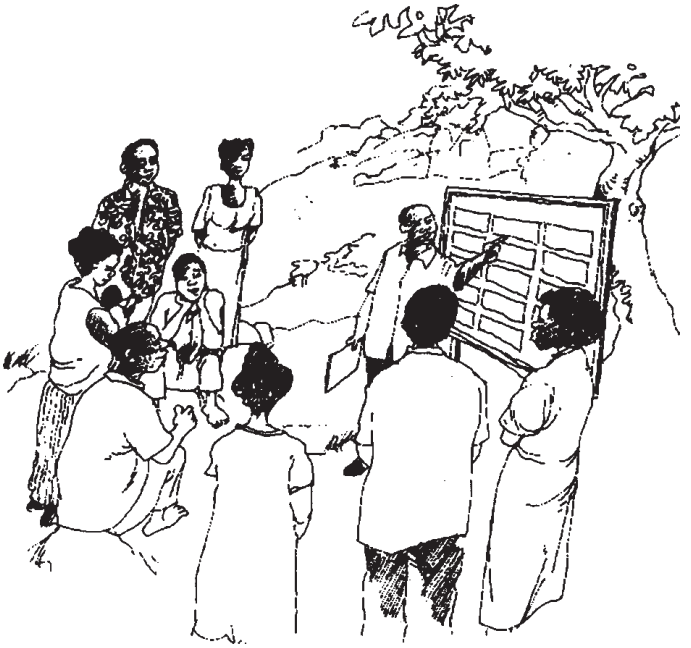
Indigenous Knowledge:
A Conceptual Framework and a Case from Solomon Islands



Despite unprecedented interest in local and indigenous ecological knowledge (IEK) over the last 20 years, there is still a lack of awareness of the complexity in IEK and the barriers to its effective use for ecosystem management. Development professionals and project participants often minimize the importance of social structures and biophysical features of the ecosystem that support systems of IEK and how the process of change impacts that system.

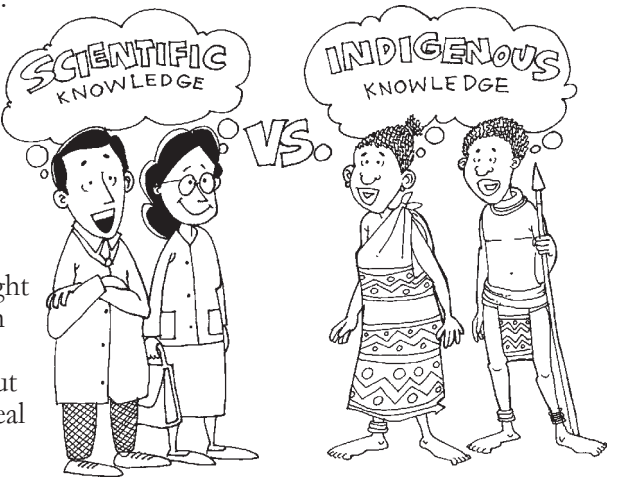
This paper describes research that attempts to expand and refine the understanding of IEK as dynamic and place-based to better inform contemporary ecosystem management. Local ecological knowledge can be understood as knowledge that emerges from a complex of ***context***, ***practice*** and ***belief*** (CPB). This conceptual framework incorporates structural and organizational features of human ecosystem interaction and concepts of space and time in the understanding of IEK.

A case example from the communities of Uzamba and Valapata in the Solomon Islands shows that understanding how people are engaged within their surroundings, instead of documenting knowledge that can be articulated, can assist in bridging differences in worldviews between researchers and indigenous peoples.

Adapted from:
Woodley, E. 2004. Local and Indigenous Ecological Knowledge as an Emergent Property of a Complex System: A Case Study in the Solomon Islands. Paper prepared for the Millenium Ecosystem Assessment Conference "Bridging Scales and Epistemologies", 17-20 March 2004. Alexandria, Egypt.

