

Hayami Y & Ruttan V W. *Agricultural development: an international perspective.*

Baltimore, MD: Johns Hopkins Press, 1971. 367 p.

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This book attempts to develop a model of agricultural development in which the behaviors of not only private- but also public-sector suppliers of scientific knowledge and technology are treated as endogenous rather than exogenous to the economic system. The model also incorporates the economic response of institutions to new economic opportunities as a component of the economic system. [The *SCI*<sup>®</sup> and *SSCI*<sup>®</sup> indicate that this book has been cited in over 310 publications.]

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In 1965 I returned to Japan from three years of graduate study at Iowa State University, in the midst of the US corn belt. Initially, the superiority of large-scale, mechanized farming in the US as compared with small-scale Japanese farming based mainly on manual labor appeared to me unquestionable. After several years' economic research, I realized that the Japanese agricultural system, with intensive applications of labor and fertilizers on mini-sized paddy fields, is not necessarily inefficient, but represents a rational economic response to the unfavorable endowment of land relative to labor. Through comparison of US and Japanese agricultural developments, I began to recognize that there are multiple paths of technological development in agriculture. I found that my perspective was shared by V.W. Ruttan, who was then an economist at the International Rice Research Institute in the Philippines.

From 1968 to 1970 I worked with Ruttan at the University of Minnesota. Our initial collaboration involved a relatively limited search for regularities in the variations in agricultural production and resource use among countries to test their consistency

with our hypothesis. The search was then extended to determine whether the intercountry regularities were also reflected in the historical experiences of selected countries and over time. This effort resulted in considerable dissatisfaction with the existing theories of agricultural and economic development, particularly with the conventional treatment of technical and institutional change. In order to proceed with our initial investigation, we were impelled to develop a model in which technical and institutional changes are induced by economic forces, which reflect product demand, original resource endowments, and resource accumulation associated with the historical processes of economic development. The model we developed did not possess formal elegance. It was a partial model in that it was primarily concerned with production and productivity. Relatively little attention was given to consumption and demand. Yet the model added significantly to our power to interpret the process of agricultural development in both advanced and underdeveloped countries.

In the 1971 edition of our book, which is the subject of this *Citation Classic*, we identified the capacity to develop technology consistent with resource endowments as the single most important variable that explains the growth of agricultural productivity of nations. The 1971 edition also put forth the theoretical perspective that the processes of both technical and institutional change could best be understood as endogenous to the economic system. These perspectives were elaborated on and extended in our subsequent research<sup>1,2</sup> and were finally brought together in a new edition of our book in 1985.<sup>3</sup>

A major step forward from the 1971 to the 1985 edition was a more formal modeling of the induced institutional innovation process. We have also been able to pursue our analysis of the role of technical change and land infrastructure development in overcoming land resource constraints in much greater depth than in our earlier work. And we have extended our analysis to include several issues that were not included in the earlier edition. These include the interactions between technical change and land and water development, the relationship between growth and equity during agricultural development, the efforts of national governments and development-assistance agencies to design and implement programs of rural development, and the problems of structural change during the later stages of economic development.

1. Binswanger H P & Ruttan V W. *Induced innovation: technology, institutions, and development.* Baltimore, MD: Johns Hopkins University Press, 1978. 423 p. (Cited 90 times.)
2. Hayami Y & Kikuchi M. *Asian village economy at the crossroads: an economic approach to institutional change.* Tokyo: University of Tokyo Press, 1981. 275 p. (Cited 40 times.)
3. Hayami Y & Ruttan V W. *Agricultural development: an international perspective.* Baltimore, MD: Johns Hopkins University Press, 1985. 506 p. (Cited 20 times.)