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Knowledge Management in a Research Organisation: International Livestock Research Institute (ILRI)

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Knowledge is fast becoming a source of competitive advantage that makes a difference between success and failure for both profit and non-profit organisations. The International Livestock Research Institute (ILRI) is a non-profit organisation which has initiated a knowledge management programme recently. This study looks at how knowledge is generated in ILRI, how it is shared, how it is transferred and how it is

integrated into the day-to-day operations of the Institute. It also looks at how the Institute encourages its employees to acquire new knowledge as well as share knowledge with others within and outside the Institute. Some of the challenges that the ILRI faces in managing knowledge are identified, and solutions which cannot always rely on information technology are discussed.

Introduction

The concept of knowledge management is relatively new to many organizations based in the sub-Saharan region of Africa. Many organizations based in the region do not as yet have formal organizational knowledge management programmes. Any organization in the region contemplating starting a knowledge management programme must contend with the difficult tasks of providing proof of the value of knowledge, changing organizational members' attitudes to accept knowledge as an important organizational resource and establishing a culture of actively creating and sharing knowledge.

The International Livestock Research Institute (ILRI) has recognized the importance of sharing knowledge created within and outside the organization, hence, the reason for initiating a formal organizational knowledge management programme. Knowledge has been recognized as one of the most important resources of the 21st century and has received considerable attention in the management literature (McFadyen and Cannella 2004).

Szulanski (2003) contends that the rise of the knowledge economy has helped organizations to recognize that knowledge assets are rapidly becoming their most precious competitive advantage and that learning to manage those assets better has become a competitive necessity.

According to Wiig (1994), the central premise behind organizational knowledge management is that all the factors that lead to superior performance – organizational creativity, operational effectiveness, and quality of products and services – are improved when better knowledge is made available and used competently. By initiating a knowledge management programme, the International Livestock Research Institute has explicitly indicated that it values superior performance in what it does.

The International Livestock Research Institute

The International Livestock Research Institute (ILRI) was founded in 1994 with its headquarters in Nairobi, Kenya and a second principal campus in Addis Ababa, Ethiopia. It is one of the 16 Future

Harvest Centres which conduct food and environmental research to help alleviate poverty and to increase food security while protecting the natural resource base.

As a non-governmental and non-profit research organization, ILRI works at the crossroads of livestock and poverty, bringing high-quality science and capacity building to bear on poverty reduction and sustainable development for poor livestock keepers and their communities. ILRI works in the developing regions of Africa, Asia, Latin America and the Caribbean. It has offices in East and West Africa, South and Southeast Asia, China and Central America. It has projects in North Africa and the Middle East. ILRI is an employer of over 700 staff from about 40 countries. About 80 staff members of ILRI are recruited through international competitions and represent some 30 disciplines. About 600 staff members are nationally recruited, largely from Kenya and Ethiopia.

As a non-profit organization, ILRI aims at creating social value for society and does not recognize maximizing of profits for stockholders as its main goal. According to Lettieri, Borga and Savoldelli (2004), non-profit organizations are required to improve continuously their performance. The demand for services that are integrated, tailored and timely, urges non-profit organizations to follow new managerial paradigms.

Objectives, methods and definitions

This study was conducted with the following objectives in mind:

- to establish how a non-profit research organization may build its internal knowledge base;
- to dispel the view that knowledge management is only possible in knowledge-based economies of the developed regions;
- to demonstrate that good knowledge management practices are possible in a non-profit research organization; and
- to establish the nature of the critical challenges of establishing and running a successful knowledge management programme in a non-profit research organization environment.

Methodology

This article is based on intensive face-to-face interviews of ILRI Information Centre Nairobi, Kenya,

content analysis, a thorough literature review and a critical analysis and synthesis of the available material on knowledge management, knowledge sharing, knowledge creation and knowledge transfer. At the headquarters in Nairobi, ILRI has an Internet café which is open to both staff and members of the public free of charge. The author took time to observe users at the ILRI Internet café.

Knowledge

Davenport and Prusak (1998) define knowledge as a fluid mix of framed experience, values, contextual information and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and it is applied in the minds of the knowers. Benbya, Passiante and Belbay (2004) define knowledge as the capability to act effectively. Wiig (1994) on his side looks at knowledge as that which consists of facts, truths, perspectives and concepts, judgments and expectations, methodologies and know-how. Regarding knowledge management, Wiig says that it is a conceptual framework which encompasses all activities and perspectives required to making an organization intelligent-acting on a sustained basis. Alavi and Leidner (1999) view knowledge management as the systematic and organizationally specified process of acquiring, organizing and communicating knowledge of employees so that other employees may make use of it to be more effective and productive in their work.

