



Date : 02/06/2006

The Role Of The Library In Promoting The Application Of Indigenous Knowledge (Ik) In Development Projects

Joyce Bukirwa Nyumba
 Lecturer/Doctoral candidate
 East African School of Library and Information Science
 Makerere University
jnyumba@easlis.mak.ac.ug

Meeting:	116 Africa
Simultaneous Interpretation:	Yes

WORLD LIBRARY AND INFORMATION CONGRESS: 72ND IFLA GENERAL CONFERENCE AND COUNCIL
20-24 August 2006, Seoul, Korea
<http://www.ifla.org/IV/ifla72/index.htm>

Abstract

Communities in many countries have got storehouses of Indigenous Knowledge (IK) that has been handed down by word of mouth from generation to generation over a long period of time either consciously or unconsciously. This knowledge is expressed in many forms, like through storytelling, drama, in conversations, meetings, as words on paper, as voices on radio, through art and culture, in photographs and recently digitally by email and Internet. IK can usefully be applied in development projects since it is considered the basis for self-sufficiency and self-determination, providing effective alternatives to western technologies. IK is however overlooked, endangered, not well managed, not widely accessible, sometimes inaccurate and those who hold it are sometimes not willing to share it. It is however is not clear to what extent libraries can facilitate the application of IK in development projects. Based on literature review, observation and own experience on IK, this paper aims at making proposals for libraries to promote the application of IK in development projects. Libraries can raise awareness about IK, document IK, develop digital libraries based on IK, identify IK specialists, establish the value of IK, and build capacity to develop IK.

Introduction

Communities in many countries have got storehouses of Indigenous Knowledge (IK) that has been handed down by word of mouth from generation to generation over a long period of time either consciously or unconsciously. This knowledge is expressed in many forms, like through storytelling, drama, in conversations, meetings, as words on paper, as voices on radio, through art and culture, in photographs and recently digitally by email and Internet. Important to note is the fact that humanity as a whole has an oral tradition base and all knowledge has its source in Indigenous Knowledge (Raseroka, 2002:3). In a similar view, such knowledge is created and exchanged when the motives of community members are triggered, and when they have the opportunities as well as the necessary means and skills to do so (INASP 2002). It has also been observed by Quek and Eyzaguirre (2002) that few people outside the local communities are aware of such knowledge while the formal institutions focus only on knowledge that leads to marketable products, modern technologies, and academic research. A number of questions emerge. Is this all that can be done to utilize IK in development? To what extent have communities integrated IK in development projects? IK needs to be tapped so that it can be effectively utilized in development projects. But to what extent have libraries facilitated the application of IK in development projects?

Aim and Objectives

Based on literature review, observation and own experience on IK, this paper aims at making proposals for libraries to promote the application of IK in development projects. Specific objectives will include:

- Establishing the justification for applying IK in development projects;
- Highlighting cases where IK has been applied in development projects;
- Identifying challenges affecting the application of IK in development projects;
- Making proposals for libraries to enhance the application of IK in development projects

The Nature of Indigenous Knowledge

Types of IK include information, technologies, beliefs, tools, materials, experimentation, biological resources, human resources, education and communication (Grenier, 1998). Indigenous knowledge (IK) is the knowledge that

people in a given community have developed over time, and continue to develop. It is based on experience, often tested over centuries of use, adapted to local culture and environment and dynamic and changing. IK pertains to experimental locality-specific knowledge and practices of medicine, as well as healing, hunting, fishing, gathering, agriculture, combat, education and environmental conservation developed by indigenous people over the years. Thus IK is local knowledge that is unique to a given culture or society (Warren, 1991:1).

Different scholars have presented IK in different ways. Below are some of the ways in which IK is presented.

