Coping with hardship in Gezira Scheme, Sudan: Farmer’s strategy of developing a system of knowledge management

Musa, N.S.A. 1,2, Birungi Kyazze, F. 2, Sseguya, H. 2,3 & Kampen, J.K. 4

1Agricultural Research Corporation, Administration of Human Resources Development and Information Management, P. O. Box 126, Head Quarter, Wad Medani, Sudan
2Department of Extension and Innovations Studies, College of Agricultural and Environmental Sciences, Makerere University, P. O. Box 7062, Kampala, Uganda
3International Institute of Tropical Agriculture (IITA), Regional Hub for Eastern Africa, P. O. Box 34441, Dar es Salaam, Tanzania
4Wageningen University, Droevendaalsesteeg 1, 6708 PB Wageningen, Netherlands

Corresponding author: nada.musa@hotmail.com

Abstract

Gezira scheme in Sudan is one of the most important schemes in the country, as it accounts for half of the total irrigated area in Sudan. From 1956 the Government of Sudan provided most of the agricultural services. However, from 1981 to 2005 the government reduced its support to the scheme. The present study aimed to identify the main Information Communication Technologies (ICTs) used for sharing experiences and creating, storing, disseminating and utilizing knowledge as a mechanism for coping with various challenges facing farmers in the scheme. The study was conducted in Gezira Irrigation Scheme, Sudan. Data were collected from 113 farmers selected using simple random sampling. The preliminary findings indicate that most of the farmers are using a combination of ICTs including phone and face to face meetings to communicate agricultural information and knowledge with fellow farmers, Gezira Scheme Inspectors, dealers, relatives, friends and neighbors followed by face to face meetings. There is little communication between farmers, Gezira Scheme Managers and the Agricultural Research Council (ARC) researchers since ACT of 2005 restricted communication to TV, Radio, phone calls and personal interaction. About 83% of the farmers acknowledged the importance of using ICTs as supportive tools for obtaining and exchanging agricultural knowledge.

Key words: ICTs, Gezira Irrigation Scheme, knowledge management, Sudan

Résumé

Le projet de la Gezira au Soudan est l’un des programmes les plus importants du pays, car il prend en compte la moitié de la superficie totale irriguée au Soudan. À partir de 1956, le gouvernement du Soudan a fourni la plupart des services agricoles. Cependant, de 1981 à 2005, le gouvernement a réduit son soutien au programme. La présente étude visait à identifier
les principales technologies d’information et de communication (TIC) utilisées pour le partage d’expériences, la création, le stockage, la diffusion et l’utilisation des connaissances en tant que mécanisme pour faire face aux différents défis auxquels sont confrontés les agriculteurs. L’étude a été menée dans le cadre du projet d’irrigation de Gezira, au Soudan. Les données ont été collectées auprès de 113 agriculteurs sélectionnés à l’aide d’un échantillonnage aléatoire simple. Les résultats préliminaires indiquent que la plupart des agriculteurs utilisent une combinaison de TIC, y compris des réunions tête à tête et téléphoniques, pour permettre la diffusion d’information agricoles avec leurs collègues agriculteurs, inspecteurs du projet de Gezira, concessionnaires, parents, amis et voisins. Depuis l’acte de 2005 limitant la communication à la télévision, la radio, les appels téléphoniques et les interactions personnelles, peu de communication existe entre agriculteurs, gestionnaires du projet de Gezira et chercheurs du Conseil de recherche agricole (ARC). Environ 83% des agriculteurs ont reconnu l’importance des TIC comme outil important pour l’obtention et le partage des connaissances agricoles.

