

Enhancing the Contribution of Research-based Knowledge to the Pursuit of Sustainability

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Panel Details

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Description: Many governments and commentators believe that science and technology should play a larger role in sustainable development. There is, however, only a very modest level of scholarship and understanding about how to enhance this capacity. We believe that a promising way forward is to frame the knowledge-to-action challenge in terms of knowledge systems. "Knowledge systems" are viewed as consisting of a network of linked actors, organizations, and objects that perform a number of knowledge-related functions (including research, innovation, development, demonstration, deployment, and adoption) that link knowledge and know-how with action. The "kinds" of knowledge include "formal" knowledge produced by the natural and social sciences, "clinical" knowledge found in engineering and medicine, and "tacit" knowledge of practitioners. There is no presumption that "knowledge systems" are the result of some master design. But we do assume that such systems, however they came into being, can be at least partially understood and manipulated in ways that improve their performance. Within this framework we can ask: What are the characteristics of effective knowledge systems? Is it possible to enhance the role of research-based knowledge in such systems without undermining the relevance of solutions to practitioners? Can different forms and sources of knowledge be combined for more appropriate solutions? How can innovation in the service of sustainability be fostered? In this panel we will bring together a very diverse set of case studies of knowledge systems that each explore how the contribution of research-based knowledge to the pursuit of sustainability could be enhanced.

Papers included in this session

(1) Knowledge flows and cash flows: investigating financing mechanisms as knowledge systems by Nicole Szlezak and Lorrae Van Kerkoff, Harvard University, USA

Abstract: Despite the power and influence of donors and other financiers in sustainable development, the role of financing mechanisms in linking research-based knowledge with action in the field is largely unexplored. This presentation reports the preliminary findings from a case study that examined way The Global Fund to fight AIDS, Tuberculosis and Malaria connected research and implementation. The Fund mobilized research in each of its three main functions: it used research extensively in convincing donors to allocate grants to the Fund; it used a scientific technical review process to judge applications for funding; and it encouraged applicants in developing countries to harness research in their applications. However it also had more subtle impacts: by insisting that applications be signed off by a committee of government and civil society representatives, the Fund also brought a wider range of knowledge into the decision-making process; by adopting a performance-based disbursement system it facilitated research capacity-building in recipient countries. The major shortcoming in the system was the lack of feedback from the recipients_ experiences back to the research community. The Global Fund shows the role that innovative funding mechanisms can play in linking research and action, as well as areas in need of improvement.

(2) Know your shrimp, trust your friends: sustainability and the knowledge system surrounding shrimp aquaculture in Thailand and Mexico by Po Garden, Unit for Social and Environmental Research, Thailand, and Louis Lebel, Chiang Mai University, Thailand

Abstract: Know your shrimp, trust your friends: sustainability and the knowledge system surrounding shrimp aquaculture production in Thailand and Mexico Shrimp aquaculture provides an ideal setting for gaining a better understanding of how knowledge systems might be harnessed for sustainability because a) technical innovation and know-how is crucial to its success, b) substantial body of research and policy attention to economic performance and socio-environmental impact exists, c) combination of intensive private and public sector R&D as well as cumulative local experience contributes to knowledge and practice that shapes the industry and, d) the spread of the industry across the world enables comparison across sociocultural contexts. This paper compares Thailand where the industry is at a mature state to Mexico where it is rapidly growing. It focuses on knowledge systems that pertain to land use, shrimp selection, pond and effluent management decisions. It concludes that experience of farmers is inadequately used to shape scientific establishment agendas. Therefore, needs and concerns of small and medium size farmers are not met by formal research which is, by and large, state and corporate driven. In Thailand, the industry suffers from disease epidemic and degrading natural resource base. Farmers found that innovations in farming techniques come from farmer groups getting together to form small learning organizations such as clubs and formal associations where knowledge is often co-produced with scientists. The role of social networks is also vital to filter out misleading information generated by suppliers of chemicals, feed, and other related products.

(3) Knowledge systems and sustainable agriculture in the Argentine Pampas by David Manuel, ECLAC, Chile

Abstract: Science and technology play a key role in the sustainability of the Argentine Pampas agriculture sector. This paper analyses the interplay between recent transformations of the public-driven knowledge system (KS) for agriculture extension, and the emergence of a private-driven KS. Private actors have acquired a leading role in agriculture research agendas. The rapid

adoption by large producers of the ‘no-till agriculture system’ brought sustainable development to the top of the agenda and emphasized the importance of integrated and adaptive knowledge. No-till agriculture increased productivity, and reduced erosion. This knowledge-intensive technology fostered learning both by the actors within the KS, and by the system itself in order to adapt to new challenges. However, many small and medium producers went out of business due to their difficulties in adopting this agriculture system. Furthermore, the parallel adoption of biotechnology increased dramatically the use of herbicides. The paper illustrates how the involvement of knowledge users in the co-production, financing, and sharing of knowledge has increased the effectiveness of the KS for sustainable development. Furthermore, the conscious organization of the actor’s relations for fostering knowledge dissemination has improved the learning capabilities of the KS as a whole. Knowledge users are increasingly ‘becoming’ scientists and they are starting to perceive sustainability science as a means for improving their economic performance, social acceptability, and the long-term continuation of their system of production. However, we argue that further co-production and collaboration between the private and public sectors as well as the participation of civil society would benefit the transition towards sustainability.

(4) Knowledge Systems for Agricultural Transformation in the Yaqui Valley, Mexico: Producers, Risk, and Resource Use by Ellen McCullough and Pamela Matson, Stanford University, USA

Abstract: This paper addresses the production and utilization of science and technology for agricultural development in the Yaqui Valley, an irrigated region in Northern Mexico known for intensive wheat production and as the Green Revolution's birthplace. We characterize the Yaqui Valley's agricultural knowledge system and analyze its performance with respect to four key processes: governance structures, producing useful knowledge for sustainable development, linking knowledge with action, and learning. We present the findings of a series of over 50 interviews with actors from Yaqui Valley organizations as well as analyses of written materials and public records. We also suggest policy alternatives for improving the ability of Yaqui Valley actors to harness knowledge for sustainable development. Our general conclusions, by process, follow: 1) Farmers wield disproportionate power in setting local research and policy agendas, which tend to be short-sighted and fail to address social and environmental externalities. 2) While Yaqui Valley research organizations are very good at breeding robust wheat varieties, no one is charged with analyzing price and market uncertainties or integrating economic analysis into agronomic research. 3) Farmer credit organizations play an important boundary role in linking knowledge with action because they process many different sources and types of information then provide agricultural finance to farmers contingent on their compliance with specific management practices. 4) A series of recent shocks, including trade liberalization measures and a 9-year drought, have provided a strong incentive for learning in the knowledge system. Public and private organizations have adjusted their missions and strategies in response to crises but have not yet mitigated shocks by anticipating or preventing them.