Clash Between Worldviews

Researchers often emphasize the factual aspects of indigenous knowledge over the spiritual foundations, worldviews and values of indigenous peoples, and this has not served indigenous peoples nor the environment well. Documentation and integration of local knowledge over the last 10 years has done little to protect the land from environmental destruction. Understanding the complexity of IEK goes far beyond consulting with local community members to document species names, classification systems, the local uses of plants, changing weather and animal migration patterns. This kind of 'directed' consultation usually results in one worldview being brought under the auspices of another, and in the process, the local knowledge is decontextualized as facts are taken out of context and extracted in a piecemeal fashion. Such treatment of local ecological knowledge by researchers presumes that knowledge held collectively in communities can be documented without consideration of how knowledge is a dynamic interplay of a complexity of variables.



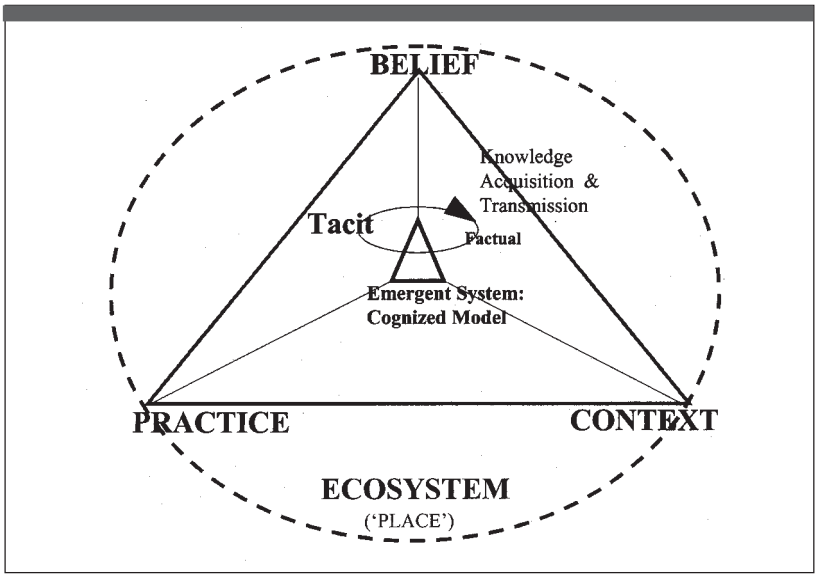
Another assumption in development ideology is that there will be epistemological compatibility between project participants. Presupposing knowledge compatibility does not acknowledge the complexity of local beliefs, practice and context operative in communities and how this shapes local epistemology, or ways of knowing. It remains a challenge to develop a 'conceptual symbiosis' (Hornborg, 1994) between all players in a development initiative, be they indigenous community members or western- trained academic scholars who have never lived in a small village. A conceptual framework is needed within which to view local and indigenous ecological knowledge – one that goes beyond the imposition of one worldview upon another and which, instead, transcends epistemological differences.

Understanding the epistemological basis of IEK is more about knowing ***Why*** rather than knowing ***How*** which tends to be emphasized more by western science.

A Conceptual Framework for Representing IEK

IEK can be represented as emerging from a complex system composed of three subsystems: context, practice and belief (CPB) (Figure 1). ***Contextual*** knowledge portrays learning due to history, demographic factors and biophysical features of place. Knowledge as ***practice*** portrays meaningful action, through physical interaction and experiential learning. Knowledge as ***belief*** portrays the influence that spirituality and values have on how people act within their ecosystem.

Figure 1. Conceptual Framework Showing the Emergence of IEK from a Traditional System where Knowledge is Acquired Within the Local Ecosystem



