

## **Precaution and the Survival Threshold**

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The precautionary principle has always been a part of survival algorithms of small farmers in developing societies, particularly in mountainous and forested regions and those areas prone to flood and drought. However, using a portfolio of meticulously mastered strategies, the farmers manage to avert risk in certain markets by taking extreme risks with other resources. Households survive by taking risks and coping with the consequences, even while improving their capacity to deal with uncertainties in the future.

Risk-taking that builds capacity to deal with bigger uncertainties requires a different way of thinking from planning for a minimal threshold of survival. To define a survival threshold, one can take the analogy of a plimsoll line. If a ship tilts beyond the boundary of this line, it may sink. But within this line's range, the ship copes with turbulence. The survival threshold is the limit within which risks are taken. Occasionally farmers gamble, just as countries and corporations do. To learn whether the gamble is worthwhile, one must understand the possible consequences for human life, health, dignity, and ultimately for the health of the ecosystem.

In the middle sixties, Indian planners decided to gamble by importing bulk quantities of seeds from Mexico, to herald the green revolution in India. There were many risks from diseases, weeds and pests. Indian scientists went to Mexico and inspected the fields from which the seeds were collected. Within two years, the entire operation transformed total food production from 67 million to 110 million tons.

Once known as a 'basket case,' India moved toward food self-reliance, today producing more than 200 million tons. But income disparities increased initially, while sustainability eventually decreased. Productivity of inputs declined, and the soil and water quality deteriorated due to excessive chemical use. The agro-biodiversity declined drastically during the same period, entirely due to public sector-driven dissemination of high yielding seed varieties.

Can we argue therefore that biotechnological risks have to be analyzed by the principle of a reasonable trade-off between known risks and social benefits derived from sufficient institutional capability to deal with the consequences? We must learn the right lessons from the green revolution experience. Without appropriate tuning of institutions (credit, irrigation, insurance, prices, etc.), India's green revolution technology could not have shown the results that it did. Biotechnological interventions need to be supported by simultaneous development of infrastructure, to manage risks and unforeseen consequences, and to ensure proper precautions.

How do we confront the trade-off between known and unknown negative externalities? Is it necessarily ethical to avoid taking risks and subject societies to suffer deprivation, merely because of some not completely quantifiable risks? Should we reduce the risks by getting location-specific testing done in each country under rigorous conditions, with all risks fully disclosed? Each country should have the choice to decide whether the risk is worth taking. Once the level of risk is mutually agreed upon, the responsibility of the global community is to ensure that a proper support system is available to safeguard the interests of technologically backward countries, if such a need arises.

The precautionary principle is a valid means of generating responsibility in taking risks. Once the risks are calibrated, specific socio-economic conditions and the cultural milieu will have to determine how much risk is acceptable, at what stage of economic development, and with what consequences. Currently, concern with unknown risks is not matched with responsibility for the known consequences of chemical pesticides and other environmental drawbacks, such as excessive extraction of ground water, decline in biodiversity, etc.

In this debate, there are several issues that have remained obscure. First, ethical agendas for poverty alleviation are seldom linked with bio-ethical concerns about the environmental impact of new technologies. Second, there is the question of known, but inadequately managed risks (like adverse effects of chemical pesticides). In developing countries, farm workers are seldom taught how to use chemical pesticides safely, or how to deal with present or potential adverse effects. Third, what is the ethical basis for differential norms of disclosure of product risks by the same corporation in developed, versus developing countries? Fourth, how do we justify not allocating sufficient research resources to tackle the problems of low productivity in rain-fed regions? Finally, what about anxieties generated by larger corporate control of biotechnological research, which has not been the case in conventional research?

To solve these problems, an approach is needed to evaluate risks on ethical, economic, equity and environmental grounds. This process must take into account the prior experience of a given society, in dealing with different kinds of technologies. The question is whether the precautionary principle is better used as a tool with which to stop uncharted action, or as a motivation by which to chart those actions contemplated or taken. My preference is for the latter alternative.