- IK is not confined to tribal groups or the original inhabitants of an area, and it is not confined to rural people (IIRR, 1996)
- It is based on ideas, experiences, practices and information that have been generated either locally or elsewhere, and have been transformed by local people and incorporated into their way of life (Ina Hoi Riwa Foundation, 2002)
- It is expressed in local languages (Langill, 2005).
- It is difficult to transmit IK to those who do not share the language, tradition and cultural experience
- IK systems are holistic: new knowledge is continuously added. (Grenier, 1998)

Similarly, IK can also be categorized according to who knows what in the community. Older people tend to have different types of knowledge than the young. Women and men, farmers, traders, educated and uneducated people all have different types of knowledge. Hence, based on who knows what, IK can be categorized as:

- ◆ Common knowledge which is held by most people in a community, for example, almost everyone knows how to cook matooke, the staple food of the Baganda, one of the local communities in Uganda;
- ◆ Shared knowledge which is held by many but not all community members, like villagers who raise livestock will know basic animal husbandry;

- ◆ Specialized knowledge which is held by a few people who might have had special training or an apprenticeship, for example, only a few villagers will become healers, midwives, or blacksmiths.

Therefore, one could say that the type of knowledge people have depends on: age, gender, education, occupation, environment, socio-economic status, experience, history and labour division within the family, enterprise, or community. This has important implications for development work. For example, if boys do the herding, they might know better than their fathers where the best grazing sites are.

Distinction between IK and Western Knowledge

There appears to be a lot of overlap between Indigenous and Western Knowledge. This overlap makes it very difficult to distinguish the two concepts. Indigenous knowledge is often contrasted with “Scientific”, “Western”, “International,” or “Modern” knowledge. Raseroka (2002:1) contrasted Indigenous Knowledge systems with modern knowledge systems, which are generated within the international system of universities, research institutes, and private firms and are documented. Since Indigenous Knowledge changes over time, it is sometimes difficult to decide whether a technology or practice is indigenous, or adapted from outside, or a blend of local and introduced components. However, for development projects, it does not matter whether a practice is really indigenous or mixed up with introduced knowledge. What is probably important is that instead of looking only for technologies and solutions from outside the community, we first look at what is in the community and then use whichever knowledge is found to be effective or combine the best of both western and local knowledge.

Figure 1: Common distinctions made between international science and IK

Area of comparison	IK	International science
Relationship	Subordinate	Dominant
Dominant mode of thinking	Intuitive Holistic Mind and matter considered together	Analytical Reductionist Mind reduced to matter
Communication	Oral, storytelling, singing, dance Subjective	Literate Objective
Instruction	Learned through observation or hands-on experience	Got taught and learned in a situation usually separated from the applied context
Effectiveness	Slow Inconclusive	Fast Conclusive
Data creation	Based on personal observations, trial and error, and synthesis of facts Data generated by resource users	Based on experimentation and systematic, deliberate accumulation of facts Data generated by a specialized cadre of researchers
Data type	Qualitative Historical (long time-series one locality)	Quantitative Statistical (short time-series over a large area)
Explanation	Spiritual Moral	Hypothesis, laws Mechanistic Value free
Classification	Ecological	Generic and hierarchical

Source: Wolfe et al. (1992) and Berkes (1993).

Justification for applying IK in Development Projects

There is a need to learn from local communities and enrich the development process (World Bank, 1998). Essentially, IK affects the well being of the majority of the people in developing countries (Ngulube 2002:61) Some 80% of the world's population depend on IK to meet their medicinal needs, and at least half rely on IK and crops from food supplies (CSOPP, 2001). Development projects cannot offer sustainable solutions to local problems without using local knowledge (Warren, 1991:2). To ignore people's knowledge is almost to ensure failure in development (Brokensha et al., 1980: 7-8). In fact, IK is key to local development (Schenhoff, 1993:11):

It is only arrogance that would argue that the expertise that matters for Third World development must come from the West, from universities, from multinational corporations, from international banks, from foreign and local professionals, but not from the farmer in Ghana or the healer in Botswana or the village teacher in Bolivia.