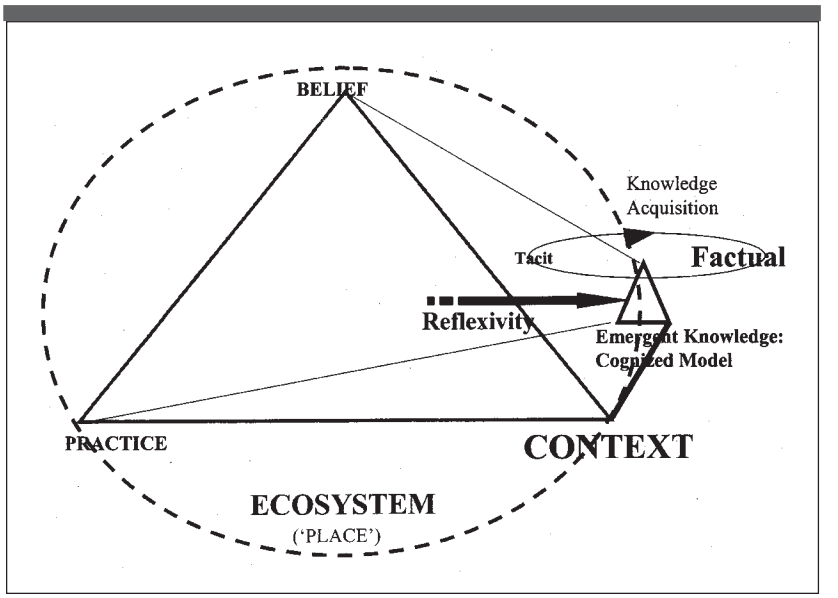
The CPB framework can be used to represent structure and organization in the complex ecosystem and it represents knowledge as engagement rather than as abstract understanding. The use of the CPB complex as a basis for undertanding local knowledge systems is intended to give some order to the myriad of ecosystem variables that influence IEK. It is based on the assumption that by understanding the whole, properties emerge that are not evident in the component parts. Indigenous ecological knowledge (shown in the diagram as the triangle 'above' the three CPB components) is considered the 'property' that emerges from the interaction of multiple component parts. Structure (the CPB variables in the socio-ecological complex) and organization (cognitive process which brings forth reality) are reciprocally inter-related. Changes in structure may influence changes in cognition – changes in cognition also influence changes in structure.

Within a complex system, IEK constitutes a metaphorical mental model, which represents context-based conceptions of the environment and provides the basis for action in daily life. Mental models are not designed to conform to the reality of the outsider, but are meant to represent and engagement of people within ecosystems.

The conceptual framework also incorporates elements of scale. The spatial dimension of IEK is the holistic, embedded or 'place-based' aspect of knowledge, signifying the situatedness (at any one point in time) within the social, cultural, historical and biophysical aspects of locale or 'place'. The temporal scale of IEK is the change that may occur in any of the CPB variables and the influence this has on emergent IEK. The time scale is also shown in the diagram as the cycle of knowledge acquisition and transfer (shown as the cycle in the center of the triangle). Both factual (explicit) knowledge and tacit (implicit) knowledge constitute the mental model.

As the CPB complex changes, in time and space, IEK also changes which, in turn, influences CPB (Figure 2). The emergent knowledge is shown as displaced from the local ecosystem due to the influence of several driving forces. For example, a component of the belief subsystem is the use of specific 'magical' practices to cultivate the traditional crop. This has changed over both time and in space: i.e., there were several practices that were specifically linked to particular times in the year or a person's life, that changed to practices determined by external drivers. The change in the spatial dimension is from practicing traditional forms of cultivation that included worship of deceased ancestors who resided over gardens, to an introduced belief system. The change in both time and space of this component has accelerated the loss of the local knowledge that is associated with traditional forms of spirituality. Traditional beliefs are strongly associated with the relationship to the land and resource base. As local knowledge becomes 'lifted' from local context, it becomes less tacit and experiential and more explicit and factual, influenced more by factors outside the local ecosystem.