Organizational knowledge

When talking of organizational knowledge, one immediately gets the impression that organizations possess knowledge and/or they are capable of knowing. Patriotta (2003) contends that knowledge is situated in plans and cognitive maps, resources and competencies, routines and procedures, practices and narratives, and organizational artefacts and technological implements. Taking into account where knowledge resides in an organization, Patriotta says that an organization is an embodiment of a particular way of seeing the world, an inscription of human knowledge and agency, an assemblage of heterogeneous materials. Patriotta then defines organizational

Table 1: ILRI, individual staff members, supervisors and section heads' responsibilities in staff development/training

ILRI	Individual staff members	Managers, section heads, supervisors and team leaders
<p style="text-align: center;">Responsibilities</p> <ul style="list-style-type: none"> • Creation of a work environment that is conducive to learning and knowledge and information sharing • Assisting staff members to identify their training/development needs and opportunities to meet such needs while matching individual career interests with institute goals and objectives • Monitor external developments and determine their implications for ILRI's staff development • Allocating staff with development funds with fairness and transparency in line with institutional priorities and individual career aspirations. 	<p style="text-align: center;">Responsibilities</p> <ul style="list-style-type: none"> • Identifying training and development needs and opportunities suitable for both individuals and groups through every possible way including discussions with supervisors and team leaders • Seeking information on training opportunities provided through ILRI and those obtainable through other channels • Effective and efficient utilization of opportunities and resources which ILRI provide for training and development • Strive to return to work at earliest opportunity after staff development activity and to contribute fully. This may include being open to share knowledge and information with colleagues through informal and formal training avenues. 	<p style="text-align: center;">Responsibilities</p> <ul style="list-style-type: none"> • Ensuring their team members are well developed to perform effectively • Actively creating a work environment which encourages learning and knowledge and information sharing • Linking the development of individual and career advancement to the aims and objectives of the project and career advancement to the aims and objectives of the Institute • Assisting and supporting staff in taking responsibility for their own development • Allocating reasonable time and resources for individual and group staff development, within the department/theme requirements and resources in line with policy guidelines • Enhancing on-the-job personal and professional development of staff through peer advice, joint research, rotation of duties, conference attendance, etc

knowledge as how organisations know about themselves, how they make sense of performance and what they do on the basis of that understanding. At a fundamental level, it is individuals who create knowledge (Nonaka, 1994). Nonaka argues that an organisation cannot create knowledge independent of individuals. The organisation supports creative individuals or provides a context for such individuals to create knowledge.

Knowledge management activities at ILRI

Knowledge management is a new organizational management paradigm that is getting a lot of attention in the modern corporate world. Profit and non-profit organisations are devoting a lot of resources to knowledge management programmes with the belief that by so doing, they may improve their performance and be more competitive. Knowledge management is a managerial function punctuated with several activities. At any one time, there are several activities taking place at ILRI, which are part of and support the knowledge management process. The activities are outlined below.

Collaboration

Organizations, regardless of their nature, are compelled to implement knowledge management programmes to enable the creation of platforms, processes and standards for collaboration and knowledge sharing across geographical and organizational boundaries (Du Plessis 2004). On collaboration, Anand et al. (2000) note that most organizations do not possess all required knowledge within their formal boundaries and must rely on linkages to outside organizations and individuals to acquire knowledge. In what Nooteboom (2000) calls dynamic fields, organizational innovation derives from knowledge exchange and learning from network connections because they gain access to new information, expertise, and ideas not available locally and can interact formally, free from the constraints of hierarchy and local rules.

In keeping with the spirit of collaboration, ILRI has established collaboration with many organisations and institutions all over the world. It collaborates with organisations and institutions in countries and regions where it does not have any operations at all. For example, ILRI collaborates

with several institutions in the USA where it does not have any operations. By March 2005, ILRI was collaborating with 142 collaborators/and or partners around the world as shown in Appendix 1.

Training and Learning

There is no doubt that training helps employees of an organization to acquire new knowledge, new skills and new capabilities. Training helps employees of an organization to acquire what Nonaka (1994) calls tacit knowledge.

ILRI recognizes that human capital is its most important asset. It also recognizes that quality staff development, which provides staff with the opportunity to contribute more effectively by developing their particular capabilities and skills, is integral to institutional performance and staff morale. ILRI therefore values and actively encourages development and improvement of personal and team skills by creating an enabling environment for continuous learning and knowledge sharing, and by supporting staff-led initiatives for group and individual training and development skills.