Grenier (1998) also observed:

Development efforts that ignore local circumstances, local technologies, and local systems of knowledge have wasted enormous amounts of time and resources. Compared with many modern technologies, traditional techniques have been tried and tested; are effective, inexpensive, locally available, and culturally appropriate; and in many cases are based on preserving and building on the patterns and processes of nature

IK is considered the basis for self-sufficiency and self-determination because people are familiar with indigenous practices and technologies. They can understand, handle, and maintain them better than introduced western practices and technologies. Further still, IK draws on local resources. People are less dependent on outside supplies, which can be costly, scarce and available only irregularly.

IK provides effective alternatives to western technologies. It gives local people and development workers extra options when designing development projects. Instead of searching only among western technologies for feasible solutions, they can choose from indigenous knowledge or combine indigenous and western technology. Indigenous technologies and practices are often cheaper than western ones. They rely on locally available skills and materials and often require little or no cash outlay. The use of IK is considered one of the cornerstones that can guarantee the survival of the economies of the developing world in the wake of scarce resources and reduced donor funding (Ngulube, 2002:63)

IK Application in Development Projects

Makara (2002:45) observes that IK provides problem-solving strategies for local communities, especially for the poor and it represents an important contribution to global development knowledge and is relevant to the development process. Ngulube (2002:61) however notes that although IK is derived from careful observation of the environment in a particular context, it can be applied in multifarious settings. Warren and Ulluwishewa (1993:12) point out that the utility of IK is not confined to the locality in which it evolves, but is useful to scientists and planners alike in designing development programmes. Additionally, there have been a number of attempts to

develop Indigenous Knowledge and make use of it in development both at the national and international scene. At the international level, value has been attached to IK by a number of organizations, some of which are given here below:

Attempts to develop IK

a) United Kingdom

In 2002, the UK Department for International Development commissioned a study to examine how developing countries are using ICTs to create, adapt, and exchange local content. Four priority areas were proposed:

- i. To stimulate local content expression;
- ii. To stimulate eContent creation and communication;
- iii. To develop eContent exchange and broadcast systems;
- iv. To strengthen local 'synthesis and adaptation' capacities.

It is true that content development is a prerequisite to IK utilization. But this project only emphasized that and never laid down strategies for content utilization in development projects.

b) Nigeria

An example is drawn from Nigeria where the project "Starting where people are" works with women in the rural communities to understand various traditional healthcare practices and to introduce 'best practice' and safer techniques in selected treatments. The project recognizes the role of traditional medicine, especially where it is the only healthcare available. It has attempted to document traditional health knowledge and skills and to stimulate links between traditional local knowledge and established medical know-how by compiling a catalogue of traditional treatments for common ailments. For example, the saying in many Nigerian communities that if someone else steps on your sputum, you will get a sore throat, this traditional knowledge has provided an anchor for a public health campaign to emphasize that spitting in public places is a public health hazard (Fantsuam 2002).

c) Uganda

Similar IK development initiatives have taken place at the national level in Uganda, for example, the Uganda National Council for Science and Technology (UNCST) emphasizes documentary heritage and preservation of information. It has put Indigenous Knowledge (IK) on its agenda and adopted a national steering committee for IK in 1999. A council responsible for documentary heritage and preservation of information was also set up.

It is worth noting that IK is best utilized in a local or indigenous language that people understand best. In order to make this possible, computer software (browser) in Luganda, a local widely spoken language in Uganda, was developed and launched in 2004. This helps in improving access to IK, once documented and made accessible through ICTs. However, such efforts are still on a very small scale and not well spread countrywide. There is need to develop content based on the specific information needs of given local communities and the language of the area.

A number of civil society organizations and the private sector have also made attempts to record and disseminate IK for the benefit of local people. Community telecenters provide access, encourage and promote application of Information and Communication Technology, learning resources and indigenous knowledge to stimulate and build local capacity for sustainable rural development. Their philosophy is building structures for information roads to the grassroots person and transforming a rural community into an Information Society. One intriguing question is: But what are these development projects?

