MICHIGAN STATE UNIVERSITY

OER Africa

AgShare Planning and Pilot Project

Impact Study

March 2012

Executive summary

The aim of the AgShare Planning and Pilot Project is to create a scalable and sustainable collaboration of existing organizations for African publishing, localizing, and sharing of teaching and learning materials that fill critical resource gaps in African MSc agriculture curriculum.

The model, as implemented in four African universities[1] is based on field-based research carried out by staff and students. That research serves the dual purpose of underpinning research-based teaching and being fed back to the farming community to improve practices there. With appropriate support provided by project management, partner universities constructed their individual pilots in line with regional needs as well as institutional ethos, priorities, strengths and constraints. As a result, the faculties electing to begin with OER production for their own masters' students developed commodity focused case studies in relation to coffee, maize, the dairy value chain, and agricultural extension. In these cases, the 'downstreaming' of materials to farmers was a follow-up activity. By contrast, one university chose to commence with five case study modules for farmers across a fuller spectrum of commodities.

With institutional pilots thus adopting different foci and strategies, impact on teaching and learning was assessed in relation to:

- student-researchers who conducted the research on farms;
- students who experienced the multi-media modules that were produced;
- academic staff who supervised the research which underpinned the OER they developed and taught to their students.

Using education theories on the context of learning, the teacher/student relationship, and the structure of curriculum, an analysis of documents and interview data found that the project had a highly positive impact on all three groups. Student-researchers benefited in several ways, but mainly in terms of their enhanced contextually relevant specialist knowledge and induction into field-based research under the guidance of academics with whom they worked closely. Theory and practice came together. Students who studied the resulting OER benefited from content developed in authentic contexts and presented in interactive ways that brought the subject alive. The OER allowed them to adjust the sequencing and pacing of their own learning in line with their own needs and interests. Amongst other OER assets, students appreciated clear curriculum structure and more purposeful forms of assessment. Like their students, academics experienced the OER as an "eye opener" that presented new and exciting possibilities for teaching. Their case study research led to new understandings of farming practices and associated value chains as well as to teaching that was now genuinely research-based. In contrast with the traditional model of classroom-based lecturing, the case study-based, multi-media OER resulted in a major shift in the way academics now construed their roles as teachers (rather than as lecturers) and as researchers.

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[1] Haramaya University, Ethiopia; Makerere University, Uganda; Moi University, Kenya; United States International University, Kenya.

In terms of project 'take up', similar advantages were cited by non-project staff who had been exposed to OER workshops and advocacy in partner universities. The AgShare model of OER provided opportunities for more flexible learning strategies, and brought together the main components of their professional work: research, teaching, and community service. These benefits, together with the potential for more interactive pedagogy, resulted in most of these academics expressing firm personal intentions to develop their own OER. Indeed, some had already begun. Several reasons account for the fact that the impact study did not find similar evidence of OER 'take up' in other universities. The most compelling reason is that the time frame within which research was conducted, and OER created and taught within rigid university academic cycles, simply has not yet provided academics and institutions adequate opportunity to embark on widespread advocacy campaigns. There has been a fair amount of advocacy within OER-producers' personal networks. Nonetheless, actual 'take up' requires decision-making and university approval processes that make consideration of this form of impact premature at this stage.

In direct and indirect ways – the latter as a consequence of AgShare training in large cooperatives – the project has impacted on several thousand farmers. Students using questionnaires designed by two agricultural experts collected data on actual impact. The agricultural experts used the completed questionnaires to provide independent reports on project impact on farmers. Overall conclusions with respect to impact were further informed by the preliminary and draft reports of systematic studies on impact of the intervention on milk production and its quality. All data and reports indicated that AgShare had a highly positive OER impact on farmers and the broader agricultural community.

In addition to its formal aims, AgShare had significant secondary effects. Impact extended beyond farmers to sectors of the value chain as well as contributing to the status and role of women involved in agricultural production. The third and most significant form of secondary impact was on the partner institutions themselves. By providing a conceptual model of cooperation between the university and its community, the project was seminal in the repositioning of one university to achieve its mission of teaching, research and serving the community.

AgShare is possibly unique in having achieved a highly positive impact across a range of stakeholders from those involved in agricultural research, as well as in teaching and learning, to those engaged in agricultural production and marketing. What made this possible? Evidence from this impact assessment points to a single overarching reason: the logic and power of the AgShare model and the effectiveness of its implementation. Case study research on farms provides the basis for integrating the roles and functions of those who teach and learn agriculture in higher education with the productive sector and associated value chains.

The AgShare pilot undoubtedly merits consolidation and extension. Within partner institutions themselves, continued support for farmers and for materials development would be necessary. It goes without saying that materials development support would also be an essential precondition for OER development in other universities. However, 'take up' in other universities needs to take place first. In this regard, current efforts on the part of OER-producers would need to be bolstered by a macro or project-level initiative to ensure that the fruits of the AgShare model are extended into new regions in Africa.

Acknowledgements

The generosity and helpfulness of project coordinators in setting up evaluation schedules for this evaluation is acknowledged with gratitude. The evaluator is also deeply indebted to

- academic staff and students who consented to be interviewed, found the time to make interviews possible, and were prepared to express their views as openly and frankly as they did.
- the two agricultural experts whose reports on project impact on farmers were assembled under pressure of time
- OER Africa and MSU staff who provided various forms of guidance and assistance
- all those who made the necessary travel and administration arrangements for impact assessment visits.

Lisbeth Levey is particularly thanked for her encouragement and support.

A draft version of this report was circulated for comment amongst key stakeholders. 'Feedback' offered was particularly beneficial in pointing out omissions and suggesting a number of more effective ways of presenting data. For this, the consultant is extremely grateful to these stakeholders. At the same time, it is noted that interpretations, inferences and conclusions remain those of the consultant.

Because of the valuable contribution of all of the above, this report is presented with confidence by the consultant who nevertheless also accepts responsibility for possible errors.

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NOTES ON READING THE REPORT

The intended beneficiaries of the AgShare project comprise students in MSc agriculture as well as other coursework programmes; students as researchers; academic staff teaching on agricultural master's programmes; and farmers and farmers' organizations.

A review of impact covering learning and teaching in higher education as well as agricultural practices on farms will inevitably be somewhat lengthy. Readers familiar with the project (as most will be) or those wishing for an overview that is more detailed than the formal Executive Summary could consider moving directly to sections 7 and 8. Section 7 provides summative ratings for the various layers of project impact. Impact on intended beneficiaries and their practices was found to be *high*. Section 8 argues that high impact may be explained in terms of project logic that anchored all activities in research on farms, as well as implementation that was sensitive to local contexts and cultures. Implications are also addressed in section 8. Those interested in impact on specific sectors, or in the impact assessment methodology, or the data on which conclusions have been based, could then select sections in respect of which they would like more detail.

For readers with more time and inclination to read the report thoroughly from the beginning, the structure is as follows.

Section 1 provides formal coverage of the project and its aims. Project logic is outlined, as this logic was crucial to the way in which the project unfolded. Detail is provided of the four distinctive pilots that comprised the project as a whole.

Section 2 is an account of the methodologies for assessing impact. For teaching and learning, the assessment relies on respondents' open-ended comments on (possible) differences they experienced as a result of AgShare.

Section 3 covers impact on teaching and learning, and section 4 deals with project 'take up' beyond the pilot participants. Impact on farming practices is covered in section 5.

Secondary forms of impact not specified in project aims are covered in section 6.

Sections 7 and 8 draw together all aspects of impact into an overall summary and conclusions.

While intended beneficiaries do, to some extent, 'speak for themselves' throughout this report, farmers do not have that opportunity. Their voices do, however, come through in the reports of two agricultural experts in Annexures 3 and 4.

Annexure 5 has the summarized Curriculum Vitae of the evaluator and contributing agricultural experts.

1. PROJECT BACKGROUND

1.1 PROJECT AIMS AND IMPACT ASSESSMENT

AgShare is an 18-month planning and piloting initiative funded by the Bill & Melinda Gates Foundation. Following the initial convening meeting in Nairobi, March 2010, Michigan State University (MSU) and OER Africa (an initiative of the South African Institute for Distance Education, SAIDE) have worked with African anchor partners in building the foundation of the AgShare Open Educational Resources (OER) collaboration. [2]

MSU serves as the facilitator of AgShare, with OER Africa as the implementing agency. The pilot phase of the AgShare project aimed to demonstrate that cooperation between universities, community organizations and content providers could generate and/or adapt OER to facilitate teaching and learning, particularly at masters' level, in participating agricultural and veterinary faculties /schools, as well as in other universities and farming communities. This aim was premised on the following propositions:

a) Course materials can be created relatively rapidly and cost-effectively in areas of need by harnessing and adapting existing OER rather than developing these from scratch;[3]

b) Deployment of such course materials into higher education programs, if designed according to sound educational principles, can lead to direct and immediate improvements in the quality of the learning experience and thus create enhanced conditions for improving learning outcomes for learners participating in those programs;

c) Where course materials are developed as OER within clearly defined educational contexts, there are immediate and practical opportunities to facilitate their re-use by other university agricultural and veterinary faculties / schools;

d) Actively engaging students in the production of educational materials will enhance their own learning experience;

e) Building structured relationships between academics, students, content suppliers and community-wide partners, such as farmers, farmers' associations/ groups and agri-businesses, to facilitate the creation and sharing of OER, can have positive impact for all parties;

f) Once OER have been created for specific educational purposes (i.e. Master's Degree program) through such structured relationships, it becomes easier and cheaper to re-package these materials for different target audiences (for example, farmers or agri-business) than if one seeks to produce materials separately for each of these target audiences. [4]

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[2] Geith, C., Butcher, N., Vignare, K., Yergler, N., Alluri, K. 2010. 'AgShare Building Community and Content with Multiple Partners'. Project Documentation.

[3] As will be seen, the promise of this proposition did not materialize to the extent that was anticipated. Academics developed their own contextually appropriate OER, with references drawn from open access materials.

[4] 'AgShare Pilot Funding Proposal' (submitted 4/19/20210)

The pilot phase was followed by the 'Global development supplement request form' (16 March 2011),[5] for funding to enable "implementation activities and thorough impact research in order to analyze these impacts" (p.5). Funding was approved for implementation and impact assessment during the period April – 19 December 2011.

1.2 PROJECT LOGIC

Although impact is self-evidently dependent on the achievement of project activities, outputs and outcomes, the present document does not delve into the detail of project implementation. For the record, however, it is clear from progress and other reports in the communal 'Dropbox' facility that, despite delays, the project plan (see Annex 1) has been enacted.

Impact assessment is best viewed against a backdrop of project logic. The premise of AgShare is outlined in project documentation arguing that, for the foreseeable future, the agricultural sector within most of sub-Saharan Africa will remain the main engine of economic growth, development, and livelihood. [6]

A striking feature of the rationale for AgShare is its needs-based logic. Bold and innovative agricultural development is obviously needed to help move smallholder farmer families from a low-skill, manual, labour-intensive industry to farming as a knowledge-intensive, networked sector. For this to happen, higher education must build research, training, and outreach programmes that are responsive to demands for innovation in the "new agriculture". At present, however, agricultural education is beset by a gulf between classroom teaching and the kind of field-based research that could inform steps to impact positively on farming practices. University teaching and research suffers from a similar disconnect in relation to other stakeholder bodies within agricultural value chains.[7]

These are the challenges the AgShare project sought to overcome through its strategy for the creation and co-creation of purposeful agricultural knowledge within and across stakeholder groups. OER provide an appropriate methodology, as reflected in project propositions a) to f) in 1.1 above. By their very nature, OER are intended to be shared, modified, and made freely available through learning networks.

Consistent with this logic, the project commenced with the identification of suitable universities as anchor partners. Host institutions for two of the pilots were recommended by the directors of two well-established African university consortia managing the curricula of regional masters' degree programmes in agriculture: the Collaborative Masters Programme in Agricultural and Applied Economics (CMAAE); and the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM).

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[5] submitted to the Bill and Melinda Gates Foundation

[6] 'OER Background summary for partners' (Project documentation, citing the World Bank's *2008 World Development Report: Agriculture for Development.*)

[7] Allen, D. W., Ochs, M.A. (2008). *Building pathways out of rural poverty through investments in agricultural information systems*. Cited in Geith et al, op. cit.