The ILRI staff development activities have been broadly classified into continuous staff development, short-term training and long-term training. In the ILRI staff development training programmes, the Institute, individual staff members, managers, section heads and team leaders are charged with specific responsibilities as shown on Table 1.

ILRI information centres

ILRI has information centres located at its campuses in Addis Ababa, Nairobi and Metro Manila. Together, the information centres hold over 130,000 items. Users may view books, grey literature, maps, photographs, newspapers, magazines, microfiches, videotapes, journal bindings, theses, conference proceedings and other items. All the information centres at the ILRI campuses are staffed with qualified and experienced information specialists who provide full reference support to users, helping them perform their own searches or performing the searches and delivering the retrieved documents.

All ILRI staff members are automatically members of the information centres. Trainees, consultants, visiting scientists, post-doctoral fellows,

long-term trainees and staff members of other CGIAR centres posted to Ethiopia and Kenya may also be members. Agricultural researchers, policy-makers, teaching staff of agricultural colleges and universities, post-graduate and doctoral students may also apply for membership to ILRI information centres.

The ILRI information centres are charged with ensuring that potentially useful conventional and non-conventional literature that may meet current and probable future information needs of the institute's research programmes is efficiently acquired. Book and serial acquisition is seen as a participatory exercise which involves both the staff of the information centres and researchers at ILRI. Information centres' staff members identify potentially useful new material and research staffs evaluate the usefulness of such materials and advise the information centres on their acquisition.

Internet Cafés

The ILRI Campus in Nairobi, Kenya opened an Internet café in September 2004. The café was opened to improve access to the Internet by staff members, trainees, post-doctoral fellows, consultants, and staff members of other CG centres. Members of the public who are registered members of the ILRI information centre are allowed free access to the Internet. Access to the Internet in Kenya and other sub-Saharan African countries is very costly and out of reach for many people (Ondari-Okemwa 2004). Many researchers and other members of the public in sub-Saharan Africa find it difficult to access available electronic information resources because of the prohibitive cost.

Senior management support for knowledge management

For any knowledge management programme to succeed or even take off the ground, the first and foremost important step is for senior management to understand what knowledge management entails (Wiig 1994). At ILRI, the top management of the Institute has recognized and understood the importance of knowledge management. The top management at ILRI shares a vision of what effective knowledge management entails and what it may result for the organization. The ILRI top management also understands the kind of activities it

has to engage in to have a successful organizational knowledge management programme. The ILRI top management fully supports the knowledge management programme and all those in top managerial positions look at themselves as senior knowledge managers. The director-general, who is the chief executive of ILRI, is looked upon as the chief knowledge officer of the Institute.

Because of the ILRI top management's conviction that knowledge management is important, the programme gets substantial financial and human resources to support its activities. The programme is headed by a PhD holder whose designation is that of an information manager. The ILRI information manager, based in the Addis Ababa Campus occupies a top-level managerial post in the Institute's hierarchy. The information manager co-ordinates knowledge and information management activities in all the ILRI sites.

Challenges

Very few organizations, if any may explicitly state that they do not have any challenges in trying to achieve their goals and objectives. ILRI has established the knowledge management programme as one way of enhancing its ability to achieve its stated goals and objectives. The knowledge management initiative at ILRI faces challenges which are unique to the Institution. First and foremost, it should be understood that ILRI is a non-profit research institution. So the knowledge management programme at ILRI may not be charged with its potential to help the Institute generate more and more profits. Some of the notable challenges that the ILRI knowledge management initiative faces are described below.

Documentation of ethno-veterinary knowledge

In Kenya and the rest of sub-Saharan Africa where ILRI operates, there have always been many small-scale livestock keepers. Long before modern veterinary medicines were introduced to such livestock keepers, they had their indigenous medicines which worked well for them. Up to this day, many small-scale livestock keepers in sub-Saharan Africa believe in their indigenous veterinary medicines. A small-scale livestock keeper may call a veterinary doctor to treat his animal, but still the

animal has to be treated with a dose of traditional medicine.

The traditional veterinary medicines have proved to be effective and cheap for small-scale livestock keepers, but ILRI has not been able to document or record fully the ethno-veterinary knowledge in the sub-Saharan Africa region. The knowledge remains widely tacit and it is likely to remain so for a long time into the future. By capturing and documenting ethno-veterinary knowledge in sub-Saharan Africa, ILRI would move a step ahead in improving the productivity and sustainability of small-scale resource-poor animal farming operations through improved and efficient utilization of traditional animal husbandry practices and indigenous medicinal plants.