Similarly, some farmers in Uganda use a local strategy to combat termites and ants, rather than using modern technologies which are expensive and sometimes not readily available. Termites are the major destroyers of crops and trees trees, especially during the early stages of growth. However, farmers discovered that either ashes or a mix of a small smelly plant ground together with onions and paraffin or used oil repels termites and ants. Other remedies include urine. Furthermore, Indigenous practices like intercropping systems and mulching have contributed significantly to household food security and minimizing the risk of low yield and plant pests

Students of one of the schools in Uganda dancing while dressed in dry banana fibers. This not only promotes the tourism industry but is also educative as it gets learners to appreciate and make use their local knowledge



Dry banana fibers are also used in making decorative artistic works, belts, bags, baskets, table and door mats. Many local women earn their income that way. Local people also apply indigenous knowledge to use herbs to treat different kinds of diseases.



Furthermore, traditional vegetables, grown using indigenous practices, are a regular side dish or sauce accompanying the staple foods such as maize, cassava, sweet potatoes, bananas banana, millet, sorghum and yams. While the staple foods provide calories needed for body energy, the traditional vegetables have very high nutritive value. Family gardens are far more common in less well-to-do households, and constitute the major or the only source of food between harvest or when harvest fails (Rubaihayo, 2002)

Challenges facing the application of IK in development projects

There are a number of challenges affecting use of IK in development projects and these are discussed below:

IK is easily overlooked

Indigenous practices are sometimes not very spectacular. Despite their effectiveness, they can easily be overlooked. For example, a traditional irrigation system consisting of mud canals and bamboo pipes looks less impressive than an introduced system of

neat, straight, and cemented canals. Nevertheless the local system can effectively distribute water to the fields. In the long run, it might even conserve water better than cement canals. Research in Nepal has shown that farmer-managed irrigation systems based on IK resulted in higher agricultural productivity than systems built and managed by government agencies (Development Finance Monitor, 1993).

IK is often overlooked because it seems “messy” and is not obvious to outsiders. For example people in some places do not weed their plots in order to reduce soil erosion, but an outsider might get the wrong impression and assume that nobody is tending the fields.

IK is an endangered species

“When a knowledgeable person dies, a whole library disappears”

This old English proverb is very true for indigenous knowledge since most of it is not documented and is passed on from one generation to another by word of mouth. Grenier (1998) observed that IK is stored in people’s memories and activities and is expressed in stories, songs, folklore, proverbs, dances, myths, cultural values, beliefs, rituals, community laws, local language and taxonomy, agricultural practices, equipment, materials, plant species, and animal breeds. IK is communicated orally, by specific example and through culture.

Indigenous Knowledge systems around the world, especially in the developing countries of Africa, Asia and Latin America are at risk of becoming extinct. They are threatened by modernization, urbanization and globalization (Chisenga, 2002:95). Quek and Eyzaguirre (2002) noted that given the past neglect and rapid pace of social and cultural change, it is not surprising that this invaluable knowledge is fast disappearing. Furthermore, little recording of IK is also leading to its extinction. Little or no recording of IK has been done. IK is often transmitted by word of mouth rather than in written form. This makes it vulnerable to rapid change especially when people are displaced or killed in famine or war, or when younger generations acquire values and lifestyles different from their ancestors. According to Warren (1992), the future of IK that reflects many generations of experience and problem solving by thousands of ethnic groups across the globe is uncertain. It is obvious that if IK is not recorded

and preserved, it will be lost and remain inaccessible to other indigenous systems as well as development workers (Ngulube .2002)

Experience indicates that some IK is lost naturally as techniques and tools are modified or fall out of use. Development processes and populations changes like rural urban migration have further accelerated this loss, endangering the survival of IK. Examples of development processes that endanger IK include government relocation schemes and large development projects like dams.