Project strategy for engaging potential university partners in the AgShare project was via circulation of a needs assessment questionnaire examining the unmet needs of different postgraduate programmes in agriculture. [8]

1.3 FOUR AGSHARE PILOT PROJECTS

The AgShare identification and planning process resulted in the commitment of four universities to the project, namely:

- Haramaya University, Ethiopia
- Makerere University, Uganda
- Moi University, Kenya
- United States International University, Kenya.

These partner institutions implemented the following four distinctive pilot programmes.

(a) Collaborative Master of Science in Agricultural and Applied Economics (CMAAE)

The appropriate faculties at Moi University and Haramaya University developed commodity-focused case studies for use in the CMAAE course 'Agricultural marketing and price analysis'. Cases focus on the 'Economic Role of Prices and Approaches to the Study of Agricultural Market Marketing' for Maize in Kenya (Moi University), and Coffee in Ethiopia (Haramaya University).

(b) Agricultural Information Communication Management (AICM)

Located in the RUFORUM master's curriculum, the other project managed by Haramaya University has similar potential for network-wide adoption and adaptation. The focus on extension activities is evident in the title 'Perspectives in Agricultural Extension'.

(c) The Dairy Value Chain

OER materials developed by the Faculties of Agriculture and Veterinary Medicine at Makerere University have focused, respectively, on improving milk production and the marketing of milk and allied products.

(d) Agribusiness Model for Farmers and Farmers' organizations

The United States International University (USIU) has developed five case study-based modules aimed at developing farmers' capacity to shift from subsistence farming to farming as a business enterprise. In this sense, in contrast to the focus on MSc in other universities, USIU focused on the undergraduate level. The wide range of commodities dealt with in the various modules include: dairy, tree seedlings, maize, beans, traditional vegetables, tea, tomatoes, bananas, passion fruit, tobacco, millet and peas. Case studies were developed through collaborative field-based research involving the USIU business school, agriculture universities and community-wide partners. A further difference with other participating universities where graduate students were key in generating data and case material, USIU used undergraduate students. The pedagogical model and the OER development process have the

[8] 'AgShare Pilot Phase Proposal Final Draft submitted 4 19 2010'. Project documentation.

potential for an entirely new agribusiness curriculum.[9]

For purposes of this report, identifying the projects by the name of their host institution is potentially misleading as two separate pilot projects are based in Haramaya. The following less personalized 'shorthand' terms are used to delineate the four pilots:

(a) CMAAE (Maize) or (Coffee)

(b) AICM (Extension)

(c) Dairy Value Chain

(d) Agribusiness for Farmers.

1.4 THE DISTINCTIVENESS OF THE FOUR PILOTS

Commonality across the four pilots is found in

- their focus on major national agricultural enterprises that have critical regional significance
- the selection of participating universities on the basis of their institutional suitability and resilience to manage project implementation.

The most notable commonality, however, is what makes AgShare itself distinctive as a project. All projects commenced with site-based research into farmers' practices and needs. Master's students, (or undergraduate students in case of USIU) who had the benefit of working closely with their faculty supervisors, carried out this research. Their case studies also came to involve other relevant community-wide partners within respective value chains. This research-based underpinning was crucial to the development of multi-media learning packages for incorporation into masters' programmes, as well as for feedback to farmers. The latter was achieved by follow-up visits using simplified aspects learning materials (referred to as "soft materials" by one project manager)

The research-based nature of the four pilots is the essential common background to the present report.

Differences across the four pilots were a consequence of AgShare respect for institutional autonomy and the importance of participants building pilots in line with institutional ethos, priorities, strengths and constraints. Two of the Project Coordinators also noted that across participating institutions (which "are unique") there were different understandings of the project, and that more initial interaction would have been welcome. Nonetheless, project planning had always viewed differences across pilots as an asset that would allow the core AgShare team to implement and monitor a range of different approaches for authoring, sharing, customizing and using OER to strengthen MSc agriculture curricula.

Table 1 reflects key aspects of institutional roles within the project.

[9] Geith, C., Butcher, N., Vignare, K., Yergler, R., Alluri, K. et al. 2010 AgShare: Building Community and Content with Multiple Partners (Project documentation)

Table 1: Four distinctive pilots within the project

Note: materials referred to in this table are available for viewing or downloading at http://www.oerafrica.org/agshare/PilotProjectsandResources/tabid/1543/Default.aspx [10]

Pilot projects	Multi-media learning packages produced for MSc students	Materials for farmers and farmers' organizations
1. CMAAE **(a) Maize**	20 hour case study unit '*Agricultural marketing and price analysis'*	Feedback was given to farmers at a two-day workshop. Posters and brochures for the farming community are being prepared.
(b) Coffee	20 hour case study unit '*Agricultural marketing and price analysis'*	"Community version" of the unit has been translated into local languages. Thirty farmers have received training together with the Handbook and video materials.
2. AICM (Extension)	48 learning hour unit in '*Perspectives on Agricultural Extension'*	Farmers requested video-based materials, not posters. Text/ narrative requires translation into local languages.
3. Dairy Value Chain	27 learning hour unit *'Dairy products quality and safety'* 45 learning hour unit *'Agricultural marketing* [11]	Brochures have been translated into local languages and between 50 and 60 farmers have attended successive training sessions. Certificated courses in skills development are offered through AFRISA (see 6.3.2)
4. Agribusiness for farmers	No materials were developed for USIU students.	Five sets of interactive paper-based materials have been produced and used in farmer training. These interactive materials are on CD-ROM and the OER Africa website. • 'Structure of Agriculture & Agricultural Policies' • 'Economics of the Firm' • 'The Entrepreneurial Perspective' • 'ICT in Support of Farming' • 'Sustainable Agriculture'

These chosen roles reflect different strategies in relation to the development of OER for students and farmers.

In the CMAAE (both Maize and Coffee), as well as the AICM, the main institutional priority was to develop and refine multi-media learning materials for their own students. 'Downstream' or 'trickle down' effects to farmers was very much more of a follow-up activity. Also, the focus here was naturally

[10] Two further resources, a situational report and a baseline study are also available on the same website.

aligned with the disciplinary character of the units offering the modules, these being the Department of Economics and Agricultural Resource Management and the School of Agricultural Economics and Agri-Business Management in the CMAAE Maize and Coffee pilots respectively. Aspects of farming related to marketing are accordingly more strongly represented than the more technical aspects of production concerned with higher yields and improved quality.

In the 'Dairy Value Chain' pilot, the development of learning materials for students has been integrated and runs parallel with the 'downstreaming' of research findings and recommended practices to farmers. With both Faculties of Agriculture and Veterinary Medicine being involved, all aspects of the value chain – from technical aspects of production through to marketing and to consumers – are integrated.

The 'Agribusiness for farmers' pilot is self-explanatory, and with its five sets of learning materials developed for farmers, is the only pilot that has not been directed at master's students. The corollary of this is that many farmers have been exposed to direct or indirect training in this pilot. The 'Economics module of the Firm', for example, was implemented within the 'Emali' group which has 277 members. [12] The 'Tigania Womens SACCO Ltd' that has received training has 6000 members.[13]

2. METHODOLOGY, DATA COLLECTION AND THE ASSEMBLING OF THIS REPORT

Research accountability routinely demands a description of its methodology. In the present case, the description that follows is more than usually detailed (and perhaps tedious) because of two factors. First, as seen above, institutional pilots adopted different foci and strategies. Second, impact must be assessed across a range of target stakeholders (see 2.1 below).

2.1 PROJECT BRIEF FOR IMPACT ASSESSMENT

Terms of the 'implementation and impact assessment phase' of the project include specification of the approach to impact assessment. Analysis of impact would demonstrate

a) sustainable use of AgShare pilot project outputs and approaches in Master's programmes at participating universities … [with a particular focus on] … the teaching and learning experience for students;

b) take-up and use of AgShare pilot project outputs by other universities;

c) impact of outputs of AgShare pilot projects on farmers.[14]

Impact across these different target groups was to be measured and analyzed in a

> … series of interlinked Impact Assessment Studies, which will aim to record and analyze the impact of the Pilot Activities on: institutions, academics, students, farmers, farmer's organizations, and other key stakeholders. A detailed Impact Assessment will be co-created between the pilot leads and two external specialists – an education specialist and an agricultural specialist. These experts will also lead the Impact Assessment. It is expected that each pilot will participate actively in the Impact Assessment activities in supporting its design, helping with data gathering, and conducting internal assessment activities

[12] Emali (WRUA) Agshare Field Report, 19 August 2011.

[13] Tigania Womens SACC AgShare Report, 22 August 2011.

[14] 'Global development supplement request form' (16 March 2011), p. 5

(supported by the experts as appropriate) to complement the external activities. This will help institutions to build capacity to conduct meaningful impact assessment beyond the project. The assessment leaders will complete a design of impact study before commencement of extension phase. In collaboration with the pilots, the leaders will conduct necessary primary research (field visits, observations, interviews, focus groups, data analysis, expert materials review, etc) in order to assess impact of AgShare project outputs and processes against original objectives set out in pilot plan.[15]

2.2 THE PLANNED STRATEGY FOR IMPACT ASSESSMENT

As background to the strategy for assessing impact on teaching and learning, it is noted that the Baseline Study[16] completed at the end of 2010 provides an analysis of academic staff opinions on the adequacy and availability of textbook and journals in use prior to AgShare. However, the Baseline Study was not based on a methodology that would enable a pre- and post-test approach to measuring AgShare impact. Even if it had aimed at doing so, it would not have been possible, within the project timeframes, to carry out a valid and reliable set of pre- and post-tests.

An impact analysis strategy was accordingly developed *de novo*. For impact on teaching and learning, this strategy relied on key participants recording observations on the basis of agreed categories and criteria. It was intended that emerging insights be shared with colleagues and the external consultant on an ongoing basis. These insights would be clarified and consolidated when the consultant visited institutions in late 2011.[17]

In the event, this envisaged participatory approach did not materialize. This issue is discussed in more detail in section 2.4, but the fact of non-participatory data generation necessitated a revised interview strategy for assessing project impact on teaching and learning.

2.3 THE REVISED AND FINAL IMPACT ASSESSMENT STRATEGY

Different techniques were necessary to assess AgShare impact on the three layers of the project, namely: teaching and learning, project 'take up', and farming practice. These are outlined below. Supplementary data were drawn from project documentation in the AgShare 'Dropbox', and the OER Africa website yielded valuable insights.

2.3.1 TEACHING AND LEARNING

Instead of the classic longitudinal 'before' and 'after' quantitative measures, the impact study relies on participants' accounts of their own 'before' and 'after' AgShare experiences. These accounts were provided in interviews that took place on site between 27 October and 11 November 2011 (for names of

[15] 'Global development supplement request form' (16 March 2011), p. 6

[16] AgShare Baseline Study Report (Revised Draft), 24 December 2010

[17] The instrument was developed through the following process: A draft design was circulated amongst key AgShare stakeholders on 24 April 2011. Seven responses were received, covering both substantive and editorial issues. Stakeholder suggestions were incorporated into a second draft that was circulated amongst stakeholders on 10 May. As no further changes were suggested by 7 June, the second draft was accepted as a basis for the 2011 impact assessment.

interviewees, see Annex 2). When interviewed, academic staff and students (both student-researchers who helped create the OER and students who studied the OER) were invited to comment, in an open-ended way, on their experience of using the new multi-media OER. Responses were recorded in note form, with as many key utterances as possible being recorded as quotes. Table 2 outlines the approach to eliciting perceptions and provides the number of respondents in each category.