Knowledge audit

The conventional understanding of the audit function associates it with financial management. Knowledge and information may be subjected to audit but professional financial auditors have not come up with audit techniques which may be used to audit these intangible resources. A knowledge audit may be conducted to determine the extent to which a knowledge management programme of an organization contributes to the achievement of the organization's goals and objectives. At ILRI, there are no known standards, techniques or methods of auditing knowledge. However, this is not unique to ILRI alone. Many other organizations may not have standards or techniques for auditing knowledge. As a resource, knowledge has certain unique characteristics which make it difficult to be audited by conventional financial audit techniques. The ILRI knowledge initiative is still young and new. With time, the Institution may come up with its unique knowledge audit techniques.

Coping with service demands

ILRI tries its best to satisfy knowledge requirements of its employees and collaborators, but it is an uphill task. The demand for knowledge and information far outstrips the Institute's ability to meet all the requirements. It takes time, financial and human resources to gather, processes, store and retrieve knowledge that may be required. As knowledge generators, ILRI researchers require a

lot of knowledge from other sources in order to be able to generate knowledge. The institute has to try to meet knowledge and information requirements of collaborators, partners, national agricultural research systems and other global groups which need ILRI services.

Personnel shortage

In the unique environment in which ILRI operates, qualified personnel are in short supply. There are not many people who have been trained in knowledge management and in information technology in particular. As a tool of knowledge management, information technology enables organizations to gather knowledge, process it with speed, store and preserve it and transfer it with efficiency and speed. Qualified knowledge managers are in high demand and ILRI finds it difficult to attract highly qualified knowledge managers. Profit-making organizations offer more attractive terms and conditions of employment to qualified knowledge managers. This is because such organizations have come to understand the value and importance of knowledge and the potential contributions qualified knowledge managers may make.

Budgetary constraints

The knowledge management programme at ILRI does not enjoy an enormous budget allocation. As much as the top management of the Institute supports the knowledge management initiative, the budget allocation is dictated by available financial resources. At any one given time, there are several projects at ILRI competing for finances and the knowledge management initiative is only one of them.

Discussion

Profit and non-profit organizations now recognize knowledge as a strategic source of competitive advantage of the 21st century. The International Livestock Research Institute is a good example of how a non-profit research organization may initiate and run a knowledge management programme. The Institute faces a number of problems in its knowledge management initiative but it has put in place what it takes to establish a successful knowledge management programme.

Sharing of knowledge and information

The ILRI research centres generate a lot of scientific knowledge as their basic business. The centres generate agricultural knowledge with emphasis on livestock. They generate knowledge on livestock diseases, livestock development, and livestock products marketing. The Institute has many research centres and knowledge generated in any centre is shared by research staff in all other centres to avoid duplication which is considered costly for the Institute. A lot of scientific knowledge produced in ILRI is embedded in the minds of the research scientists. ILRI employs research staff on contracts which may or may not be renewed. While such researchers are still working for ILRI, the Institute encourages them to share whatever knowledge they have gained with colleagues. The ILRI research centres try to find out what their scientists, partners and staff know and to capture that knowledge for donor reports, fundraising, contribution to scientific research and quality, and to allow them to grow and preserve their knowledge assets.

ILRI recognizes that effective knowledge management requires solid and reliable information systems which may facilitate access, retrieval, and sharing of knowledge and information. Against all odds, ILRI has tried to put in place solid information systems which are relied on to facilitate the access, retrieval and sharing of knowledge and information. Good information systems rely on advanced information and communication technologies which may be lacking in the regions where ILRI has operations. Regardless of lack of well-developed information and communication technologies in most countries where it has operations, ILRI has developed reliable information systems which enable research staff in all centres to share and exchange knowledge and information.

The ILRI information centres to a large extent facilitate sharing of knowledge and information. ILRI maintains two major information centres; one at ILRI-Ethiopia, in Addis Ababa, and another at ILRI-Kenya, Nairobi. The two sites subscribe to nearly 250 current journals and house 75,000 monographs. The ILRI-Kenya information centre specializes in biological sciences and the ILRI-Ethiopia information centre offers a wider spectrum of disciplines ranging from agricultural economics to veterinary science. The ILRI-Ethiopia houses a

unique microfiche collection of 22,000 unpublished documents from research centres in 27 sub-Saharan African countries. The ILRI information centres circulate books and periodicals to all ILRI staff and registered external users. Users may access the Institute's in-house databases via ILRI's local area network and external databases on CD-ROM or via the Internet.

