangers More important than that is the attempt to maintain the positive potential of the "human capital" to avoid hazards Without this potential, even the specialized Professionals are useless. Thus, it is a question of survival to adjust the quality of the "human capital." Without a widespread folk wisdom embedded in a proven disaster culture, the risks of modernization and industrialization are severe.

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