Figure 2. Conceptual Framework Showing the Shifting to Disembedded IEK as Knowledge is Acquired Outside the Local Ecosystem



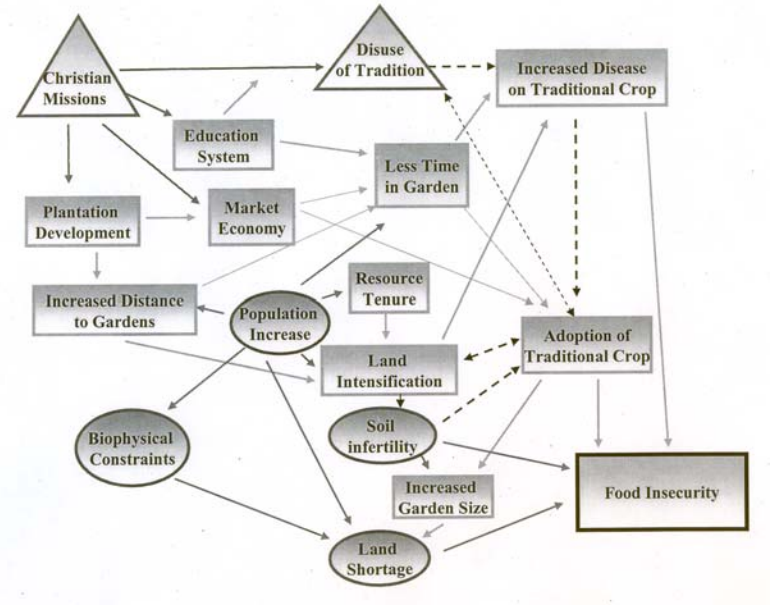
The process of reflexivity shown in Figure 2 emerges and influences the knowledge production cycle. Reflexivity, while displacing IEK further towards the explicit or abstract end of the knowledge continuum, is referred to as the 'formalization' of knowledge. It is a process that may become an important, if not critical, process enabling knowledge holders to transcend time and reclaim 'traditional' knowledge that was once used in a specific context and apply it within a new context. Reflexivity may also be considered part of the resilience and adaptive capacity of a community. The concept of reflexivity as introspection may be a means to locate both traditional and contemporary IEK in the current context of ecosystems management.

Re-articulating traditional practices, institutions and associated knowledge so that it has application within a new context is partially the 'process of knowing how we know. The process of being reflexive bridges different contexts (spatial and temporal scales) and allows for a set of beliefs or practices that are embedded in a particular context to be applied in changing contexts.

Food Insecurity and IEK: A Case Example from Solomon Islands

A critical issue and recent phenomenon in both communities of Uzamba and Valapata in the Solomon Islands is food insecurity. The introduced crop (sweetpotato) has been widely adopted and has displaced the traditional staple crop (taro), which is now showing decreased productivity. The diagram below visually tracks reasons for the decline by showing changes in the system as well as impacts to the relations between components within the system. Specific variables are shown that have specific relevance to the issue of food insecurity. The IEK specific to the issue emerges from these variables. Representing IEK surrounding food insecurity in this way both expands upon and compliments the reasons that community members give for the current food crisis.

Reasons given for crop decline of the traditional staple are:
1) increased disease (stated by younger community members)
2) loss of traditions (stated by older community members)



The drivers of this system are roughly divided into three main elements: one is the changed belief system, shown here as introduced religion; the second is the context of changing population demographics; and the third is the recent practice of the adoption of an introduced crop. Looking at the first 'driver', it is evident that introduced religion has had the multiple effects of changing traditional spirituality, changing the traditional education system, encouraging the market economy and increasing the development of plantations.

The next driver, population increase, influences the intensification of land, land shortage, the time spent gardening and biophysical constraints. The third driver, the adoption of an introduced crop, influences the decline of the traditional staple, the size of gardens, soil fertility and land intensification. Each of these factors then, in turn, affect other factors, as shown by the myriad of interconnections in the system.