Table 2: Improved teaching and learning

Participants	**Open-ended interview in which participants described their experience of working with the OER in contrast with 'conventional' teaching approaches. Main issues and probes:**	**Number interviewed**
Students involved in research that informed the module	• Comment on the possible benefits or disadvantages of working in the field with experienced faculty staff or your supervisor. • Has your understanding of research, or teaching, or of the farming community and value chains changed as a result of your research on farms and your OER experience?	11 students
Students who experienced the multi-media OER module	• Did your experience of the OER differ from your experiences of more conventionally taught modules, and if so, what were the differences? • What did these differences mean in terms of the effectiveness of learning?	11 students in 2 focus groups
Academic staff involved in the research and development of the OER and / or teaching the module	• Did your experience of the OER differ from your experiences of more conventionally taught modules, and if so, what were the differences? • Has your OER experience had any implications for your understanding of research, or teaching (or your sense of identity, as a teacher), or of the farming community and value chains?	12 academics
Project coordinators / managers, and deans	• Has the project impacted on staff and students in positive and/or negative ways? • Has the project resulted in any form of institutional change or thinking about institutional issues?	7 academics

Data analysis began with a content analysis of interviewees' responses.

In the case of student-researchers, reported benefits are categorized and listed in rank order in section 3.2.1 below.

In the case of students who studied OER, emerging categories of judgement are listed in Table 6 (see section 3.2.2) and mapped onto a template of 'exemplary' teaching practice. The content of this template is obviously critical to the credibility of conclusions reached in respect of AgShare impact. It is acknowledged that any such model of exemplary practice would be open to contestation. Nonetheless, the following three sets of theories drawn from different aspects of the teaching and learning process each enjoy widespread if not universal acceptance. While theorists may argue about their relative emphasis, and may argue for the inclusion of other kinds of indicators, it is very unlikely that a serious argument would be raised to *exclude* any of these tenets from a list claiming to be trustworthy indicators

of exemplary teaching practice. The three theories serving this purpose cover the context of learning; the teacher/student relationship; and the structure of curriculum.

(a) The context of learning

'Situated learning theory', developed and refined in the world of work and in the literature, has gained widespread recognition and support. In contrast with most classroom learning activities that typically involve abstract knowledge, dealt with out of context, Lave and Wenger[18] argue that learning, as it normally occurs, is embedded within activity, context and culture. It is also often unintentional rather than deliberate.

Knowledge, therefore, should be presented in authentic contexts, in the kinds of settings and situations that would normally involve that knowledge. Meaningful learning takes place when learners become involved in, or are aware of a 'community of practice'. Communities of practice are groups of people who share a concern (or a passion) for something they do and learn how to do it better as they interact regularly.[19] The value of the concept in the context of AgShare arises from the fact that farmers are at the beginning of value chains that may include, for example, the storage and transportation of goods, formal grading of the quality of the product, and the role of marketing agents and retailers. Students of agriculture need to develop a holistic understanding of inter-relationships between agents in the various value chains.

(b) The teacher/student relationship

From situated learning theory it follows that social participation and interaction is an essential component of situated learning. This view of the teacher / learner relationship is also supported by influential theorists like Dewey, Piaget and Vygotsky, whose collective work on how students learn is primarily responsible for universal acceptance (in theory, at least) of the principle of participatory, interactive, student-centred learning.

(c) The structure of curriculum

Curriculum content should obviously be up-to-date and relevant, and indeed it is very likely to be exactly that when it is drawn from communities of practice. Purposeful curriculum design is required to present this knowledge in a way that makes its structure and outcomes clear to students. Modes of presentation should allow for problem solving and debate (consistent with (a) and (b) above); and there should be scope for teachers and students to exercise control over the *sequencing* and *pacing* of content.[20] In

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[18] Lave, J. and Wenger, E. 1991. *Situated Learning: Legitimate Peripheral Participation*. Cambridge: Cambridge University Press.

One notes that communities of practice may vary from small groups of individuals informally pursuing common interests, to 'virtual' online communities pursuing more formal agendas. 'HIF-net', for instance, is an e-discussion list with approximately 1250 members from 130 different countries. It is community of practice that provides a neutral focal point for discussion of issues relating to the practice of access and use of information by healthcare. *http://journal.km4dev.org/index.php/km4dj/article/viewFile/9/4* (accessed 20 January 2012)

[19] http://www.ewenger.com/theory/index.htm (accessed 25 November 2011)

[20] These and other curriculum concepts are owed to the seminal work of Basil Bernstein, particularly in Bernstein, B. 1996. *Pedagogy, symbolic control and identity: theory, research, critique*. London: Taylor and Francis.

other words, students should have opportunities to learn at a pace suited to their individual levels of understanding; and they should ideally be able to return to earlier concepts, or to jump ahead of the planned sequence, again in line with their own learning needs and interests.

Students' assessments, suitably aligned with curriculum structure and module aims, should be formative and developmental as well as summative. Assessment criteria should be clear to students.

2.3.2 OER 'TAKE UP' BY STAFF IN OTHER DEPARTMENTS/ FACULTIES AND IN OTHER UNIVERSITIES

In AgShare institutions, staff not involved in the project but who had attended OER workshops were interviewed; those from other institutions who had attended OER 'showcasing' were contacted by email. The broad questions put to them, and the numbers of staff interviewed or emailed, are listed in Table 3.

Table 3: Questions to determine OER 'take up'

Academics who had attended advocacy workshops	**Interview or email questions**	**Number interviewed or contacted**
Staff in participating universities	• What were your initial impressions of the multi-media OER approach to teaching? • What are the key differences between this approach and more conventional teaching approaches? • Would you consider using the OER approach?	8 individual interviews; 2 focus group interviews with 11 staff (i)
Key academics in other universities	• What were your initial impressions of the module you have seen demonstrated? • Are you likely to use this OER module? • Are there any possible obstacles to your using this module (either in its present or adapted form)?	Email requests for information were sent to 19 academics at 5 universities.(ii)

Notes on sample size:

(i) Advocacy workshops within partner universities took different forms, and not all were in a position to provide exact numbers of staff attending these. With an overall estimated 80 academics exposed to advocacy workshops, the total of 19 who were interviewed represents a 24 % sample.

(ii) Advocacy targeted at other universities took so many varied forms – including conference presentations – that it is not possible to arrive at a credible total of those exposed to OER advocacy.

2.3.3 AGSHARE IMPACT ON FARMERS AND THE BROADER AGRICULTURAL COMMUNITY

Two interview schedules were drawn up to capture project impact on farmers.

Because of the specialized nature of the Dairy Value Chain pilot that involved the contribution of two

separate faculties, an agricultural expert with extensive relevant experience was contracted to compile a dairy-specific questionnaire.[21] This instrument was trimmed down by Makerere staff in light of their knowledge of which questions would be most applicable to the farmers they had worked with.

An agricultural expert in community farming initiatives[22] constructed a more generic questionnaire to capture impact on farmers in the other AgShare pilots.

Master's students under the supervision of faculty staff administered both interview schedules. The picture of data collection is shown in Table 4.

Table 4: Data collection on AgShare impact on farmers

Pilot	Interview data Total number of farmers interviewed = 52
Agribusiness for farmers	(a) Students' reports on visits to 5 farms (each reporting on a different module of study) (b) A focus group discussion with 6 farmers on the USIU campus
AICM (Extension)	4 focus group discussions with a total of 19 farmers
CMAAE (Coffee)	Individual interviews with 10 farmers
Dairy Value Chain	Individual interviews with 12 farmers

2.4 Strengths and Limitations of this Impact Assessment

The most notable weakness of this impact assessment arises from the fact that data generation was not participatory. The revised strategy for assessing impact came about simply because (a) OER multimedia resources took longer to finalize than planned [23], and (b) OER implementation had to be infused into fixed university academic cycles. The extreme case of the CMAAE (Coffee) OER module commencing only two weeks before the consultant's visit illustrates why participatory evaluation was not possible. "Premature" was a recurring theme in respondents' comments on impact analysis. Delays in opportunity for offering the OER modules to students also had 'downstream' effects on opportunity to adapt materials for farmers, and to 'showcase' the module at other universities. Some 'showcasing' or advocacy workshops have been possible (see section 4), but are so recent[24] that immediate impact cannot be expected.

Other reasons for delays were mentioned, such as delays in accessing supplementary project funds. One

[21] For CV, see Annexure 6b

[22] For CV, see Annexure 6c

[23] Many of those involved in materials production more widely will argue that this activity almost always takes longer than expected. In the present case, reasons for delays are twofold: (a) contextually suitable OER for adaptation were not as readily available as had been anticipated, and (b) with staff being new to materials production, it was necessary for project management to provide more project support than anticipated.

[24] For example, an advocacy workshop was held at Nairobi University, 7 December 2011.

Dean also observed "there is the university way of doing things, and the project way of doing things." His point was that the two are not always in easy alignment. Whatever the combination of causes, the effect of OER modules being offered later than planned is that insights into impact were based on retrospective judgements offered to the consultant, on site – rather than on ongoing, generative impressions shared between academics and the consultant in parallel with the offering of the OER. In turn, this undoubtedly implies that the present impact assessment could have been based on a richer, more developed set of data.

Nonetheless, site visits were extremely productive. This was because after having been somewhat guarded in the numerous exchanges prior to the site visit, project managers[25] arranged full sets of interviews for site visits, and all those interviewed communicated their views thoughtfully, openly, and in the opinion of the consultant, sincerely.

All in all, despite the non-participatory nature of the exercise, it is the consultant's view that this impact assessment is based on representative, credible sets of data. In this sense, the present report is offered with confidence.

3. PROJECT IMPACT ON LEARNING AND TEACHING

3.1 BACKGROUND: THE MULTI-MEDIA LEARNING MATERIALS

All stages of materials development rooted in research in the field were fully supported by OER Africa and MSU. Examples of some of resources in the Project 'Dropbox' folder include:

- Creating Course Modules in Agriculture: Using Free Online Resources (a Power Point file)
- AgShare Resource Guide: Freely available academic readings to supplement course modules[26]

The Resource Guide in particular played an important role in reinforcing the concept of OER as well as in generating a notion of the possibility of OER as a viable way of improving teaching. In a more practical way, it led to provision of useful additional references for students' reading (see also 8.2 below).

In response to institutional needs and requests, there is evidence of extensive 'hands on' AgShare support offered by expert materials developers. The result is a set of high quality[27] multi-media OER on the OER Africa website.[28] While the quality of available OER does not allow conclusions to be drawn about their actual impact on teaching and learning, the latter certainly depends heavily on the former. A brief overview of the typical AgShare OER structure may thus provide a helpful background to

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[25] called 'coordinators' or 'administrators' at some sites

[26] http://www.oerafrica.org/ResourceDownload.aspx?assetid=2328&userid=1 This resource guide is a compendium of the individual handbooks that were prepared for the AgShare university partners. It is subdivided into sections, such as lecture materials, student readings, websites, and video.

[27] The notion of 'high quality' refers more to well-structured, research-based content and effective pedagogy than to flawless editorial presentation. By their very nature, OER tend to be 'work in progress'.

[28] http://www.oerafrica.org/agshare/PilotProjectsandResources/tabid/1543/Default.aspx

consideration of impact. The OER covering the first topic of CMAAE programme Agricultural and Price Analysis (CMAAE, Maize) represents a suitable example as the voices of students who had experienced this module are also captured in the analysis below (see 3.2.2 below).

The CMAAE (Maize) OER commences with the clear objective of providing a "theoretical and empirical basis for evaluating agricultural market organization and performance". The promise of blending theory and practice – in the form of case study research - is fulfilled in the five sections that follow. Each section is clearly mapped out with projections of study time to guide students' study plans.

Sub-module 1 (Economic role of prices) begins with the theory of pricing functions (distributive, allocative, signaling, and so on). A video taken in the field illustrates the distributive and signaling functions. Students are then introduced to a map of Kenya showing maize surplus and deficit areas. This leads them into the task of identifying, with reference to relevant theory, reasons why areas of deficit have occurred and how the government has intervened. This in turn leads to a further task carrying an evaluation weighting of 8 marks: "Create an annotated poster to teach the application of the price function to policy makers and to traders using the map and your interpretation". Finally, in an exercise demanding the application of theory in practice: "How would you as a student of marketing advise the government together with farmers and traders in the maize sub-sector to deal with the following problem of maize pricing and distribution highlighted in the next 7 articles?" The articles comprise short excerpts from current media reports, newspaper controversies, weather predications, and other factors impinging on maize production. Additional references for reading include online Creative Commons-licensed works and hyperlinks to articles and other relevant resources drawn from the AgShare Resource Guide.