Mots clés: TIC, projet d’irrigation de Gezira, gestion de l’information, Soudan

Background

In Sudan, just like many African countries, agriculture is an important sector of the economy. Crop production is either irrigation and/or rain-fed. There are six major irrigation schemes; Gezira, Rahad, New Halfa, Elsueki, White Nile and Blue Nile with a total of 1.8 million hectares. Gezira is one of the most important schemes as it represents half of irrigated area of the country (Mahir and Abdelaziz, 2011). From 1956, the Government provided most of the agricultural services such as extension, research, irrigation, credit and marketing of cotton. However, from 1981-2005, the Government reduced its support to the scheme (Taha, 2002; Ali, 2013) following the focus on exploitation of oil and structural changes (Nour, 2011). In 2008, oil revenue accounted for over half of government revenues and 95% of exports (World Bank, 2013). Following the reduced support to the agricultural sector, the sector’s contribution to the country’s GDP declined from 50% to about 33% from 1999 to 2011; exports declined from 73.4% in 1998 to only 8% by 2006 (Ministry of Finance and National Economy, 2006). Although farmers have faced many challenges as a result of this, they have still managed to produce and market their agricultural commodities (Osman et al., 2011; Mahgoub, 2014).

Farmers’ ability to continue with agricultural production and marketing their crops indicates that there is a system in which they are managing agricultural knowledge. This study aimed at identifying the main knowledge enabler Information Communication Technologies (ICTs) support for sharing experiences and creating, storing, disseminating and utilizing knowledge. In the next section, we briefly outline the theory of knowledge management on which we have based our research.
Literature summary

The study borrow from the organisational learning framework (Hoe and McShane, 2010) to find out how farmers acquire and disseminate knowledge and utilise knowledge in order to access agricultural inputs and markets. The organisational learning framework incorporates informal and structural knowledge acquisition and dissemination constructs, along with three predictors; shared vision, interpersonal trust and perceived importance of market knowledge. It is composed of three knowledge processes; knowledge acquisition, dissemination and knowledge use. The Knowledge Value Chain (KVC) consists of knowledge infrastructure, knowledge processes and knowledge performance (Lee and Yang, 2000). Knowledge infrastructure is composed of informal and formal organisations, enablers of knowledge management and linkages among stakeholders and actors along the knowledge value chain. Knowledge processes are the knowledge creation, storage, dissemination and utilisation processes while knowledge performance is the interaction between the components of knowledge infrastructure and knowledge processes. The KVC explains knowledge management as a series of nodes linked in a chain, each node output after transformation becomes an input to next node (Almarabeh et al., 2009). There is need for precise and complete knowledge throughout the chain so that when it reaches to knowledge seekers it can contribute to their ability to make right decisions at the right time. The knowledge management described in four processes, i.e., creation, storage, dissemination and utilisation will explain the relationship that exist between these four processes (Lee et al., 2013) and how these interrelationships among knowledge management processes can enhance individual and organisation performance which in this study is addressing agricultural production and marketing needs.

Study description

The study aimed at identifying the main ICTs used for sharing experiences and creating, storing, disseminating and utilizing knowledge by farmers in Gezira scheme. The study was conducted in Gezira irrigated scheme, Sudan. Gezira scheme was established in 1925 and is located in South Khartoum. The scheme has 0.88 million hectares which is half of the irrigated land in Sudan. Sennar Dam that supplies water to the scheme was constructed in 1925 (Osman et al., 2011). The scheme has 128,000 farmers (Mahgoub, 2014) from whom a total of 384 farmers were sampled from the seven of the 22 locations deemed to be geographically diverse. Questionnaires were used to collect the data.

Results and discussion

Results given here are still preliminary based on a subsample of 113 farmers whose data were available by the time of writing. The average age of the farmers was 60±13 years and ranged from 52 to 68. They were mainly married men (92%) who had attained secondary education. An overview of the ICTs used to exchange agricultural knowledge is given in Table 1. It shows that some farmers use both modern and traditional ICTs to communicate agricultural knowledge with fellow farmers while others use only face to face meetings. There appears to be few meetings of farmers and the Gezira Scheme managers in the
Table 1. ICTs used by farmers to exchange agricultural knowledge (%)