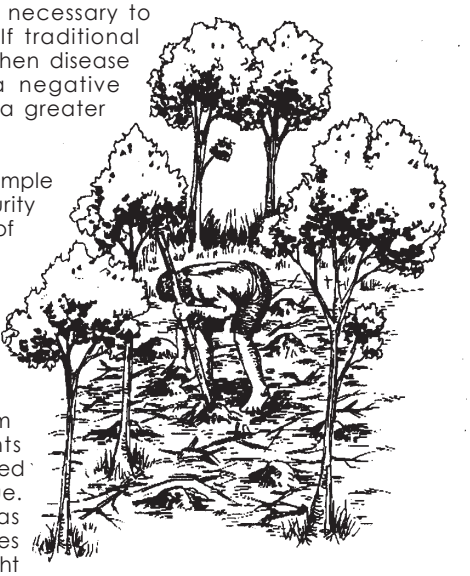
Food Insecurity and IEK: A Case Example from Solomon Islands... *continued*

In response to changing socio-ecological conditions (the drivers mentioned above), the system 'moves away' from the original stable operating point, which was the use of the traditional staple crop that supported Vella communities for hundreds of years. In systems terms, a point was reached where a significant change in the original system occurred (decline in traditional staple) before the system began an alternate path and reorganized towards a new self-organizing and resilient operating point (the introduced crop).

To describe the system that created conditions for the shift and the characteristics of the system before and after, the diagram should be viewed from the broader context, which illustrates a number of influences acting concurrently. These interactions are explained as follows. Foreign missions and new forms of national governance that encouraged plantation development and formal education, changed the local economy, prohibited custom and thus changed traditional methods of gardening. These factors also created changes in practice, which were an increased demand for plantation work, resulting in less time spent in the subsistence garden and more time spent earning income.

There was also more time spent in church-related activities. Swidden cycles changed to shorter fallows, resulting in intensification of land use and nutrient-poor soils. Increasing population along with marginal biophysical conditions that constrain land availability also occurred. At the same time that the productivity of the traditional staple crop was being undermined by increasingly infertile soils, less attention to tending the crop, the disuse of traditional practices, which all resulted in the increase of disease and pests, there was a changing value system from traditional foods to a preference (by the younger generations) for an introduced crop as well as imported foods.

Cultivation of the introduced crop became the norm. There are two positive feedback loops, which maintain this system as dependent on the introduced crop. The first feedback loop is that the introduced crop has lower soil fertility requirements and so shorter fallow periods become the norm so that the cycle of cultivation is increased. The resulting nutrient-poor soils (which the traditional staple cannot grow in), can only support the more tolerant introduced crop, thus the cycle is maintained. The second positive feedback loop is where the adoption of the introduced crop accelerates the disuse of traditional cultivation practices, which were necessary to ensure productivity of the traditional crop. If traditional techniques are not used to control disease, then disease incidence increases, which, in turn, has a negative influence on the traditional crop leading to a greater dependence on the introduced crop.



From the diagram, it is clear that there is no simple linear cause and effect that links food insecurity solely to disease or loss of traditions. While both of these factors play a significant role in the change process, the relationships are more complex. The approach of looking at multiple variables and their interactions also transcends the conventions of analyzing problems and finding solutions from the separate disciplinary perspectives of sociology, economics and ecology. IEK as emergent from the complex web of interactions highlights knowledge as engagement. It is the unarticulated local knowledge surrounding this resource issue. The conceptualization of local knowledge as emergent from a set of CPB variables replaces the set of issue-driven facts that are often sought after by resource managers intent on using local expertise to find direct solutions to problems.

Conclusion

The concept of local/indigenous ecological knowledge as a system and deconstructing that system to understand how knowledge is known, influenced and constructed establishes common ground for bridging the epistemological gap that occurs when people with different worldviews are working together on a common issue. (For indigenous views on bridging epistemological differences, see box next page.)