This OER formed part of a formal faculty Curriculum Review process that served a dual purpose of peer review and inducting other staff into OER. Exchange visits with the Haramaya group that was teaching the same theory in the CMAAE (Coffee) module served as a form of external peer review.

In an influential modification of Bloom's (1956) celebrated work, Anderson and Krathwohl (2001) provide a taxonomy of six ascending levels of cognitive development: remembering, understanding, applying, analyzing, evaluating, creating. This taxonomy is useful for identifying skills needed for both critical and creative thinking. The potential for developing all of these is evident even in such a brief overview as that of the CMAAE sub-module above.

As a prelude to an analysis of students' experiences, we note that the 'twin' CMAAE OER on coffee has a similar structure as its counterpart for maize.[29] It is developed around five case studies which track the value chain from producers through to co-ops, traders, quality assurance agencies, marketers, and consumers.

3.2 IMPACT ON STUDENT LEARNING

The project impacted on student learning at two different levels: First, the students who conducted the research with academic staff in the process of creating OER experienced impact as *researchers*. Second,

[29] OER developers from Moi and Haramaya worked together closely.

students doing coursework that relied on the OER that had been developed experienced impact as *learners* or users of OER.

3.2.1 OER IMPACT ON STUDENTS AS RESEARCHERS (OR CREATORS OF OER)

Masters' students carrying out the case study research on farms certainly brought key benefits to the project. In the Dairy Value Chain project they were described as "drivers" of the case studies. All had been carefully selected on the basis of their skills being fit for particular purposes. Thus while most were in the field of agri-business or general business administration and marketing, one who played a central role in compiling and editing reports needed for USIU's projects with farmers was a specialist in journalism.

The eleven student-researchers interviewed on site visits provided clear evidence of the way their experiences had benefited their studies as well as their personal growth.

First, they had gained a much broader and more contextually relevant understanding of specialist fields they had previously encountered only as abstract background to their theoretical studies. In addition to the actual practice that they were researching (e.g. maize, coffee, or dairy) they commented on their new understanding of the interlinked nature of systems such as farming and transport. Against an even broader contextual setting, several noted that, having grown up in towns, they had now come to understand what rural life really was. One commented on how his stereotypical images of farmers had been dispelled. There were two clear instances of impact on personal career plans. The student of journalism had begun moving into specialization on environmental issues, and a fourth year International Business Administration (Marketing) student now plans to go into farming. "Passing exams doesn't ignite our passions." Meeting a woman producing 300 litres of milk a day, which she had costed at 28 KSh per litre, did. Using the Agshare methods from the 'Entrepreneurship' module he was able to show his digital plans for dairy, chicken and passion fruits production.

Second, AgShare experiences had enhanced the formal curriculum by providing an internship or work-placement experience that may not have been a formal curriculum requirement. Student-researchers reported the value of seeing concepts in action. Theory and practice thus came together in a way that their classroom-bound peers would not have experienced. The student of journalism was particularly eloquent about the advantages of having been able to conduct interviews, make recordings, take photographs and write reports - for real clients.

Third, as researchers working in the field with experienced researchers – their lecturers – they had experienced a privileged induction into research. The merits of apprenticeship in research are widely acknowledged in the academic world, and in the RUFORUM universities, supervisors are indeed actively involved in their students' research. However, because of constraints of time and staff/ student ratios, this practice is not always followed in higher education more generally. The difference in the AgShare model is that it systematizes and makes the supervisor/ student relationship more fully developed. AgShare student-researchers affirmed the value of their research 'apprenticeships'.

Fourth, student-researchers had become part of a community of practice. Several commented on how much they had learnt from the informal contact with staff while travelling together and getting to know them as individuals and as researchers. "In class, we were teacher and students"; in the field we were

colleagues". Students within the same pilot also benefited from working together closely, and this is particularly true of the two students who were doing complementary work in maize and dairy within the CMAAE (Maize) pilot.

Fifth, student-researchers cited ways in which their personal skills and growth had been enhanced. These include learning to access open and other resources; confidence in interviewing and writing skills; social skills in dealing with other stakeholders; and learning to work in a team.

Sixth, as an outcome of the above, some student-researchers reported having been initiated into formal scholarly publication other than a dissertation. The Abstracts of the two CMAAE student-researchers referred to above, for example, are appended to the multi-media package to which they contributed; and their counterparts in other pilots have their research suitably acknowledged in the relevant OER. Publication in the open domain is at least a modest step towards writing for peer-reviewed journals.

Table 5 reflects the number of students whose personal accounts included open-ended mention of the impacts described above.

Table 5: Summary of impact on student-researchers

Impacts reported by student-researchers	**Number of students reporting this impact** **(No. of students = 11)**
Enhanced specialist knowledge within the context of the relevant value chain	11
Benefit of 'work-placement' experience in developing understanding of theory and practice	9
Apprenticeship into research	8
Membership of a broader community of practice	7
Personal growth and skills	7
Initiation into publication of research	4

Overall, the evidence strongly suggests that the student-researchers had reached the highest level of cognitive development in Anderson and Krathwohl (2001, above) taxonomy: knowledge creation.

3.2.2 OER IMPACT ON STUDENTS AS LEARNERS (OR USERS OF OER)

Of all perceptions on the new OER modules, it is those of students that have most potential to inform judgements on impact. On the one hand, the sample of students is not as large as one would have liked. At the time of the research visit, the AICM students at Haramaya were on vacation, and those at Makerere were in the field.

On the other hand, the two focus group interviews with students in the two CMAAE modules provide a solid, complementary basis for insights into impact. Those at Moi were part-time students in full-time employment in sectors that represent the spectrum of maize value chain. This group comprised a marketer, a planning officer, a district agricultural officer, and a public officer in agri-business. While this group was thus well placed to offer mature judgements as both students and employees in the relevant sector, Haramaya students presented the more uninhibited, pure 'student' voice. The fact that there was accord across the views of these two distinctive groupings, as shown in Table 6 below, lends a measure of confidence to inferences that are drawn. Also, to strengthen the validity of individual views expressed by students, the consultant invited and sometimes provoked their colleagues to disagree. The consultant also challenged a number of judgements by asking if the appeal of the OER was not simply one of novelty. Students disagreed with these suggestions and challenges. Overall, student responses impressed the consultant with their maturity. Favourable comments were often justified by thoughtful reasons on why the OER had resulted in meaningful learning. Responses went far beyond students simply 'liking' or enjoying the module.

One may thus have confidence in accepting the paraphrased views and quotes in Table 6 as consensual.

Table 6: Student perspectives on the multi-media OER modules (Maize and Coffee) in the CMAAE

Maize module (6 students in focus group interview)	**Coffee Module** (**5** students in focus group interview)	**Indicators of exemplary teaching and learning**
(a) The context of learning		
The materials are "genuine" – from Kenya, not the USA, where many textbooks originate (the latter are "unreal because of mechanization" and the scale of farming). "I knew it was real because I recognized some of the farmers in the video!"	In the module we encountered "real problems that open your eyes about our country" ….. This is "inspiring".	Content is developed in authentic contexts
You don't only listen and possibly read – you see, and listen to other voices.	The source of knowledge is not just the textbook and teacher – "you can see stakeholders and hear their voices".	Learners are introduced to a 'community of practice'
We gained real insights from the field. Theoretical concepts "came alive".	There was much more "application of knowledge than we are used to."	Theory is linked to practice
(b) The teacher/student relationship		
We were "seeing, not just listening" and could make inputs. Classes were "exciting, very lively".	Your views and opinions are heard.	The teacher interacts with students. The student voice is heard.

We saw how farmers' practices were part of inter-related systems. Problems are "more complex than on surface". Solutions are not easy and there can be "winners and losers" in the value chain.	Problem solving was "good preparation for the dissertation". The way we learnt was "kind of research style" and we came across "researchable" topics.	Problem solving and debate
(c) The structure of curriculum		
Topics and issues had "a flow".	The sections are "well ordered".	Course design makes structure and outcomes clear
I can still see the farmer and remember his words [from the video]. Relevant online materials are "much easier to access than the library".	References are online, easily accessible, and at no cost.	Access to supplementary resources and readings
	"I read the guide before class so I could debate!"	Students and teachers can adjust *sequencing* of topics
We can learn "when we want, where we want".	An integrated package gives us "learning options"	Students and teachers can adjust *pacing* of content
	Assessment is different. It's not just "paper tests". Participation and contributions in class "count".	Formative as well as summative assessment
Assignments "sprang" from the case studies	"We know where the questions come from."	Assessment is aligned with module structure
		Assessment criteria should be clear to students.

A striking feature of this table is the extent to which student judgement corresponds with the theoretical indicators of exemplary teaching. Only the last indicator – the clarity of assessment criteria – is not evident in either set of student accounts. It is, however, a somewhat abstruse, perhaps even esoteric indicator, and it may have been implicit in students' other comments on assessment. Certainly, the categories above are not mutually exclusive.

An unintended consequence of the OER was the impulse it provided for students to discover how much information is available on the Internet. Several commented on how their 'search' skills had improved simply through practice using keywords. Without using the term, student accounts of their personal growth, as students, suggested that the OER had helped build their capacity for personal lifelong learning. An interesting illustration of this was provided by an academic at Moi. The first knowledge he had of his OER being posted on the OER Africa website was when one of his students, citing information from it during class discussion, told him it was there.

Not surprisingly, students' overall comments on the OER were strongly favourable. No student disagreed with the fact that the OER module had presented a completely "new" or "unique" approach to teaching, and a number expressed the hope that all modules might be like this one. A former student and now a newly appointed member of staff expressed the wish that he had been taught in the "OER way".

Because students drew such a clear distinction between the OER experience and what they called 'traditional' or 'normal' teaching, they were invited to volunteer a score out of 10 for the effectiveness of each mode of teaching and learning. Each submitted their scores privately to the consultant before scores were totalled and announced. Scores are shown in Table 7.

Table 7: Scores for student assessment of the effectiveness of two modes of teaching

Module	**Score for effectiveness of 'normal' method of classroom teaching**	**Score for effectiveness of the multi-media OER approach to teaching and learning**
CMAAE (Maize) (6 students)	Total $^{26}/_{60}$ = average **4.3**	Total $^{49}/_{60}$ = average **8.2**
CMAAE (Coffee) (5 students)	Total $^{28}/_{50}$ = average **5.6**	Total $^{41.5}/_{50 =}$ average **8.3**

Even though these were obviously crude 'ballpark' scores, students appeared to find the exercise meaningful, and more importantly, it led to further questions and justifications regarding judgements on OER impact. The clearest signal from this discussion is that the difference was *radical***.** Given the uniformly laudatory comments on the OER experience, students were asked why their scores fell short of $^{10}/_{10}$, and what could be done to improve the modules. The response from both groups was similar: "Our lecturers never give us 100%!"

3.2.2 Academics' perceptions of OER impact on student learning

Next to students, it is the academic staff involved in developing and offering the OER who have the most pertinent views on their impact on teaching and learning. Staff who had taught the same module to different previous student cohorts commented on the fact that with the OER they were teaching the same theories, but now in a way that one described as having made "an immense difference" for student learning. Referring to the OER as a "self-speaking module", another academic commented on how the OER was promoting independent student learning.

Importantly, those teaching the OER module confirmed their own students' views on its effectiveness. This is reflected in the average 'ballpark' ratings three staff provided for the relative effectiveness of conventional classroom teaching as opposed to the OER: $^{6}/_{10}$ for the former; and $^{8}/_{10.}$ These estimates are close to those of their students although, perhaps not surprisingly, the teachers rated conventional classroom teaching a little higher than did their students.

3.3 OER IMPACT ON TEACHING

While academics offered brief generalizations regarding OER impact on their current students, they offered much more expansive comment on how their OER experiences had brought about changes in the way *they personally construe their practices as teachers.*

Adinew (2011) maintains that

> … the teaching-learning approach in the MSc programs of most African universities has some serious limitations. Generally, it can be described as: entirely theoretical (with no or little practical aspect); chalk-and-talk (with no supplementary teaching materials); and most of all, it is textbook-based that uses books that are published in the context of Western Developed countries.[30]

The normative, default approach to teaching, as described by academics involved in the AgShare project (under such labels as the "classical model"), is very much in accord with Adinew's analysis. This is was evident in staff observations such as

- "I used to give lectures and the exam. Now it's interactive, participatory."
- "I always just taught the theory. That's how we were taught."