Furthermore, there are also local capacity limitations and the way global content is pushed. Even in the remote areas of the country, the powers that push global or just non-local content are much stronger than those pushing local content. This can be seen in television programming, in advertising, the spread of global brands, in classrooms using imported curricular and examinations, use of foreign languages in schools and universities and low status of local languages on the Internet, in research, in the dissemination of reliable scientific information and over reliance on foreign technical assistance. With a few exceptions (village phones and community radios), most formal content and communication channels in developing countries, Uganda inclusive, help to push external content into local communities (Ballantyne, 2002). This increased access to other people's knowledge has accelerated the disappearance of IK, and hence its access and utilization in development projects.

IK is not well managed

The roles of creators and keepers of information tend to be quite distinct. The European Commission on Preservation and Access (2002) noted that those who created materials (IK) had no interest in their preservation, and those who kept materials had no control over their creation.

Secondly, library and information professionals have not been at the forefront in terms of managing IK, despite the fact that it is becoming an important resource in planning and managing sustainable development projects. The dominant information management model has been based on acquiring, organizing and preserving recorded and codified knowledge, which is largely generated by researchers, laboratories,

research stations and universities. Such a model has little room for IK, which is not formally codified and resides wholly in minds of local people (Ngulube, 2002:61-62). Because IK is not well managed, it is very difficult to tap it for use in development projects. Ngulube (2002:63) has summed up the major challenges to the management and preservation of IK as relating to methodology, access, intellectual property rights, and the media and format in which to preserve it. Underlying this is also the question of whether or not to use the western paradigm for preserving IK.

Furthermore, the collection of indigenous information is laborious, time consuming and costly (Lawas and Luning, 1996) For instance, as a result of inadequate management, most of the indigenous knowledge accumulated by colonial district officers and early missionaries cannot be located in many archival institutions in Africa (Ngulube , 2002:64)

Limited access to Indigenous Knowledge

Access to the indigenous information collected so far is very limited because it is not well organized in terms of being indexed and abstracted (Warren & McKiernan, 1995:426). This partly explains the underutilization of IK in development projects (Mathias, 1996: 17). In addition, the lack of marketing strategies can also account for the low levels of use of IK (Ngulube, 2002:65). Without access to IK, then it cannot be used in development projects

Unwillingness to share IK

It is common practice that some of the local people are not willing to share their IK. Some IK is generic and can be freely accessed in many communities, both by members and outsiders. Ordinary people are also generally happy to share their knowledge. However traditional healers and herbalists are not so willing to share their knowledge, and the ability to access supernatural sources of information to cure diseases as well as to solve social, political and economic problems. Doubleday (1993) observed:

Knowledge is power, so individuals are not always willing to share knowledge among themselves, or with outsiders. Knowledge is a source of status and income (as is the case, for example, with a herbalist) and is often jealously guarded. A related issue is that some indigenous peoples fear that their IK will be misused, and lacking the power to prevent such abuses, they choose to keep quiet.

This therefore calls for great care to be taken to deal with such local issues of ownership and intellectual property so as not to undermine the content creators (Fantsuam, 2002)

IK may not always be accurate

Just like other knowledge systems, IK has its limitations and weaknesses. IK may not be appropriate and accurate in all circumstances. It may be unwise to accept all traditional knowledge as good practice or as sustainable practice. Indigenous peoples have at times mismanaged resources. For example, according to Gadgil et al. (1993), nomadic hunters and gatherers who are not tied to any specific resource base may not have a conservation ethic. Some IK practices are less efficient than modern technologies. Indigenous people's experiments may be poorly designed and therefore incomplete or incorrect (McCorkle 1989, cited in Wickham 1993).

Issues of Intellectual Property Rights (IPR)

Grenier (1998) observed that there is politicization of indigenous groups and the indigenous-rights movements. Many indigenous people are demanding the right to be heard in development processes. They demand to be officially acknowledged. However, one still questions how a country can restrict access to its IK, and if access is granted, how can IK be protected and how can law and policy be used to ensure that a fair share of the benefits from any products derived from IK is returned to local communities?