The Institute has a selective dissemination of information called ILRIalerts, which draws its data from the monthly updates to ILRI's in-house bibliographic database. ILRIalerts has a built-in feedback mechanism which monitors the usefulness of this service to each user. A total of 420 users from 39 countries subscribe to the service. Users are able to receive their SDI results by email.

To further enhance knowledge and information sharing, ILRI has developed and continues to build an information portal. Research scientists of all ILRI research centres have access to the portal and contribute to it. The portal is user-friendly and enables ILRI research scientists to exchange knowledge and information more easily with fellow research scientists in collaborating organizations.

Rather than encouraging personal and group development of employees, ILRI tries to create an environment that is conducive for sharing knowledge and information. After staff members have gone through a development activity such as long-term training, they are expected and encouraged to return to work at the earliest opportunity and contribute fully. On returning to work after going through training, employees are expected to be open to share knowledge and information with colleagues through informal and formal training avenues. After training, an employee is expected to acquire new tacit knowledge, new capabilities and new skills. The only way such an employee may pass the new tacit knowledge is by training colleagues formally or informally.

Research activities

ILRI is a research institute which tries its best to do what is expected of a research institute. It has good research facilities which enable and encourage researchers to conduct research continuously, hence generating new knowledge. Researchers who are not employees of ILRI but who have the same research interests as those of ILRI are allowed to use the Institute's facilities. The Institute

may even support such researchers beyond allowing them use of its facilities. Most ILRI researchers have published their research findings in refereed journals. They mostly co-publish in teams of two, three, four or more. They are encouraged to publish also with researchers from other research institutions outside of ILRI. Publications of ILRI researchers are well recorded and reported in the annual reports as part of knowledge management activities of the Institute.

Research facilitation

Some research organizations or institutions may have good policies on facilitating research, but such policies may just be on paper and are never implemented. ILRI has tried to facilitate research in every way possible. The research facilities it has in place include well-equipped laboratories, information centres and free Internet connectivity that researchers may access around the clock. Researchers are allowed to initiate research projects which may be funded by ILRI. The Institute may directly fund such research initiatives or seek funding from collaborating organizations or other donors. The Institute also funds research projects initiated by researchers who are not its employees. The only condition is that such research projects be of relevance to the Institute's research interests. In the sub-Saharan Africa region, it is very rare for a research organization or institute to fund research projects of researchers who are non-employees or who may not in any way be affiliated to the institute.

Knowledge management, training and learning

Learning is the primary approach for generating capabilities (Saint-Onge and Armstrong 2004). Saint-Onge and Armstrong define knowledge as the capability to take effective action and learning as the process of turning information into knowledge to take effective action. These definitions are illustrative of the strong relationship between knowledge and learning. Learning may be considered as the process of making meaning – of internalizing information – whereas knowledge forms the basis for how solutions are applied. Before knowledge can flow, it is important to ensure that the learning process has filtered and vali-

dated information as value-creating knowledge stocks.

The end product of learning, training and human resource development is knowledge. An organization may not possibly manage what it does not have and ILRI contends that training, learning and development of staff are some of the ways of gathering the knowledge that must be present within the organization so as to be managed. ILRI takes training of research staff seriously. The institute recognizes that training and education for research staff may be used as an incentive for facilitating knowledge sharing. An important role of knowledge management is facilitating the sharing of knowledge that may be available either in the explicit or tacit form.

ILRI hires personnel who are already well equipped with capabilities, who already have a working knowledge and the necessary skills. However, this does not stop the Institute from further training, developing and educating newly hired staff. After working with the Institute for some time, employees acquire new knowledge, skills and capabilities. The International Livestock Research Institute does not have or set any limit on personal development of its employees. Continuous learning and training of employees are highly encouraged.

Critical responsibilities of supervisors, and section heads include ensuring that their team members are well developed to perform effectively, and to actively create a work environment which encourages learning and knowledge and information sharing. The Institute links career advancement to employees' development as much as possible. Supervisors, section heads and team leaders are expected to allocate reasonable time and resources for individual and group staff development. This is an indication that ILRI encourages personal development of employees through training and learning.

In training its staff, ILRI believes that it is one way of transferring skills and know-how to staff so that they may perform their tasks more effectively and efficiently. ILRI also believes that it can transfer basic knowledge and understanding by training its staff. Training and educating staff helps ILRI to cultivate knowledge-oriented employees. All research scientists at ILRI are seen as knowledge creators and knowledge managers who make it easy for the Institute to manage both explicit and tacit knowledge.