Taken-for-granted practices of the traditional or 'classical' kind are indeed powerful. They seem 'natural', just like the familiar physical geography of lecture rooms with uniform mass seating for the recipients of knowledge, and the dedicated space, often with specialist equipment, for the purveyor of knowledge. As one lecturer noted, staff are not trained in teaching and so they approach it in ways that are familiar, safe, and accepted as 'normal'. If they come across different teaching approaches, it is "by accident".

AgShare, of course, was no accident. But it has been a powerful catalyst, described by one lecturer as a "role model". The power of modeling a practice is well known, and it underpins staff views on the radically different way in which they now construe teaching. Examples of expressions of change are:

- OER was an "eye opener – completely new to me".
- The module shows "how teaching should be done."
- [The multi-media module has] " … completely changed the way I look at teaching. We are now better teachers and researchers."
- "… an entirely new experience" ….[My understanding of teaching is now] "much richer".
- On the University's new policy of e-learning: "I thought it meant just digitizing lecture notes. Far from it!"

By way of contrast with the 'classical' mode of contact teaching, the paraphrased statements in Table 8 reflect typical staff views on key aspects of teaching to which they now expressed allegiance. These key aspects are the same as those used for depicting student views in Table 6 above. However, a number of

[30] Adinew, G. 2011. The impacts of the Ethiopian Commodity Exchange on Coffee marketing: a Case-Study in Eastern Ethiopia. Case study developed for the CMAAE (Coffee) module.

these indicators have been slightly amended to capture the way in which staff contextualized these issues from a *teaching* perspective. Not all staff utterances are included here, and nor does the list of utterances in Table 8 claim to represent the views of all 12 academics interviewed.[31] It is a list of typical views.

Table 8: Staff perspectives on the multi-media OER modules (from all pilots)

Staff comments (paraphrased) on the assets of multi-media OER	Indicators of exemplary teaching/ learning
(a) The context of learning	
OER cover "the real situation" – a big change from teaching textbook theories that are mainly not contextually relevant. We'd previously bought video clips but didn't use them because these were Argentinian /Australian etc. AgShare brought the local community into scene. The OER case studies are a "blessing". We have a "new understanding of rurality". It's difficult in a normal class to "simulate real life situations". Now we have relevant case studies that include the whole value chain. The community is the starting point - "we can learn from them". Now I don't "rubbish traditional knowledge". Farmers have valid knowledge that one must work with. With case studies we don't have to teach "aberrations. Now it's African-centred." Previously, "theories made reference to hypothetical situations or to overseas examples."	Content is developed in authentic contexts
[Writer's note: Staff were introduced to a number of different kinds of community of practice.] *(a) A community of knowledge producers* Teachers, students, farmers: we're "co-constructors of knowledge". We used to just take technology to farmers. Existing outreach – "nothing comes back". Now we learn from farmers. *(b) A community of actors in value chains* The Ethiopian Commodity Exchange, a government body, had seemed "impenetrable". They grade coffee. But we've had discussions about improving the system with them. Our work with dairy products has led to much interaction and discussion with	Induction into a 'community of practice'

[31] This group of 12 academics includes those who been involved in developing and teaching OER for both their own students and for farmers.

public health officials. *(c) A broader interdisciplinary community* We've worked with staff across disciplinary boundaries e.g. business, agriculture, ICT. AgShare has brought together individuals from different sections of the university, "even across buildings"! The university had failed to merge Veterinary Sciences with Agri-business. There was animosity. Now, working together in AgShare, "we can have a cup of tea together!" Working with farmers has broadened our field with related issues. Environmental issues are big. "A new excitement comes with that."	
My research was always somewhat abstract, hypothetical. I've had "the unique experience" of actually reaching a target audience directly with my research. Sustained contact with the community has brought many new insights and "enhanced normal teaching". I hadn't worked closely with students before. We've overturned the traditional research model with active engagement. We understand problems and suggest improvements. Farmers have a sense of ownership. I've "grown as a researcher". I now have skills and confidence to do online searches. Research-based teaching uses real examples – you can't develop materials on your desktop. We used to get theory from books. Now we get data from the field. "Merge, and something beautiful comes out."	Theory is linked to practice – new understanding of research and research-based teaching
(b) The teacher/student relationship	
The OER has had a major impact on the way I teach. Instead of "dumping textbooks on students", and not listening to them much, now I listen and respect their views. I'd heard of interactive teaching – now I know what it means. "Less time lecturing, more time teaching." I used to come in and "roar at the class, ultimately give them exams. Discourage questions." There's now a much freer, interactive atmosphere and more time to attend to student difficulties. It's interactive. Problem solving together creates trust.	The teacher interacts with students
Students have DVDs with real life situations relevant to theory. They read first, then discuss in class. "Students don't arrive knowing nothing". Class time is about exchanging insights, clarifying issues, debating issues, forming opinions. Case studies lead to questions about issues. Because the teacher or textbook is no	Problem solving and debate

longer *the* authority, students learn by coming to their own conclusions. "Conventional teaching can be dry" because it's so abstract. We must teach concepts like the institutional approach, managerial approach etc. With OER "theory comes to life, we see it in everyday life".	
(c) The structure of curriculum	
I have a new sense of the importance of an integrated, coherent package with additional readings for students. "And of the preparation time necessary to do it properly!" Structuring a module in an OER can take students to "the highest level of conceptual thinking."	Course design makes structure and outcomes clear
OER – an eye-opener bringing a realization of online resources that can be accessed for teaching and for research. I "used the guide extensively." I've got new information literacy skills - framing questions, accessing and evaluating sources, evaluating content, using information legally.	Access to supplementary resources and readings
Students can revisit materials, unlike lectures. This is good for "present learning and lifelong learning".	*Sequencing* of topics can be amended
	Students and teachers can adjust *pacing* of content
The "biggest thing" I've learnt is assessment. At the end of the course I used to "scratch my head" thinking of exam questions. Now, "the questions in the case studies are like a revision preparation for the exam". With case studies, "the questions are already there".	Formative as well as summative assessment
Case studies using video and text are closely linked with assignments	Assessment is aligned with module structure
	Assessment criteria should be clear to students.

Other benefits identified included:

- With reference to project support, staff had added an entirely new capacity to their repertoire of teaching skills: materials development. Apart from its impact benefits, a number of academics commented on how personally rewarding this learning experience had been.
- Two academics observed that although materials development takes more time than one expects it to, OER, once completed, reduces workload by obviating the need for 'lecture preparation'.

An overview of the range of perspectives that emerged leads to a major conclusion:
In stark contrast with the traditional model of classroom-based *lecturing*, the case study-based, multi-media OER have resulted in a major shift in the way academics now construe their roles as *teachers* (rather than as lecturers) and as *researchers*. We are talking about a radical shift in the image of the professional role of an academic. This shift is best viewed against the broader background, where

> In Higher Education, most academics have spent their professional lives specializing in their home discipline, not education. When they stumble upon a new pedagogic approach there is a predictable split between fanatical up takers and equally resistant naysayers.[32]

By contrast, the situation depicted in Table 8 is one of academics 'speaking with one voice'. The fact that this is so is testimony to the powerful logic and appeal of the AgShare model. This emerging academic identity has been achieved at a cost, however:

- At first, "openness was a big concern". This was overcome because it's the "right" way to go. At the end of the day, "personal benefits outweigh the threats."
- "Our work becomes public."
- Learning to have one's teaching materials critiqued is ultimately helpful, but "being criticized is painful!"
- I'm no longer "the master of everything".

4. OER 'TAKE UP' BY STAFF IN OTHER FACULTIES/ UNIVERSITIES

The general view of institutions that impact assessment was premature (2.2 above) applies most particularly to the issue of OER 'take up'. This is not because institutions have not exploited opportunities to 'showcase' their OER. Within their own institutions, and in relation to other universities, they have.

Table 9: OER advocacy and showcasing outside of participating universities

OER Pilot	Nature of advocacy/ showcasing
CMAAE modules (Maize and Coffee)	• OER demonstrated to representatives of 16 members of the CMAAE regional workshop in Swaziland • Maize module demonstrated at Nairobi University
AICM module	Demonstrated to five local universities, and to one in RUFORUM
Dairy Value Chain pilot	Presentations at four regional universities

There is, however, one notable difference between 'internal' and 'external' showcasing. The former can take place and may indeed even be more effective as part of the process of developing multi-media OER. So, for instance, Moi staff not involved in AgShare were introduced to the OER as part of a formal

[32] Editorial, *Journal of Education,* 2011, no. 51

departmental curriculum review process (see section 3.1). External audiences are very different. Understandable 'pride of ownership' means that no academic would normally wish to showcase anything less than a complete, fully developed, reasonably well-edited OER. Strategically it would also seem unwise to showcase anything that is still under development.

'External' showcasing, to date, has accordingly been somewhat cautious. With fully developed OER now in place, and having been tested, institutions are only now well positioned to promote their multi-media materials and the OER concept. Activity recorded in Table 9 took place only in late 2011.

'Take up' impact, to the extent that it can be gauged at present, is outlined below, beginning with progress within participating universities.

4.1 Impact on teaching and learning in participating faculties

Eight academics not involved in the project were interviewed individually, and two focus group interviews were held with eleven such staff in the Department of Rural Development and Agricultural Extension at Haramaya. Focus group participants also submitted short written reports on their impressions of the AgShare OER approach and of its promise. Collectively, these interviews and reports reflect an internal consistency of judgement that is best reflected in the content analysis of written reports in Table 10.

Table 10: Views on OER multi-media approaches as compared to conventional teaching approaches: the views of 'Non-pilot' academics within participating faculties.

Category of judgement	No. of staff expressing this view (total = 11)
OER provide "anywhere, anytime opportunity" for students to learn	10
OER brings together: theory and practice; and teaching, research, and community work	9
Fully integrated multi-media packages provide a better structured curriculum and developmental learning progression	8
Pedagogy can become more interactive, and promote independent student learning	8
Definite personal intention to develop OER	8
Were completely new to the OER concept which was an "eye-opener" and very different to the normative teaching style	7
Saves time for staff	3
Introduces staff to new broader academic communities	2
OER open up new avenues for reference works and supplementary reading for students	2

It is notable that these opinions uniformly reflect OER strengths as compared with conventional classroom teaching. The only other comments were cautions issued by four staff: the 'new' approach needs infrastructure, time, and skills. The fact that eight staff nonetheless expressed firm intentions of developing OER says much about the strength of OER appeal. Two of these staff mentioned that they had already commenced the task. A further four at Makerere also reported having already begun developing their own OER.

As instances of use of existing OER can be difficult to identify, *actual use* may be more prevalent than the two known instances that can be reported here. Staff at Haramaya reported that video clips from the CMAAE (Coffee) OER were being used in undergraduate programmes in the Department of Agricultural Economics, and a former PhD student from Moi was using the CMAAE (Maize) OER in his teaching post at a nearby private university. At the present stage, however, knowledge of 'take up' outside of partner institutions is too incidental to report formally.[33]

Within participating universities, OER 'take up' has thus showed the first signs of moving from aspiration to realization.

4.2 OER 'TAKE UP' IN OTHER UNIVERSITIES

Requests for information with respect to initial impressions and the likelihood of OER use were emailed to 19 academics that had been present at advocacy initiatives and OER showcasing.

Since there were only three responses, these are worth quoting:

> (i) Mr. Samson shared with us the information about the project. But, I have not used it so far.
>
> (ii) We tried to utilized some portion of it since it is more advanced and designed for graduate students.
>
> (iii) As a Staff of Debre Markos University, I am so happy about Open Educational Resource (OER) since it will make our teaching and learning process more effective. So if we can get the opportunity about how we can operate and prepare the material, it is very nice to proceed more. My reflection is so affirmative and in favor of it for the following points:
>
> - It is well organized and approached in simple ways
> - It is nicely contextualized and easy to grasp, the examples are so helpful to easily understand the concepts and theories
> - The audio and video are also a nice teaching and learning aid, it shows vividly the application of the concepts and theoretical knowledge.

After the first round of failure to elicit responses other than these three, further requests – this time from a number of AgShare Coordinators to those who had attended a 'showcasing' event – were equally fruitless.

