Connecting Science to Decision Making for Combating Desertification in India

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PROPER ENVIRONMENTAL MANAGEMENT IS THE 'KEY WORD' TO ENVIRONMENTAL SUSTAINABILITY, IMPACTING DIRECTLY ON HUMAN WELL-BEING AND QUALITY OF LIFE. MORE SO, COMBATING DESERTIFICATION POSSESS MORE CHALLENGES TO POICY MAKERS IN EVOLVING APPROPRIATE STRATEGIES TO TRANSFORM RESEARCH RESULTS INTO ACTION-ORIENTED PROGRAMMES.

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INTRODUCTION

Sustainable development that promotes ecological sustainability and human well-being is a practical necessity of our times. Ecological sustainability can not be achieved without reducing poverty and provisioning for the just and dignified improvements in livelihoods. Likewise, nor can sustainable human well-being be achieved without sustainable environmental management. Therefore, investing in creation, communication and linking knowledge to field and policy action is necessary for both poverty reduction and ecosystem sustainability[2,3].

A large number of research papers are published by scientists that have messages for addressing the issue of desertification. It is sometimes with the encouragement of the United Nations Convention to Combat Desertification and its Committee on Science and Technology, and some times through local support. The expectation has been that the research will contribute to combating desertification. However, little of this research has been applied in drylands for its identified purpose. There are many reasons for this, including the limited translation of scientific research into an accessible format for application by practitioners, development agencies or rural communities[4].

Management innovations for connecting science to decision-making

The management innovations[5] that help in linking knowledge to action may be found in the efforts that are now specifically addressing the issue of knowledge systems for sustainable development[6]. Efforts to mobilize science for combating desertification are more likely to be effective when they manage boundaries between knowledge and action in ways that simultaneously enhance the salience, credibility, and legitimacy of the information they produce[7]. The functions that contributed most to managing boundary between knowledge and action are communication, translation, and mediation.

Active, iterative, and inclusive communication between scientists and decision makers helps in mobilizing knowledge that is seen as salient, credible, and legitimate in among the practitioners. Linking knowledge to action also calls for the participants in the resulting dialogue comprehend each other. Mutual understanding between scientists and practitioners is often hindered by jargon, language, experiences, and presumptions about what constitutes convincing argument. Translations facilitate mutual comprehension in the face of such differences. In multi-stakeholder contexts, conflicts are a reality. Mediation can enhance the legitimacy of the process of linking knowledge to action through increasing transparency, bringing in all perspectives, designing rules of conduct, and establishing criteria for decision making[7].

Research on sustainability science suggests that the "boundary management" functions—

communication, translation, and mediation—can be performed effectively through various organizational arrangements and procedures.

Boundary organizations: (i) involve specialized roles within the organization for managing the boundary; (ii) have clear lines of responsibility and accountability to different stakeholders on both sides of the boundary; and (iii) they provide a platform in which information can be co-produced by stakeholders from different sides of the boundary through the use of boundary-objects (accessible reading material, policy-briefs, training etc.). As Cash *et al.*[7] note, "…all else being equal, those systems that made a serious commitment to managing boundaries between expertise and decision making more effectively linked knowledge to action than those that did not. Such systems invested in communication, translation, and/or mediation and, thereby, more effectively balanced salience, credibility, and legitimacy in the information they produced".

In addition, a strong leadership at the program management level is a common characteristic of most successful efforts to link knowledge with action[8].

The next section describes the available literature on connecting science to decision making for combating desertification. It may provide us some guidance on how to move beyond the impasse.

Representative literature on linking knowledge to action for combating desertification

There is a growing concern about linking knowledge to action in different disciplines.

Connecting community action and science to combat desertification: evaluation of a process[9]: This study in southern Africa notes that combating desertification requires the involvement of many people ranging from communities who experience the effects on a daily basis and scientists attempting to understand the biophysical and socio-economic causes and consequences of desertification, to developers and policy makers on all levels. In many instances, however, the understanding, approaches and actions of these different groups contradict rather than support one another. In order to overcome the challenge, a conference process was undertaken during 2000-2002 in southern Africa which brought together communities, scientists, and practitioners to test the concept that they could connect and work together to combat desertification, given an appropriate framework. The conference was a success and many lessons were learned. Time, funding, enhanced communication and goodwill are the primary ingredients for ensuring that different sectors complement one another in their efforts to combat desertification.

Combating desertification : building on traditional knowledge systems of the Thar Desert communities[10]: This study argues to link traditional knowledge in field action for combating desertification in Rajasthan. It suggests propagating indigenous rural livelihood systems for combating desertification— rather than replace or abandoning them as a result of state bureaucracies. The Thar Desert of western India is known for its rich and ancient culture system and traditions. The communities have long been part of the Thar Desert ecosystem and have evolved specific strategies to live in harmony with its hostile environment. The ancient rural livelihood knowledge system reflects time-tested techno-scientific knowledge with a proven track record of sustainability, especially during natural hazards like drought and famines. In addition, several of the traditional skills of local communities in arts and crafts, music and instruments have made modern man aware of the art and techniques of sustainable use of local biological resources and preserving their biodiversity along with using waste products of the forests, without harming the desert ecosystem.

