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“Bridging the gap between increasing knowledge and decreasing resources”

## Considering Imperfect Information in Supporting Development Decisions

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### Abstract

Agricultural development is constrained by limitations of data availability and quality. While research for development aims to close these knowledge gaps, most such research is never used in decision-making. On the other hand, most development decisions are not supported by robust science. Major reasons for this situation are that research is rarely sufficiently comprehensive and studies almost always omit important factors, because they are hard to measure, lack data or lie outside the researchers' area of expertise.

New approaches are needed that provide decision-makers with timely and accurate information that supports specific decisions. Business analysis methods have been developed to support decisions under imperfect information. Applied Information Economics is such an approach, in which analysts develop business-case models for decisions together with decision-makers to ensure that all benefits, costs and risks that need to be considered are included in the analysis. Such models initially do not include much mechanistic detail, but they strive to be comprehensive, in that all relevant factors are incorporated, regardless of ease of measurement. The team then proceeds to define their current state of uncertainty on all variables, as expressed by probability distributions, and to run Monte Carlo simulations to anticipate the range of plausible decision outcomes. From this analysis, variables of high information value are identified as priorities for measurement, measurements are taken where needed and the decision is optimised.

Applying the principles of Applied Information Economics, we investigated a number of decision cases in development, including irrigation projects in Africa, dam construction in the Mekong, yield improvement prospects of Conservation Agriculture in East Africa, urban water supply in Wajir, Kenya's and improved seed supply systems in West Africa.

In almost all decisions, high-value variables were different from what scientists routinely measure. Furthermore, in most cases, relatively small research efforts were necessary to reduce uncertainty about decision outcomes sufficiently for making recommendations about the decision that had a very small chance of being wrong. The wider application of this approach has potential for greatly enhancing the efficacy of development investments and to identify key priorities in research for development.

**Keywords:** Business analysis, decisions, expert knowledge, Monte Carlo simulation, uncertainty