CONCLUSION

Despite limited documentation, people have managed to transmit knowledge efficiently from generation, conserving wisdom for centuries. Social and technical skills are shared and used throughout communities, and in the process, passed to children. IK cannot be ignored if development is to take place. No development worker can ignore already existing knowledge among the people. Despite the challenges mentioned above, IK can still be used in development projects. Libraries can adopt the following measures to support this cause.

RECOMMENDATIONS

Raise Awareness

There is need to raise awareness in the community about the value of their IK. This can be done through recording and sharing IK success stories in songs, drawings, puppet plays, story telling, dramas, videos, and other traditional or modern means of communication. Village libraries can go along way in supporting this by initiating and organizing activities that will get the local people meet and share IK practices amongst themselves. Sensitization campaigns about IK and issues related to intellectual property rights should be conducted. All stakeholders including the local people, the IK practitioners, policy makers, librarians and documentalists should be involved. A free and conducive atmosphere should be created to ease sharing IK

Documentation

Libraries should record and document IK. Since IK is essential for development, it must be gathered, organized and disseminated in the same systematic way as western knowledge (Agrawal, 1995:3; Gonzalez, 1995:5; Warren et al., 1993:3). Community members should be helped to record and document their IK generating what can be called Community IK databanks or libraries. It is important that local communities document their indigenous knowledge, give it due recognition and are empowered to maintain and use this knowledge. Community databanks or libraries will include local content, which is the expression of the locally owned and adapted knowledge of a community (Ballantyne 2002). This recorded IK can later be circulated in newsletters, books, video, radio, newspapers, telephones, Internet and other traditional or modern means of communication like art, drama and music. Indigenous forms of record keeping can be encouraged. It is also important that IK is made available.

While doing this, accuracy of IK should first be ascertained by specialist to avoid use of IK practices which may be harmful to people.

Related to this systems for storage and retrieval of indigenous knowledge should be developed. Conventional bibliographic descriptions may not apply for IK. An example of such systems is that designed by Andemichael, Magara and Nyumba (2003) for indigenous music in Eritrea. Such systems would ease storage and retrieval of IK and consequently its application.

Digital Libraries

While enhancing IK documentation, digital libraries based on IK can also be developed. These are known to preserve indigenous culture and making relevant information readily available locally. They open up the possibility of flexible and coherent multimedia collections that are fully searchable and browsable in multiple dimensions and permit more active participation by indigenous people in preserving and disseminating their own culture (Witten & Bainbridge, 2003)

Managing and preserving IK will help promote its utilization in development projects thus leading to reduce poverty, enhancing equity, reducing environmental degradation and thus leading to sustainable development and increased local participation in the development process. Information professionals should play a significant role in managing IK resources. Libraries should devise strategies for making IK information and knowledge accessible by:

- Preparing IK databanks (inventories and registers), taking into account the intellectual property implications of such databanks;
- Making IK accessible to the community by means of marketing strategies;
- Developing collection development policies for IK, bearing in mind the implications of the storage media for its preservation;
- Developing standardized tools for indexing and cataloguing IK systems;
- Compiling bibliographies of IK resources.

Identify the IK specialists

Further still, there is need to identify and indigenous specialists. Indigenous specialists are community members who have special skills or expertise in one or more subject areas or who practice a profession (e.g., healers). Other useful people to identify include decision makers, innovators, political opinion leaders, who in one way or the other affect management and application of indigenous knowledge in development projects. Databanks of such individuals should be maintained to allow for ease of access and sharing in case their IK is required.

Establishing the value of IK

In conjunctions with development workers, libraries should establish measures of assessing each type of IK – practice, technology, organizational structure, human resource, etc. The criteria to use may include the efficacy of IK, its cost-effectiveness, availability, understandability, cultural appropriateness, effect on different groups of communities, environmental soundness, and constraints plus whether and how they can be overcome. Such criteria would help establish the value of IK and the ease with which it can be applied in development projects.