The same lack of response followed two emails to the Secretariat of RUFORUM that had circulated invitations for 'Expressions of Interest' in respect of assignments that included "Instructional Design and

[33] A separate systemic study of 'take up' could be extremely beneficial to strategies for encouraging further 'take up'.

Uploading 8 MSc AICM Courses."[34] The leading question to the Secretariat was whether the RUFORUM invitation was in any way linked to the AgShare AICM pilot at Haramaya.

This general lack of response might be partly explained by any one or a combination of factors such as email addresses no longer being valid, difficulties in accessing internet, mother tongue language issues, or simple lack of interest. One AgShare project manager was of the view that there is a general "apathy when it comes to reading stuff"; and another, talking of the difficulty of setting up OER showcasing events, observed that it was very difficult "to pin people down".

Thus, while the present impact assessment has strong evidence of positive developments within AgShare partner universities, it is unable to provide substantive evidence of OER 'take up' in other universities. Moreover, indications are that it will be difficult to achieve if academics, for whatever reason, are unreceptive to communications from the 'outside'. Measures to encourage OER 'take up' have thus far been reliant on the personal networks of OER producers. Early evidence suggests that this strategy, on its own, is unlikely to be adequate. Additional 'take up' measures in the form of project-level advocacy would certainly seem to be called for.

5. OER IMPACT ON FARMERS AND THE BROADER AGRICULTURAL COMMUNITY

Only the CMAAE (Maize) pilot is not represented in this section. This is because there have been no further activities with farmers in this pilot since the earlier two-day report back to stakeholders. As posters and brochures for farmer intervention in this pilot are still in preparation, training for farmers in the CMAAE (Maize) pilot has yet to begin in earnest.

However, in quantitative terms, through cooperative groups, AgShare training has impacted directly and indirectly on several thousand farmers. For qualitative considerations, the 52 farmers interviewed in four pilots (see Table 4 above) provide a representative sample of farmers who experienced direct training.

5.1 IMPACT IN THE DAIRY VALUE CHAIN

With 90% of milk production in Uganda being marketed through informal channels, and with the adulteration of milk (with dam water, for example), a reportedly common practice, the need for improved practices is self-evident. The goal of the AgShare initiative was to increase dairy production through improved knowledge and skills in respect of the management of milk production.

Professor Kaneene of MSU is guiding a rigorous scientific assessment of the impact of the AgShare intervention on milk production, diseases that lower reproduction and milk yield (brucellosis and mastitis), milk quality and safety, and agribusiness performance indexes. The final reports are unavailable at the time of writing.

[34] j.apio@ruforum.org (24 October 2011)

Preliminary assessments, however, have indicated improvement in milk quality (as determined by lower total somatic cell count), milk safety (as measured by the prevalence of mastitis and brucellosis), reduced spoilage of milk, and higher prices received for milk and yogurt.[35]

Penultimate draft reports of these detailed quantitative and qualitative studies[36] also provide evidence of improvements with respect to:

- farm management practices
- milk production per cow
- quantity and quality of processed products
- marketing strategies
- farm milk processing, as well milk handling practices like milking from clean places, reduced milk spoilage losses, and milk adulteration.

The report on the judgements of the small-scale farmers in the southwest of Uganda is attached as Annex 3. The following are summarized points from this report:

- Almost half of the respondents had become involved through the Amate Gaitu cooperative or project officer, with the balance having been introduced by friends or family members, the local village chief, by local veterinarians.
- Over 90% of respondents had hoped to learn more about dairy production systems, with the balance hoping to learn more about ways of adding value to the commodity.
- **"**There was an overwhelmingly positive feedback about the impact of the stakeholder meetings, with all respondents indicating that they benefitted from these sessions."
- All respondents benefited from one-to-one feedback sessions based on laboratory reports of disease status of the dairy herd.
- Although just over half of the respondents had been positive about the dairy project at its inception, all respondents gave overwhelmingly positive feedback at its conclusion.
- Almost 92% of all respondents indicated that the project was beneficial and all reported improvements in their dairy production systems.

The agricultural expert concludes:"… the Makerere University dairy project was overwhelmingly successful in terms of improving dairy production in small-scale dairy production systems in the

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[35] Dairy Value Chain Project Conducted at Makerere University: A case study illustrating the effectiveness of a university-lead project integrating the use of OER to provide training and support in improving production and economic performance of dairy herds (Project documentation).

[36] *Improving Efficiency of the Dairy Value Chain through Utilization of OER in Uganda,* and *Farm Milk Production, Marketing and Processing in Kiruhura District*

southwestern parts of Uganda." He argues the need for "continuation of this or a similar project, based on the use of similar methodology as was employed in the present project."

5.2 Impact in the AICM, CMAAE (Coffee) and Agri-business for farmers' pilots

The report of the second of the two agricultural experts (Annex 4) covers the AICM (Extension), CMAAE (Coffee) and the Agri-business pilots. In the case of the first two programmes, materials for farmers were developed after the OER for students had been completed. The latter pilot focused exclusively on farmers from the outset.

The framework of the research schedule was to measure impact in terms of knowledge, skills, attitude and behaviour. As with the Dairy Value Chain report, Annex 4 is worth reading in full, but for the sake of brevity, only the highlights are summarized here.

- *Attitude*: This was addressed first because attitudes are the drivers of behaviour. Knowledge and skills count for little if the appropriate attitudes are not in place. AgShare promoted many new attitudes that imbued farmers with a sense of "liberation and fulfilment". Their views mattered, and they felt affirmed. The shift to market-orientation – the farm as a firm – was a fundamental shift that enables other project impacts. There was a new awareness and openness in relation to what technology offers, and a realization of the power of farm management.

- *Knowledge:* New forms of knowledge were evident in: the power of choice (e.g. the relationship between value of the product and quantity); knowledge of systems (e.g. the leverage of collective action); farm management (e.g. record keeping and costing); primary production (e.g. ways of increasing yields); and the effects of government policy.

- *Skills:* Clear accounts were given of new production skills and farm management skills. Record keeping was a key new skill as it provided a basis for decision-making.

- *Behaviour:* "Most farmers indicated that they had actually applied what they learned to their individual farm businesses. They were able to see for themselves the 'truth' of what they had learned. For several farmers, applying the learning was a life-changing experience and it is in this aspect of the programme that the greatest impact was made in changing their farming paradigm 'from farm to firm'."

It is notable that negative feedback from farmers concerned only technical issues. Their own levels of literacy, and IT literacy in particular worried some. Internet accessibility was a drawback. It was noted that while the materials were often in local languages, a number of the actual training sessions were conducted in English, which many of the participating farmers did not speak.

The value of the training offered to farmers is thus doubly affirmed when the only difficulties they raise are in respect of optimal effectiveness in the delivery of training. Similarly, farmers noted that it was often difficult to apply what they had learned fully without additional post-training accompaniment and mentoring. While such accompaniment was provided to a limited degree, farmers felt that it needed to continue.

5.3 Overall view of impact on farmers

The independent reports of both agricultural experts – using rather different analytical approaches – present similar findings. For broadly similar reasons, both report high impact of the training on farmers. This picture of different data sets contributing to a common picture is further reinforced by anecdotal evidence provided by academics and student-researchers during the consultant's site visits. Three of many examples are:

- The benefit to farmers of moving into value-added milk products was highlighted. Whereas profit on a litre of milk averaged 200 Uganda shillings, profit rose to 600-800 Uganda shillings when the milk was used to produce yoghurt.
- Rather than being subject to the vagaries of the local market with its periodic gluts and low prices, one group of tomato growers had begun processing and bottling tomato paste.
- A student-researcher who had helped a farmer write successful business plans had been rewarded with a gift of two cows.

The most profound aspects of impact are often those that are not immediately obvious. As students are trained to be more sensitive to farmers and the conditions of their work, AgShare impact will spread.

6. Secondary forms of impact

The AgShare pilots had three consequences that, although not part of formal project aims, have an importance that justifies their inclusion in this report. The first is impact on sectors of the value chain; the second is impact on the status and role of women; and the third, impact on the host institutions themselves, also has implications for AgShare sustainability beyond the life of the project.

6.1 Impact on sectors of value chains

The development of case studies set in farming practices has impacted on various sectors of value chains. As incidental consequences, instances are of course uneven, but evident nonetheless. The following warrant mention:

- In the Agribusiness Farmers' pilot, there are several instances of cooperatives, in particular, having worked with USIU to negotiate with government officials in order to achieve necessary changes. For example, tomato producers in dry riverbed areas mounted a campaign to deter the illegal practices of "enemies – the sand miners providing sand for construction in Nairobi."
- The two-day report back to stakeholders in the CMAAE (Maize) pilot involved three District Agricultural Extension Officers, the manager of a maize milling company, a District Veterinarian, and representatives of the East African Grain Council, the Kenya Dairy Board, and the Ministry of Agriculture.
- In the Haramaya CMAAE pilot, discussions with the Ethiopian Commodity Exchange have led to improvements in the coffee system (see 3.3 above). The handbook and video material on coffee quality improvement and marketing developed for farmers has also been distributed to five Agricultural and Rural Development Offices.

- The Dairy Value Chain provides a striking example of cooperation with community partners, including government (see 6.3.2 below).

While there are few ready examples of actual impact, within value chains there certainly is evidence of a new awareness of other role players and of the inter-related nature of relationships, problems and challenges.

6.2 THE STATUS AND ROLE OF WOMEN IN AGRICULTURE AND IN SOCIETY

A number of academics involved in the case studies research suggested that some traditional hierarchies (e.g. men manage cows, women handle the milk) were beginning to break down. With men increasingly "shying off" from farm work, as one respondent put it, the immediate task of providing for family needs are increasingly been thrust on women. AgShare, by now supporting projects in which women have taken the lead, has helped to enhance the status and roles of women farmers. The following two examples are from USIU.

AgShare has consolidated and expanded the scale and scope of the Kajiado Women's Project that had started in Kenya in 2005. Land in six divisions in the Kajiado central constituency is wholly owned by the Kajiado Women's Project, and managed by the women. [37] Through activities such as training in record keeping, costing of labour, improved marketing and a better grasp of government policy, the group has moved from humble beginnings to one that is now increasing its sales to the Kenya Cooperative Creameries.

The Tigania Womens Sacco Project, "Empower Women to Develop Nations" was established as a microfinance institution in the generally dry area of Tigania East, Kenya, in October 2008. Benefits of Agshare to Tigania Women's SACCO:

- Sustainable Agriculture: Through the Ministry of Agriculture the SACCO is educating women farmers on what to grow sustainably on their land.
- Information systems: Acquisition of a computer and an appropriate information system will ease their workload and necessary training so as to enable correct bookkeeping and storage of information
- Entrepreneurship: Farmers are being assisted in writing their business plans to look for the required funding from capital ventures.
- Economics: Tigania womens group is educating the farmers through the wards on how to manage their accounting techniques and is carrying out a costing technique with the farmers after attending the workshops and some farmers realized that they have been acquiring losses since they started their ventures. [38]

[37] Kajiado women's milk project – student's draft report, 30 August 2011

[38] Tigania Women's Sacco Report – student's draft report, 22 August 2011

6.3 INSTITUTIONALIZATION OF THE AGSHARE MODEL

6.3.1 OER AS A MEANS OF MEETING PRESSING NEEDS

Universities participating in AgShare are no different to any others experiencing pressures of increased student numbers in the face of diminishing government subsidies with attendant resource constraints. Staff in all AgShare pilots reported the increasing interest of either or both university management and national government in promoting 'distance' learning approaches, with the obvious corollary that such initiatives would need to be underpinned by materials development. The difference with institutions housing AgShare pilots is that the AgShare model of OER multi-media learning materials is increasingly being held up as the example for broader initiatives to emulate. This appeared to be the case particularly at Haramaya where modular materials-based courses are being ushered in together with promotion of learner-centred teaching approaches.

While this might be a case of OER appeal at an instrumental or even 're-active' level, there were definite indications that institutions are viewing the AgShare model in more proactive ways.

6.3.2 OER AS A WAY OF RE-POSITIONING THE UNIVERSITY

University mission statements are typically developed around the three pillars of research, teaching, and community development. In practice, in many cases, the pillars support no more than a stereotypical 'ivory tower'.