<table>
<thead>
<tr>
<th>ICTs use</th>
<th>Farmers</th>
<th>GS managers</th>
<th>GS inspectors</th>
<th>ARC researchers</th>
<th>Dealers</th>
<th>Relatives</th>
<th>Neighbors</th>
<th>Friends</th>
<th>Pesticides</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0</td>
<td>51</td>
<td>31</td>
<td>70</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>68</td>
</tr>
<tr>
<td>Phone</td>
<td>3</td>
<td>7</td>
<td>2</td>
<td>7</td>
<td>9</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Face to face meetings</td>
<td>42</td>
<td>12</td>
<td>26</td>
<td>7</td>
<td>46</td>
<td>50</td>
<td>49</td>
<td>50</td>
<td>14</td>
</tr>
<tr>
<td>Phone &amp; Face to face meetings</td>
<td>55</td>
<td>19</td>
<td>39</td>
<td>3</td>
<td>23</td>
<td>47</td>
<td>48</td>
<td>48</td>
<td>17</td>
</tr>
<tr>
<td>Radio</td>
<td>0</td>
<td>7</td>
<td>0</td>
<td>6</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TV</td>
<td>0</td>
<td>4</td>
<td>2</td>
<td>7</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Author’s own calculations; GS = Gezira Scheme, ARC = Agricultural Research Corporation

Table 2. Importance of ICTs in agricultural Knowledge by domain (%)

<table>
<thead>
<tr>
<th>Importance</th>
<th>Land preparation</th>
<th>Seed and fertilizer</th>
<th>Fund sourcing</th>
<th>Pest and Insurance</th>
<th>Irrigation</th>
<th>Weeding</th>
<th>Storage</th>
<th>Transport</th>
<th>Marketing</th>
<th>Agricultural Insurance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not applicable</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>Very unimportant</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>Unimportant</td>
<td>8</td>
<td>8</td>
<td>9</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>8</td>
<td>9</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Not important</td>
<td>3</td>
<td>3</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>9</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Important</td>
<td>27</td>
<td>27</td>
<td>20</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>26</td>
<td>23</td>
<td>23</td>
<td>15</td>
</tr>
<tr>
<td>Very important</td>
<td>60</td>
<td>61</td>
<td>60</td>
<td>66</td>
<td>64</td>
<td>62</td>
<td>57</td>
<td>56</td>
<td>64</td>
<td>38</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Author’s own calculations
various locations of the Scheme. With regard to the Gezira Scheme Inspectors, farmers mostly communicate using both face to face and a phone followed by face to face interactions only. Whereas more than 63% of farmers interact with the Gezira Scheme Inspectors on production of gazette crops, some also consult on other crops. Communication between farmers and ARC researchers is very limited. Only 30% of the farmers attempt to communicate with ARC researchers. They communicate through TV, radio, phone and personal interactions.

An average of 49.6% of respondents indicate that face to face meetings were the preferred ICT between farmers, relatives, friends and neighbours. This was due to the close social relationships that exist between farmers, relatives, friends and neighbours. They often communicate when they meet at social events such as funerals, weddings and social clubs or when they simply meet during day times. The use of ICTs between farmers and pesticide dealers is very weak. The few who do use face to face meetings or phone or a combination of both.

About 58% of the farmers (Table 2) acknowledged the importance of using ICTs mentioned in Table 1 as supportive tools for obtaining and exchanging agricultural knowledge on land preparation, seed and fertilizer, sourcing funding, pests and disease management, irrigation, weeding, storage, transport, marketing and agricultural insurance. Whereas an average of 23.7% thought that ICTs were important to obtain for purpose of exchanging and using agricultural knowledge, a small group of farmers (12.4%) thought that it was not important.

Further analysis will be done to evaluate the influence of ICTs support on knowledge management processes.

Acknowledgement

We appreciate the financial support of SHARE Intra-ACP Mobility Grant for financing this study. Our special appreciation goes to the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) for also funding this research and publication of findings. We are grateful to Agricultural Research Corporation-Sudan (ARC) and Gezira University for offering the first author training opportunities. We further acknowledge all the respondents in Gezira Irrigated Scheme, Sudan, who took time from their busy work schedules to respond to our interview questions. This paper is a contribution to the 2016 Fifth African Higher Education Week and RUFORUM Biennial Conference.

References