As much as possible, ILRI has tried to make itself a learning organization. A learning organization is that organization that is devoted and committed to learning, both for personal development and for the organization as a whole. Time devoted to thinking and learning is recognized and rewarded. Organizational learning involves learning from both successes and failures (Skyrme 1999). ILRI has made itself an organization in which employees continually expand their capacity to create results they truly desire, where new and expansive patterns of thinking are encouraged and nurtured and where collective aspiration is set free. The Institute has made it possible for its employees to continue learning as individuals and to continue learning together as groups. On and off-the-job learning is highly valued and encouraged at ILRI.

Effects of the ILRI knowledge management initiative

The ILRI knowledge management programme is still relatively young, but it has had a number of positive effects on the Institute and beyond. ILRI is satisfied that through sharing of knowledge and information, there has been quality improvement of its centres' operations. Staff in the ILRI centres continue to improve their effectiveness, thus improving their ability to contribute to ILRI's mission, development objectives, and achieve greater impact.

The International Livestock Research Institute has the lead responsibilities on the Virtual System-wide Livestock Programme (vSLP). This Consultative Group on International Agricultural Research (CGIAR) System-wide Livestock Programme is an interdisciplinary programme which deals with livestock feed resources, natural resource management and associated policy issues. It has geographically dispersed partners and projects from many participating institutions. The geographically dispersed team of researchers working as part of the System-wide Livestock Programme stand to benefit from a mechanism that helps them to be more effective at communicating and working with each other, at sharing knowledge and information and jointly managing their affairs.

The virtual System-wide Livestock Programme provides SLP scientists with a "one-stop" shop for discussing, designing and implementing SLP ac-

tivities through more effective coordination, and knowledge and information management. The activity has resulted in:

- Customized software for vSLP network;
- A searchable database of SLP projects;
- Key sources of information within SLP (data sets, methodologies and publications);
- Linkage between the virtual network and a pilot project virtual laboratory, particularly for scientists to use communication tools (e.g. electronic white boards); and
- Interactive communications module for vSLP.

The knowledge management initiative at ILRI has to a large extent resulted in a knowledge and information sharing culture within and outside the Institution. Research scientists in the ILRI research centres readily share knowledge and information that may be available or generated at any of the research centres. ILRI has opened its doors to research scientists of national agricultural systems of the countries in which it operates. Research scientists from national agricultural systems of the countries in which ILRI operates share knowledge and information with the Institute's research scientists. Faculty members who teach agricultural sciences at institutions of higher learning in the countries where ILRI has operations also share knowledge and information with the Institute's research scientists. Such faculty members and researchers have access to ILRI's information centres and laboratories. They may also have access to ILRI's research findings.

It may not be easy to quantify ILRI's contributions towards poverty eradication and food security in the countries it operates. However, there is no doubt that its research activities have generated knowledge and information which policy makers of the various countries may find useful when formulating policies on poverty eradication and food security.

Conclusion

The International Livestock Research Institute knowledge management programme stands out as a good example of the best practices that may be emulated in sub-Saharan Africa and other developing regions where it has operations. It is an

example of how a non-profit non-governmental organization may establish a good knowledge management programme that may be copied by other such organizations. The Institute faces some challenges in its knowledge management initiative, but it is adaptive, flexible and tries adjusting to the environments in which it operates. For example in Kenya and Ethiopia, information technology may not be very well developed, but ILRI has demonstrated that information technology is only one of the tools which support efficient knowledge management.

ILRI endeavours to create an environment in which learning can take place and in which exchange of knowledge and information is possible. The environment that ILRI has created encourages creation and sharing and transfer of knowledge. Group training encourages socialization, which is a prerequisite for exchanging tacit knowledge according to Nonaka and Takeuchi (1995). The Institute has established collaborative relationships with institutions within its areas of operation and outside of its areas of operation, which is an indication that it understands that it cannot possess all the knowledge it requires within its formal boundaries and must rely on linkages to outside organizations and individuals to acquire knowledge.

Acknowledgements

The University of Cape Town Postgraduate Funding Office partially funded this study. The author also gratefully acknowledges the guidance received from Gretchen Smith, senior lecturer, Department of Library and Information Studies, University of Cape Town.

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Editorial history:

paper received 9 May 2005

final version received 14 March 2006

accepted 14 March 2006.