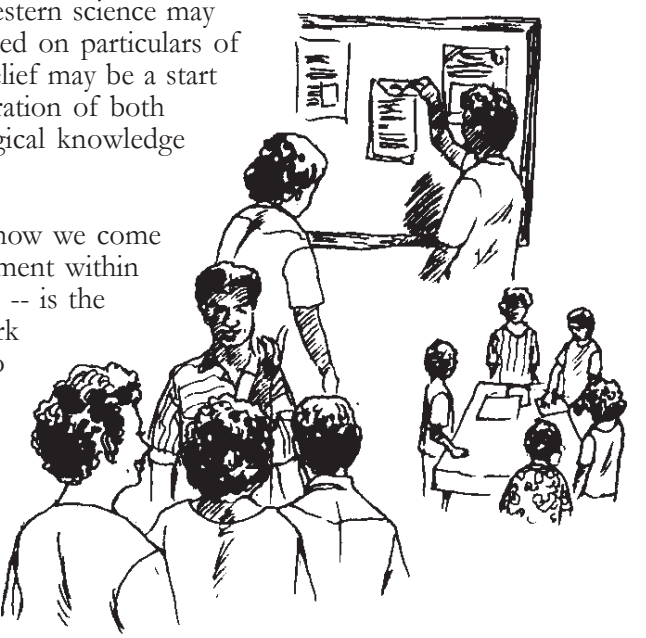
Sharing knowledge turns out to be astonishingly difficult but challenging dichotomies assists in breaking down the barriers.

- The perceived dichotomy between 'local' or 'indigenous scientific' and 'western scientific' exists because knowledge of indigenous peoples has been essentialized as a cultural commodity and western science is grounded in the mistaken belief of universal truth. If the concept of knowledge in all societies is understood by how we know through the mode of engagement within the ecosystem, and not as an objective truth, then there is some common ground to enable multiple perspectives to contribute to ecosystems management, whether on a local, regional, national or even global scale.

- The dichotomy of absolute vs. culturally-constructed knowledge is broken down by the understanding of knowledge as effective action in a world that is constituted by engagement within the ecosystem. This approach based on an awareness of the complexity and variability of epistemology places all knowledge systems within a common conceptual framework for understanding.

- The recognition that western science may also be constructed based on particulars of context, practice and belief may be a start to more effective integration of both local/indigenous ecological knowledge and 'western science'.

Understanding epistemology - how we come to know in our lifelong engagement within our local and global ecosystems -- is the basis for a conceptual framework (CPB) that provides a means to seek commensurability among different worldviews and perspectives and bring a more thorough understanding of human-ecosystem interactions.



Can we Bridge Epistemologies? – Indigenous Views

(Excerpts from a workshop on Bridging Epistemologies – Indigenous Views: Indigenous Understanding of Nature and its Changes. Indigenous Views About Science and Ways of Bridging Different Knowledges from the Perspective of Indigenous Peoples. Millenium Ecosystem Assessment, 17-20 March. Alexandria, Egypt.)

There is still a great degree of unilateral emphasis on the role of science as the driving force and beneficiary on how to integrate local knowledge into western science. We proposed to go beyond it creating a space to engage in an intercultural and dialogical encounter. Each knower elaborated on three issues:

- How we perceive nature
- How we perceive science
- How we imagine a bridge for dialogue with scientists and development actors.

We feel enriched by following thoughts regarding the nature of knowledge, the interactions between different epistemic communities, the role of power and domination, the limitations of science, the potentials of other ways of knowing and imagined ways to build epistemological bridges. We would like to share these ideas.

How we perceive nature

- *"Yacha, a Quechua concept, mea ns knowing, living, sharing. It is rooted in a positive care for everything. It is a form of appreciation of life manifested in the dialogue with my family, with the mountains, the chakra (fields), rocks, water springs, hail, frost, rain, llamas, and alpacas... Everything communicates and teaches."*

- *"Indigenous knowledge systems are manifold; there are thousands of indigenous ways of knowing, all treasures and potentials of the survival of humankind. But within this tremendous diversity of ways of knowing there are commonalities of indigenous wisdoms – we love our land, we are not separated from nature"*

How we perceive science

- *"Indigenous wisdom is not western science, it is different from and is more than science."*

- *"Science and the scientists describe how but do not explain why..."·*

- *"Science lacks sentiments, use of senses and recognition of the silent knowledge, the sacred."*

- *"Scientists describe us–without love and respect–without understanding–from their own world view. We also recognize that some disciplines or members of western sciences are also modifying themselves, diversifying and opening up towards a post-materialist science."*