The use of indigenous knowledge for controlling soil degradation in Africa[11]: Only 16 per cent of the approx equal to 30 million km^2 continent of Africa consists of good arable land. Most regions in Africa suffer from various forms of environmental degradation including: drought; desertification; erosion; compaction and crusting; anthropogenic degradation; and salinization. Together these processes result in water, soil and

plant nutrient losses, declining soil fertility and, therefore, declining productivity. The causes of soil degradation and erosion in Africa and the use of indigenous soil conservation measures to control degradation are discussed. Strategies for the implementation of a sustainable soil conservation programme would better succeed if they also rely on linking local knowledge to action.

Restoring the Great Basin Desert, U.S.A.: Integrating science, management, and people[12]***:*** The Great Basin Desert lies between the Sierra Nevada Mountains to the west and the Rocky Mountains to the east. Nearly 60% of the area's deserts and mountains (roughly 30 million ha) are managed by the U. S. Department of Interior's Bureau of Land Management. This area is characterized by low annual precipitation, diverse desert plant communities, and local economies that depend on the products (livestock grazing, recreation, mining, etc.) produced by these lands. The ecological and economic stability of the Great Basin is increasingly at risk due to the expansion of fire-prone invasive species and increase in wildfires. To stem this loss of productivity and diversity in the Great Basin, the BLM initiated the "Great Basin Restoration Initiative" in 1999 after nearly 0.7 million ha of the Great Basin burned in wildfires. The objective of the Great Basin Restoration Initiative is to restore plant community diversity and structure by improving resiliency to disturbance and resistance to invasive species over the long-term. To accomplish this objective, a strategic plan has been developed that emphasizes local participation and reliance on appropriate science to ensure that restoration is accomplished in an economical and ecologically appropriate manner. If restoration in the Great Basin is not successful, desertification and the associated loss of economic stability and ecological integrity will continue to threaten the sustainability of natural resources and people in the Great Basin.

How community action, science and common sense can work together to develop an alternative way to combat desertification[13]***:*** This study describes the Spitzkoppe Community Campsite in western Namibia that lies in an area with very limited water resources. Water scarcity places a constraint on community income generation and development opportunities. The existing water resources are overexploited and to ensure future water security, the community must take sustainable water management into consideration in their daily lives and business ventures, including tourism. This has been successfully achieved at the Spitzkoppe Community Campsite through a combination of high community motivation, organisation and action, the involvement of researchers and trainers in water resource management and support from developers. The most appropriate water management solutions were found through ongoing practical testing of different strategies and technologies over two years. This paper presents a case study of a community-based tourist camp at Spitzkoppe and traces the community's progress towards developing an alternative way to combat desertification and support to livelihoods through a tourist business.

Combating desertification in the southern Kalahari: connecting science with community action in South Africa[14]***:*** The study notes that democracy in South Africa requires a new approach to project management, one that includes community involvement at all levels of project planning, decision-making and execution. This study describes the challenges encountered and the lessons learned during the development and execution of a project addressing rangeland degradation and rehabilitation in the Mier Rural Area, South Africa. Difficulties encountered during the participatory execution of the project resulting from the conflict between community social requirements on one hand and ecological principles and financial constraints on the other are described. Another problem has been the community's apathy to threats of desertification. Because of higher priority problems such as medical care, education and the provision of water, sections of the community are questioning the applying of scarce financial resources to 'lower priority' projects

such as rangeland research and restoration. Furthermore, political and ideological differences within the community have resulted in various degrees of project acceptance and participation. A holistic approach to project management, with complete and open flow of information and joint decision-making, is vital to ensure full participation of all stakeholders affected by desertification.

Role of demonstration projects in combating desertification[15]*:* The International Arid Lands Consortium was established in 1990 to promote research, education, and training for the development, management, restoration, and reclamation of arid and semi-arid lands throughout the world. One activity of the Consorium is supporting demonstration projects that lead to better management of these fragile ecosystems. Projects demonstrate the applicability of recently acquired research information and technology to management situations and stress the linking of available knowledge to decision-makers. This paper outlines requirements for, and usefulness of, demonstration projects as one of the ways to link knowledge to action.

CONCLUSION

The scientific information now available concerning ecosystems and human well-being holds the promise of significantly improving the choices that the public and decision-makers take concerning the environment. But for that promise to be fulfilled, a bridge needs to be built between the research community holding this information and the decision-makers seeking it[16]. The best way to do this is by setting the stage for the flow of knowledge between researchers, policy makers, and resource managers[17]. Implementing effective conservation action requires that production of knowledge through monitoring and assessments be integrated functionally with a process for developing an implementation strategy and processes for stakeholder collaboration while maintaining a broad focus on the implementation of conservation and development action. Operational models[18] that take care of stakeholder collaboration, link with land-use planning, social learning, and action research are more successful. Some of the emerging new approaches and innovations[19] in this field of knowledge management need to be taken into consideration[20 -21 22 23 24 25 26 27 28 29].

In summary, linking knowledge to action is necessary to concurrently combat desertification and ensure livelihoods of people dwelling in dry tropics. Scientists and practitioners are required to be aware of the intricacies about what makes knowledge applicable and what it takes to produce the science that makes an impact on the ground.

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