AgShare provides a model based on field-based research carried out by staff and students, with that research serving the dual purpose of underpinning research-based teaching and being fed back to the farming community to improve practices there. The potential of this model – for the university itself - did not go unnoticed in host institutions. At USIU, the comment was made that AgShare brings life to community development, which is often a lifeless symbolic component of the mission statement. At Moi, it was observed that "the OER mode fuses" extension work with teaching and research. For the same reason, according to two academics at Haramaya, the University President had referred to AgShare in a number of addresses.

Makerere has gone beyond simply recognizing the potential of the AgShare model. Developments are best represented in the account of the Dean of Veterinary Medicine. At a time when the university was "being squeezed" from the outside and troubled by serious internal doubts about its relevance, AgShare arrived as a "unique" model that anchored academic excellence in transformation of the community. AgShare, became seen as '"THE model" to make the university relevant to society - locally, regionally, and nationally.

In conjunction with other projects, AgShare has synergized an impulse for the repositioning of Makerere as a "development" university. This impulse has been institutionalized in AFRISA (Africa Institute for Strategic Animal Resource Services and Development). Funded by the Republic of Uganda Ministries of Education and Agriculture and approved by the Makerere University Council to whom it reports, AFRISA provides a "platform of training and research to innovation actors in the animal resource sector".[39] The

[39] *AFRISA* pamphlet.

paradigm shift is from "the classical 'Ivory Tower' model to the ACP3 model (Academic-Community-Public-Private Partnership" model. Initial impact of the model is captured in the *AFRISA* pamphlet:

> … AMATEGEITU Dairy Farmers Cooperative through the AFRISA platform has completed training of 50 Farmers and Extension Workers in critical Farm skills and value addition on milk and these participants have been deployed to render services to the Cooperative society and the general farming community.

The Minister of Agriculture attended the award of these certificates (a ceremony at which it was noted that he took "locally-produced yoghurt, not Coca Cola" as a refreshment).

In this sense, AgShare has had considerable impact. It has helped to inspire the way in which the institution itself functions. AFRISA has a memorandum of understanding (MOU) with the Ugandan government and with the Amate Gaitu Cooperative Society. There is also what the Dean refers to as a "multiplier effect" that extends the reach of the network. A further MOU has been signed with the Uganda Cranes Cooperative Creameries. This government-funded initiative has already contributed to the identification and treatment of East Coast Fever.

Expansion is also evident in the range of value chains currently listed on the AFRISA website: [40]

- Milk and Milk products value chain
- Meat and Meat products value chain
- Sleeping Sickness and Nagana
- Natural products and complementary Medicine technology
- Bee keeping and Honey products value chain
- Poultry and Poultry products value chain
- Leather and Leather Technology value chain
- Microbes and Microbial value chain
- Aquaculture
- Wildlife and Tourism management
- Climate change and Ecosystem health
- Public Health, Zoonotics and security
- Enterprise Management and Investment value chain.

Courses now offered on the AFRISA website include:

- Basic Skills Certificate
- Professional Skills Certificate
- Skills Diploma
- Skills Bachelor Degree
- Postgraduate Courses
- Skills Masters Degree.

In the dairy value chain, skills certificates are offered in:

[40] www.afrisa-africa.org (accessed 7 December 2011)

- Ice-cream production
- Yoghurt and Ghee Production
- Artificial Insemination Techniques
- Butter and Ghee Production
- Farm Information and Records Management
- Small-Holder Milk Production and Marketing.

These are indeed impressive 'multiplier effects'. With several other projects and funders listed on the AFRISA homepage it is important to establish the *relative* contribution of AgShare. While the university was already inclined towards a more relevant, developmental posture prior to AgShare, it was AgShare funding that helped actualize the vision. Most importantly, AgShare provided the *conceptual model for cooperation*. As the Dean put it: "AgShare was the seed which kept producing more seeds."

A corollary of the institutionalization of the AgShare model is the sustainability of the project itself. At Makerere it has the structural elements of a community of practice identified by Wenger (2006).[41] A community of practice differs from a project team in several significant ways. Whereas a project team is driven by deliverables with shared goals, milestones and results, and is dissolved once its mission is accomplished, a community of practice is often organically created, and membership changes and members may take on new roles within the community as interests and needs arise. [42] This is very much the position of AgShare within AFRISA.

6.4 The relationship between secondary effects and the formal project

By their nature, secondary effects are unintended. It can thus be useful to link these secondary effects with the formal project. Table 11 provides a summary.

Table 11: Secondary project impacts in relation to the formal project itself

Secondary Impacts	Aspect of the AgShare project out of which secondary impacts arose
Impact on sectors of the value chain	Project *logic*: basing OER on field-based research carried out by staff and students
Impact on the status and role of women	Project *strategy*: not imposing a template for OER development on institutions, but rather supporting institutions in building on conditions, initiatives and possibilities existing in the own contexts
Institutionalization of the AgShare model	AgShare project *logic* and *strategy* provided a model with demonstrated outcomes in accord with institutional mission and strategy.

[41] Three elements in parallel: a domain of knowledge, a notion of community and a practice. http://www.ewenger.com/theory/index.htm (accessed 25 November 2011).

[42] McDermott, R., Archibald, D. 2010. Harnessing Your Staff's Informal Networks. 88. *Harvard Business Review.*

7. RATING AGSHARE IMPACT ALONG ITS VARIOUS DIMENSIONS

Up to this point we have covered detail of impact at each of the layers of the project. Table 12 consolidates the detail of these different layers into single overall judgements that in combination provide a visual overview of project impact.

Table 12: Overall ratings on all dimensions of project impact

AgShare OER impact on:	*High positive impact*	*Significant positive impact*	*Moderate or minor impact*	*No impact*	*No available evidence at this stage*
1. Learning: Master's students involved in case study research	☐				
2. Learning: Students studying the OER unit or module	☐				
3. Teaching: Staff researchers and teachers of the OER	☐				
4. OER take-up: non-Agshare teachers in partner universities		☐			
5. OER take-up: Teaching staff in other institutions					☐
6. Farming practices: Farmers	☐				

Note Criteria for judgements in Table 11:

Learning & teaching (1, 2 and 3): *High positive impact* = evidence of all major indicators of effective practice
Significant positive impact = evidence of most indicators of effective practice
Moderate or minor impact = few indicators of effective practice are evident
No impact = students, lecturers and other academics find the model wanting and/ or reject it
No available evidence yet = judgement would be premature at this stage.

OER take up (4 & 5 above): (a) The number of academics indicating intention to use and/ or develop (or are already doing so)
(b) reasons for using and/ or developing OER are related to the relative number of indicators of effective practice, as in 1, 2 and 3 above.

Farming practices: Judgements of appointed agricultural experts based on institutional reports and farmers' responses to interview schedules; such accounts triangulated with anecdotal evidence provided during the consultant's visits to institutions. Quantitatively, through cooperative groups, AgShare training has impacted

directly and indirectly on several thousand farmers (see concluding paragraph in section 1).

With respect to the lack of availability of data on 'take up', the problem is not that of project or institutional inertia. There has been vigorous promotion of OER modules at other universities and forums (see Table 9). Nor is it an adverse reflection on the promise and likelihood of 'take up'. The problem is rather one of timing, as suggested in earlier sections of this report. It is simply too early to expect there to be evidence of demonstrable 'take up'.

In the case of impact on teaching and learning, it needs to be stressed that high positive OER impact does not simply mean the substitution of one set of effective teaching practices with another. The AgShare Baseline Study[43] (see 2.2 above) suggested that students had not enjoyed adequate access to relevant texts and journals. Without these, at master's level, student learning is impoverished even if the standard of lecture delivery is high. In this sense, OER impact has been relative as well as substantive, as reflected in Table 11.

How credible is the overview presented in Table 11? First, the limited student sample in respect of those who had experienced the OER, discussed in 2.4 above, is equally applicable here. Second, the judgements in Table 9 are generalizations that embody the weakness of all generalizations. In offering the advantage of simplicity they present the risk of concealing nuances and qualifiers to the extent that conclusions might be a little simpler than reality.

To counter these criticisms it could be argued, first, that the generalizations have some validity because the judgements on which they are based were constructed through the use of criteria about which controversy is not very likely, and respondents were credible (see section 2.4 above). Second, there is the fact that respondents expressed no dissenting views. None, for example, argued that the OER model was less effective than conventional classroom teaching. Absence of dissenting views reminds us of the theory that 'falsification' is the essential marker of scientific discourse.[44] Karl Popper argues that it makes no difference however many *confirming* instances one finds for a theory. On the contrary, it takes only one counter observation to falsify it. In Popper's famous example, we need to find only one black swan to refute the theory that all swans are white. Thus, although judgements on teaching and learning in the present report are based on categories that are endorsed by numbers of similar points made by respondents (the sort of inductive process of which Popper would be suspicious), interviews encountered no black swans.

[43] AgShare Baseline Study Report (Revised Draft), 24 December 2010.

[44] Popper, K. 1999. (translated by Patrick Camiller). *All life is problem solving.* Routledge: London and New York.

8. CONCLUDING OBSERVATIONS: IMPACT AND IMPLICATIONS

8.1 A UNIQUE KIND OF IMPACT

It is not unusual for projects to have high positive impact. What makes AgShare different is that its impact has been achieved across a range of stakeholders from those involved agricultural research and in teaching and learning about agriculture, to those engaged in agricultural production and marketing. More specifically, this impact analysis found trustworthy and convincing data to conclude that there has been *high positive impact* on:

a) Students' capacity to conduct meaningful, high quality independent research in the research component of the master's degree

b) More relevant and effective student learning in the coursework component of the master's degree

c) The way in which academic university staff now conceptualize their role as teachers and researchers

d) Farmers' practices that lead to improved quality and productivity, and that position them to begin moving away from subsistence farming.

While further advocacy for the OER multi-media modules will have to take place before OER 'take up' can be achieved in other universities, there has been *significant initial impact* on other academics within the faculties in which the OER have been developed and taught.

Secondary forms of impact beyond project specification are evident in three areas. First, there were instances in which research on farms led almost organically to contact and liaison with other role players in various sectors of value chains. This has enhanced awareness and understanding of the inter-related nature of relationships, problems and challenges across these sectors. Second, the project has played a role in improving the effectiveness and status of women's farming groups. Third is the effect of the AgShare model on its host institutions. In all of these there is awareness of the potential of the AgShare model to address pressing institutional problems (such as increasing student numbers in the face of resource constraints) and to inform thinking about new ventures such as distance teaching. However, it is the potential of the AgShare model to guide strategies for a coherent institutional approach to teaching, research and community development that is most powerful. This potential has indeed been realized at Makerere University where an institute has been established to promote and manage the kinds of partnerships necessary to transform an 'ivory tower' institution to a "developmental" university.

8.2 AN EXPLANATION FOR HIGH IMPACT

Impact is obviously more easily achieved if it demands no great change in the behaviour or mindsets of those at whom change is targeted. Of all stakeholders targeted for change in AgShare, students would almost certainly be those for whom change was easiest. One would expect students to be receptive to approaches that make learning more interesting, relevant and participatory. One would also expect them to be in tune with multi-media packs that have digital or online supplementary readings.

If students had little to lose and much to gain by embracing OER modules, the same cannot be said of

academic staff and farmers. Prior to AgShare there is a very clear picture of academics deeply steeped in the 'traditional' or 'classical' mould of teaching, that is, delivering lectures strongly focused on theoretical content. The embedded nature of this taken-for-granted pedagogy was clear, as were the nature of threats posed by OER (see section 3.3 above). With OER, academics potentially stand to relinquish, or at least share, the very basis of their authority and status as *proprietors of knowledge*. Having one's teaching exposed in the open domain is certainly also more threatening than teaching only to one's own (possibly more uncritical) students.

Farmers are proud people, as several academics noted. They are the inheritors and bearers of more than land, buildings and livestock. They also inherit codes of practice and traditions that are not readily discarded.