In order to enhance the economic value of IK, there is need to recognize the context in which IK was developed and where it is applied. Standards should be developed to accommodate the special nature of IK. Libraries and all concerned parties must also identify criteria and standards by which local people judge IK. Though this may be difficult, it is important to find out what people value most in a specific IK, why they chose it, what they see as its strengths and weaknesses, what they think would happen if the IK were not available, who would be most affected if the IK were not available and what features people look for when they test a technology. This implies that there is need to learn the people's view of IK. It is only if we combine both insiders' and outsiders' assessment, that we will be able to identify and better understand the value and usefulness of IK in development.

Capacity Building

The relevant capacity needs to be developed through training IK specialists, who will integrate IK in development projects, but are also knowledgeable in IK recording, storage, dissemination and matching IK to development projects. Librarians should be trained in local environments so that they get used to the needs of the local people and can actually appreciate the value of IK in those communities and how to manage with it. This is in line with an earlier recommendation by Magara and Nyumba (2002), who justified the need for engaging LIS students in industrial training for capacity building.

In conclusion, libraries should ensure that developing countries participate actively in our information society, rather than observing it from outside. All efforts should be

made to ensure that IK is captured, documented, stored, made accessible and shared so that it can effectively applied in development projects. Libraries can go along way in ensuring that this is done.

References

1. Agrawal, A. (1995). Indigenous and scientific knowledge: some critical comments. . *Indigenous Knowledge and Development Monitor*, 3(3), 3-6.
2. Andemichael, Yohannes Abraha; Magara, Elisam and Nyumba, Joyce Bukirwa. 2003. Design of an Indigenous Music Information Storage and Retrieval System: Lessons for Eritrea. *Indilinga: African Journal of Indigenous Knowledge Systems*, 2 available at <http://www.inasp.info/ajol/journals/indilinga/vol2abs.html#8>
3. Ballantyne, P. (2002). Collecting and propagating local development content. . *INASP Newsletter* (20), 3-4.
4. Brokesha, D., warren, D. & Werner, O (Ed.). (1980). *Indigenous knowledge systems and development*. Lanham: University Press of America.
5. Chisenga, J. (2002). *Indigenous knowledge: Africa's opportunity to contribute to global information content*. Paper presented at the 15th Standing Conference of Eastern, Central and Southern African Library and Information Associations. 15-19 April 2002
6. Civil Society Organisations and participation Programme (CSOPP). (2001). *Conserving indigenous knowledge: integrating new systems of integration*: UNDP.
7. DFM. (1993). In Recording and using indigenous knowledge: what is indigenous knowledge? Retrieved 23/11/2001, from <http://www.panasia.org.sg/iirr/ikmanual/ik.htm>
8. Doubleday, N.C. 1993. Finding common ground: natural law and collective wisdom. In Inglis, J., ed., *Traditional ecological knowledge: concepts and cases*. International Program on Traditional Ecological Knowledge; International Development Research Centre, Ottawa, ON, Canada. pp. 41–53.
9. European Commission on Preservation and Access. (2002). Preservation of the digital heritage. [Discussion paper for UNESCO February 2002: 1-8].
10. Fantsuam, J. D. (2002). Starting where the people are. *INASP Newsletter* 13.
11. Gadgil, M.; Berkes, F.; Folke, C. 1993. Indigenous knowledge for biodiversity conservation. *Ambio*, 22(2–3), 151–156.
12. Gonzalez, R. M. (1995). KBS, GIS and documenting indigenous knowledge. . *Indigenous Knowledge and Development Monitor*, 3(1), 5-7.
13. Grenier, L. (1998). *Working with indigenous knowledge: a guide for researchers*. Retrieved 13/04/2006, from <http://www.idrc.ca/openebooks/>.
14. Ina Hoi Riwa Foundation. 2002. In Chisenga 2002
15. International Institute of Rural Reconstruction (IIRR). (1996). *Recording and using Indigenous knowledge: a manual*. Silang, Cavite, Philipines: IIRR.
16. INASP (Ed.). (2002). *Creating and communicating local development content*.
17. Magara, Elisam and Nyumba, Joyce Bukirwa. 2002. Information Manpower Capacity Building for Decentralization in Uganda through Industrial Training, *IFLA Journal*, 28(1): 31-37