- *"The western scientific paradigm is embedded in a worldview that is impacting the world through disciplines which impose values on governance, research, education – all of life. In this context the world view of others –of indigenous societies which are more horizontal and linked to nature – is denied and only a few elements of practice are permitted to surface. Actions are taken based on the western worldview informed by science and thus tensions between the youth and elders emerge, knowledge is lost and undermined, language is threatened and biodiversity is diminished. Indigenous world views are seriously threatened, and sometimes shattered."*

- *"Western science is separated from nature. Its separation of culture and nature, expressed in its analysis and division into discipline, is part of the western tradition and culture and based on its particular worldview."*

- *"There is an ethical responsibility on scientists to be clear about the values and world views that are embedded in their approaches and about whose purposes are being served. Scientists and development agents need to be critical and clear about the risks and benefits for indigenous people, and of course they need to engage indigenous people in this risk assessment from the outset and develop mutually- agreed positions."*

- *"Modern science will have the ultimate problem unless they incorporate culture and religion in the process because they will continue to face gaps and to exist in isolated fragments or pieces, which do not complete the integrity of humanity and the earth."*

Can we Bridge Epistemologies? – Indigenous Views... *continued*

How we imagine a bridge for dialogue with science and development actors

- *"Indigenous world views and knowledges are expressed through songs, poems and through languages, representations and practices not easily accessible to outsiders. Each ethnic group is different. Our memory is quick, we map things in our mind, not on paper. And we can easily share our experiences. We practice and interpret our own abstract ideas. Outsiders and brokers can help us to conceptualize our ideas, and so give back to us and our children and the not-yet-born."*

- *"Western science and indigenous science (traditional knowledge, local knowledge, etc, are **equally** important and distinctive in their own right. Continued **respect and understanding** within and for each other's science is needed to progress forward, without one being more important than the other. To build bridges, indigenous communities need to be empowered to translate their own science in a culturally- appropriate way for **all** people to understand and move forward and thus control how and where traditional knowledge is used, without outsiders being the experts."*

- *"If scientists could work not just with sophisticated knowledge and rational feelings but with emotional feelings toward the future of the earth, then bridging between indigenous knowledge and scientists and between humans and nature might be possible. It is arrogant to think that science can solve all problems."*

- *"The idea of a bridge implies the existence of communities that are distant and inaccessible, with impenetrable borders. These do not exist in our world. Building bridges requires the willingness to walk at the pace of sensing and knowing beyond the rational knowledge that has colonised our minds."*

- *"Local people can easily cross the bridge to modern science. As a matter of fact, they have been adjustingt to the modern world dominated by modern science for generations. Because of the assimilationist attitude of modern science, local people have started to realize the losses of their identity, culture and self. Local people are going back to their bases of culture, identity and self having realized the accountability attached to it. Local people have started the reconstitution embracing environment and nature."*

- *"A bridge between epistemologies is not possible or not desirable because it produces invasion and domination. We can only – consciously – sit down at a table of dialogue, in a world where many worlds (or epistemologies) are welcome, where we can talk amongst ourselves, and also talk with modern science. But at this table we need to leave behind arrogance and the wish or attitude to dominate. We have to come with humbleness, with eagerness to learn, with openness and respect. In this neutral space of encounter, what can everyone contribute, what is our gift? What is the gift of the scientist? Is the scientist prepared for a dialogue? Is he or she able to support us? Do they have the means to talk with us? Can they enter an alliance and commitment overcoming the limitations of their worldviews?"*

Contributed by:

- Darryn Wilson, Larrakia man from Australia
- Marcela Machaca, woman from Quispillaqta, a Quechua community in the Central Andes of Peru
- Baramee Boonduang, Noi Santianurothai and Prasert Trakansuphakon, Karen people from Northern Thailand
- David Millar from Ghana
- Jorge Ishizawa from Lima, Peru
- Datu Victorino from the Philippines
- Yang Fuquan, a Naxi researcher from Yunnan, China
- Esther Camac from Costa Rica
- Veronica Arbon, Arabunna woman from Australia
- Jocelyn Davies, researcher on desert knowledge from Australia
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