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"The Precautionary Principle, the Law of Unintended Consequences, and Biotechnology"

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ABSTRACT

The Precautionary Principle is increasingly becoming a major tenet of food policy and biotechnology in many countries and has morphed into mainstream European food policy through the actions of the European Commission (The White Paper issued on January 1st, 2000). In the fall of 2002, three Southern African countries Malawi, Zambia and Zimbabwe refused to allow entry of genetically modified food aid from the United States.

The Precautionary Principle was being used to prevent as yet unknown human health effects and harm to trade with Europe, both of which were uncertain, while threatening the starvation of millions of people with near certainty.

The expansion of the Precautionary Principle into food policy and biotechnology may impose constraints on scientific progress, consumer well being, and international trade. Yet, we are unaware of any significant challenge to the Precautionary Principle in leading food policy and agricultural economics journals. Therefore, the purpose is to explore the Precautionary Principle as an economically significant policy choice variable. The paper will define the Precautionary Principle and its relation to the Law of Unintended Consequences; outline the historical evolution of the Precautionary Principle; review the few existing economic models of its use; and develop a new economic model based on the Precautionary Principle. Within such a framework, the paper will examine the relationships between the Precautionary Principle, the Law of Unintended Consequences, and biotechnology. The work will evaluate the pros and the cons of the Principle as it relates to innovation in agricultural and food technologies. The goal of the paper is to encourage discussion and debate about how the use of the Precautionary Principle will impact food and science policy, and to provide a relevant framework with which academics and policy makers can examine and assess food policies under a new political regime.

This paper will develop a framework of analysis through a theoretical model following the irreversibility hypothesis of Gollier et al. (2000) [1]. The paper will extend the Gollier et al. work in the following way. We will incorporate scientific uncertainty as the underlying stochastic (and dynamic) variable and the consumer option to accept or reject a food product based on this underlying uncertainty of risk. Considering a consumer point of view with time discounting, two different populations can be identified. A population that is risk averse, but has food substitutes available, will not heavily discount future consumption. The consumer has an option to wait until scientific uncertainty or ambiguity is resolved. However, future consumption in the face of starvation now will be heavily discounted. Faced with the same scientific uncertainties, but lower risk aversion and a larger discount rate, the consumption option to the second cohort is significantly lower. With this model, we will illustrate how time, time preference, and utility of one population can lead to externalities in the form of unintended consequences to another population. From a political economy point of view, the imposition of standards based on the Precautionary Principle applied to the first population fails the second population.

[1] Gollier, C., B. Jullien and N. Treic (2000) "Scientific Progress and Irreversibility: An Economic Interpretation of the Precautionary Principle" Journal of Public Economics 75:229-253.