18. Makara, M. (2002). *Management of indigenous knowledge in Lesotho: prospects and challenges for information professionals*. Paper presented at the 15th Standing Conference of Eastern, Central and Southern African Library and Information Associations. 15-19 April 2002
19. Langill, S. (2005). Introduction to Indigenous knowledge. Retrieved 7th February 2005, 2005, from <http://www.agroforestry.net/overstory/overstory82.html>
20. Lawas, C. M., & Luning, H. A. (1996). Farmers' knowledge and GIS. *Indigenous Knowledge and Development Monitor*, 4.
21. Mathias, E. (1996). Framework for enhancing the use of indigenous knowledge. *Indigenous Knowledge and Development Monitor*, 3(2), 17-18.
22. McCorkle, C.A. 1989. Towards a knowledge of local knowledge and its importance for agriculture RD&E. *Agriculture and Human Values*, 6(3), 4-11.
23. Ngulube, Patrick. 2002. *Strategies for managing and preserving indigenous knowledge in the knowledge management era*. Proceedings of the 15th Standing Conference of Eastern, Central and Southern African Library and Information Associations. 15-19 April 2002. 61-69
24. Quek, P. a. E., Pablo. (2002). Using ICTs to collect and propagate local biodiversity content: a synopsis of ICT projects in Kenya, Malaysia, Nepal and Yunnan. *INASP Newsletter* 20.
25. Raseroka, H. Kay. (2002). *From Africa to the world-the globalisation of indigenous knowledge systems: setting the scene*. Proceedings of the 15th Standing Conference of Eastern, Central and Southern African Library and Information Associations. 15-19 April 2002. 1-12
26. Recording and using indigenous knowledge: what is indigenous knowledge? Retrieved 23/11/2001, from <http://www.panasia.org.sg/iirr/ikmanual/ik.htm>
27. Rubaihayo, E. B (2002). The contribution of indigenous vegetables to household food security. *IK Notes*. 44:1-4
28. Schoenhoff, D. M. (1993). *The barefoot expert: the interface of computerized knowledge systems and indigenous knowledge systems*. . Westport, CT: Greenwood Press.
29. Warren, D. M. (1991). *Using indigenous knowledge in agricultural development*. *World bank Discussion paper*. Washington, DC: World Bank.
30. Warren, D M. 1992. *Indigenous knowledge, biodiversity conservation and development*. Keynote address at the International Conference on Conservation of Biodiversity in Africa: Local initiatives and institutional roles. Nairobi, Kenya, 30 August-3 September
31. Warren, D. M., & McKiernan, G. (1995). CIKARD: a global approach to documenting indigenous knowledge for development. In D. M. Warren, L. J. Slikkerveer & D. Brokensha (Eds.), *The cultural dimension of development: indigenous knowledge systems* (pp. 426-434). London: Intermediate Technology Publications.
32. Warren, D. M., Von Liebenstein, G. W., & Slikkerveer, L. (1993). Networking for indigenous knowledge. *Indigenous Knowledge and Development Monitor*, 1(1), 2-4.
33. Wickham, T.W. 1993. *Farmers ain't no fools: exploring the role of participatory rural appraisal to access indigenous knowledge and enhance sustainable development research and planning. A case study of Dusun*

34. Witten, I. H., & Bainbridge, D. (2003). *How to build a digital Library*. . Amsterdam: Morgan Kaufmann Publishers.
35. Wolfe, J.; Bechard, C.; Cizek, P.; Cole, D. 1992. Indigenous and Western knowledge and resource management systems. University of Guelph, Guelph, ON, Canada. Rural Reportings, Native Canadian Issues Series, No.1.
36. World Bank. (1998). *World Development Report*. Washington, DC: World Bank.