In fact, for both academics and farmers, participation in the AgShare model required a change in aspects of their professional identity. Yet, in respect of both, AgShare impact was high. What made this possible? Evidence from this impact assessment points to a single overarching reason: ***the logic and power of the AgShare model and the effectiveness of its implementation.***

The first key, pivotal aspect of the AgShare model is that it is rooted in case study research conducted by students and faculty staff, with farmers, on farms. This enabled academics to embed theory in case studies from *authentic* contexts, and the multi-media OER packs brought the farmer to the classroom. For academics, this was the realization of genuine research-based teaching. From this flowed beneficial impacts for all stakeholders: new communities of practice; new and more open networks; more purposeful and appropriate content for curricula with enhanced design, pedagogy and assessment. And for the first time in the experience of academics that were interviewed, the learning from research was being fed back to farmers to promote greater productivity and quality at the same sites of practice where the whole story began. As a possibly unnecessary reminder, the story began with AgShare providing a model based on field-based research carried out by staff and students, with that research serving the dual purpose of underpinning research-based teaching and being fed back to the farming community to improve practices there.

The second key aspect of the AgShare model is that participating institutions enjoyed the freedom to develop aspects of the project plan in ways that best suited their own mission, strengths and circumstances. The result was four distinctive pilots (see sections 1.3 and 1.4 above). Likewise, when the pilots themselves interacted with farmers, they did not encourage a formulaic approach, but encouraged "the farmers to learn and then to apply their learning to their unique circumstances".[45] Institutions and farmers confirmed the well-developed theory that change initiatives must be sensitive to the cultures and contexts in the settings where learning takes place.[46]

It is the logic of the model that promotes the ***integration of the roles and functions of those who teach and learn in higher education with the productive sector and associated value chains***. The value of this kind of integration was evident in one academic's view that "OER brings together theory and

[45] Agricultural Expert's Report, Annex 3, p. 1

[46] Fullan, M. 2002. The Change Leader. *Educational Leadership,* Vol. 59 (8): 16–21.
Fullan, M. 2006. Change theory. Centre for Strategic Education. Seminar Series Paper no. 157.

practice; and teaching and research." While this view helps to explain the appeal and acceptance of AgShare, it could benefit from one qualification. It was not *OER* per se that integrated the functions of various role players. It was the logic of the AgShare model, with OER as the enabling technology or instrument. Strategically, the model used OER to good effect. The multi-media teaching resources developed for master's programmes and for farmers are on the OER Africa website,[47] and as discussed above, are sourced in authentic contexts. However, AgShare presents an unusual case of OER development 'from scratch' *as well as* the use and re-use of existing OER.[48] The AgShare Resource Guide[49] served the development of original OER in two ways. In the accounts of academics, it served as an orientation and induction into the new world of OER, providing also a sense of how much "is out there". Resources from this guide were also built into the OER being developed as recommended supplementary readings for students. The new OER thus combine content drawn appropriately from both local and the global contexts. In turn, the new OER themselves were 're-used' by being adapted for use by farmers.

The only flaw that emerges in AgShare logic was the underpinning assumption that "Course materials can be created relatively rapidly and cost-effectively in areas of need by harnessing and adapting existing OER rather than developing these from scratch" (see section 1.1 above). In actual fact, much potentially useful material in the public domain was found to have copyright restrictions. Moreover, much of it lacked the *contextual* relevance that accounts for the success of the OER materials created 'from scratch' in the project. The fact that participating institutions were able to overcome the relative lack of existing OER suitable for adaptation is testimony to the power of the AgShare model and its impact within the partnership.

8.3 Some implications of the AgShare project

It has been said that universities are the world's most change-resistant institutions. The AgShare model has influenced the way in which a university sets about repositioning itself (see sections 6.3.2 and 8.1) in regard to its core functions of teaching, research and community development. As these are the functions to which universities universally subscribe, there are clear implications of the model for institutional strategic planning. The model clearly 'works' for Agriculture and allied fields like Agribusiness. The question that cannot be addressed here is whether it has the same potential in other faculties and disciplines. But it is a worthwhile question for future research.

For the present, limiting the question to Agriculture, AgShare can hardly be expected to have done more to demonstrate impact and the appropriateness of the model. Questions might be raised about the scale of impact. For example, the OER produced are but single components within complete programmes; and even the impressive number of farmers reached directly and indirectly through cooperative groups is small in relation to total farming populations. But as a pilot project – and in that sense aimed at demonstrating that impact *can* be made, rather than that impact will be widespread – the project has unquestionably succeeded. The most striking symbol of success is perhaps the book,

[47] http://www.oerafrica.org/agshare/PilotProjectsandResources/tabid/1543/Default.aspx

[48] There is little coverage of OER use and re-use in the OER literature.

[49] http://www.oerafrica.org/ResourceDownload.aspx?assetid=2328&userid=1

being planned in one faculty, on how education *can* change society. This topic is in marked contrast with 'Education cannot compensate for society', [50] a work that set the tone for a torrent of sociological research showing that power relationships penetrate the organization, distribution and evaluation of educational knowledge in a way that makes formal education complicit in the reproduction of social inequalities.

Overall, AgShare has convincingly demonstrated the power of AgShare as a conceptual model. There is ample evidence to conclude that the model merits consolidation and extension. At the end of the pilot there is some evidence of AgShare institutionalization, and in participating departments it appears to have sufficient traction to become self-sustaining. However, continued materials development support for academics would be essential. Relevant departments would also need resources to enable continued support for farmers who have benefited from initial training.

The biggest single remaining question is that of OER 'take up'. This question is critical if the promise of OER is to be realized, and if OER scalability is to be achieved. While prospects of 'take up' appear promising within AgShare institutions, there is as yet no tangible evidence of 'take up' in other institutions. Reasons for lack of evidence on this issue were both cited and suggested in section 4.2 above. However, that account stopped short of addressing the question of the *likelihood* of OER 'take up' in other institutions now that participating universities are in a position to mount advocacy workshops using fully developed multi-media learning OER packages backed by the experience of having piloted these with their own students. On the one hand, one might assume that 'take up' will happen organically. By definition, OER licensing is designed to facilitate 'take up'; and for those institutions within RUFORUM and the CMAAE consortia in particular, the OER are tailor-made for their existing curricula. There would be no need for the lengthy curriculum-approval processes often put forward as reasons for curriculum stasis.

On the other hand, the broader OER literature does not yield meaningful cases of OER 'take up' occurring simply because resources are freely available. In the AgShare experience, we have seen preliminary instances of institutions not being as receptive to OER advocacy as one might expect, even in cases where advocacy advances were made through academics' own existing personal networks. It might be institutional lethargy that imperils OER 'take up'. Or it might be possible that the OER movement as a whole underestimates the territorial boundaries and barriers that exist between competing universities in market economies. Or it might be that books and other reference materials have a public presence (bolstered by sales personnel and promotional material) while OER are much less visible. Either way, the balance of evidence suggests that OER 'take up' in other institutions will not simply happen of its own accord. Nor would it be reasonable to expect the AgShare OER developers to be well positioned to mount vigorous advocacy initiatives on their own. Notwithstanding their emergence as capable and committed OER 'champions', the penalty of their success is the demand on their time and expertise from their own colleagues and institutions.

In conclusion, there is strong evidence and logic to argue for:

[50] Bernstein, B. 1971. Education cannot compensate for society. In Cosin, B., Dale, I., Esland, G., & Swift, D. 1971. *School and society: a sociological reader*. The MIT Press: Cambridge, Massachusetts. p. 65

(a) Continued materials development support for academics within the participating AgShare institutions, and ongoing practical support for 'AgShare' farmers and farmers' organizations.

(b) A macro or project initiative to promote 'take up' of the AgShare model and its OER for farmers and agricultural students in other settings and institutions (i.e. working with individual AgShare academics and their networks but not leaving overall management responsibility for 'take up' with them.)

Given the success of AgShare in meeting pressing needs in the teaching and practice of agriculture, it would be a tragic waste if the opportunity to build on project accomplishments were now simply left to chance.

ANNEXURES

ANNEX 1: PROJECT PLAN

Project Objective 1:	Establish the foundation of the AgShare collaboration by month 18	
Activities	**Outputs**	**Outcomes**
Activity 1: Engage three to six existing anchor implementation partners around which to build the AgShare collaboration and hold one planning meeting in Africa during the planning phase.	• 3-6 anchor implementation partners representing the three different partner categories (faculty, field researcher, publisher) • Documentation of high-priority, high-impact MSc topic areas and material types in demand by participating faculty • One meeting with anchor implementation partners, and other key partners and stakeholders	• Identification and commitment of 3-6 existing anchor implementation partners ***4 universities, in three countries, representing both RUFORUM and CMAAE:*** ***1. Haramaya University, Ethiopia*** ***2. Makerere University, Uganda*** ***3. United States International University, Kenya*** ***4. Moi University, Kenya*** • Documentation of MSc agriculture curriculum demand ***Completed for initial university partners. Report due April 30, 2010.*** • One event during the planning phase ***Nairobi meeting March 2010***
Activity 2: Catalyze shared practices among AgShare partners.	• Documented content templates • Documented metadata practices • Documented intellectual property practices • Documented long-term evaluation practices • Documented mechanisms within and between partners by which activities will align with demand of participating faculty • Documented feedback loops within and between participating partners	• Documentation of shared practices ***Pilot Phase Activity***
Activity 3: Optimize Creative Commons' DiscoverEd search and tracking tools for AgShare.	• Implementation of at least one instance of DiscoverEd and related discovery and tracking tools for use within and beyond AgShare • Published and open ontology's for building awareness of AgShare and facilitating the effective flow of information relevant to agricultural education in Africa • At least one customized template suited to the African agricultural context • Training materials regarding semantic mark-up, distributed	• Establishment of a working DiscoverEd instance that meets project needs • Automated verification of use or reuse of AgShare OER throughout the project • Participant surveys and other research leading to a published ontology • At least 90% positive feedback on workshop design and outcomes ***Pilot Phase Activity***

	collaboration and related issues pertinent to OER creation and use • Two workshops on OER discovery, adaptation and best-practices	
Activity 4: Complete a planning framework for each AgShare partner to identify critical assumptions and methods that require testing prior to full implementation, by month 6.	• Documentation of critical assumptions and methods used within and between partners in AgShare	• Documentation of critical assumptions and methods that need testing prior to full implementation ***Project plans complete.***
Activity 5: Complete an initial MSc agriculture needs assessment recommending new and revised topics and types of materials needed by MSc faculty.	• Documentation of one or more effective and sustainable mechanisms for assessing and communicating demand	• Initial needs assessment ***Completed for initial university partners. Report due April 30, 2010.***
Activity 6: Develop pilot testing plan for approval and release of funds by BMGF by month 7.	• Plan for creating and using OER • Plan for pilot testing critical assumptions and methods	• Documentation of plan for pilot testing phase of project ***See project plans*** • Approval of pilot testing phase by BMGF to release funds.
Project Objective 2:	Upon release of pilot funds by BMGF, conduct pilot testing to ensure long term sustainability and scalability by the end of 18 months	
Activities	**Outputs**	**Outcomes**
Activity 7: Provide evidence of effective and sustainable mechanisms among AgShare partners to identify curriculum demand by MSc agriculture faculty.	• Documentation of one or more effective and sustainable incentive mechanisms.	• Evidence of identification of curriculum demand by MSc agriculture faculty.
Activity 8: Provide evidence of effective and sustainable incentives among AgShare partners to respond to the MSc agriculture faculty demands.	• Documentation of one or more effective and sustainable incentive mechanisms.	• Evidence of response by AgShare partners to MSc agriculture faculty demands.
Activity 9: Create OER to meet identified demand in MSc agriculture curriculum.	• OER created for specific topics and formats identified in initial needs assessment.	• Evidence of effective production of OER.
Activity 10: Provide evidence of actual use of the OER by MSc agriculture faculty.	• Documentation of faculty usage of AgShare OER.	• Evidence of actual OER use by MSc agriculture faculty.
Activity 11: Provide evidence of feedback loops engaging multiple stakeholders.	• Documentation of feedback loops within and between AgShare partners.	• Evidence of feedback loops within the AgShare partnership.
Activity 12: Document pilot testing results by month 17.	• Documentation of results and evidence from the testing phase of project. • Meeting of project team, anchor partners and stakeholders.	• Documented evidence resulting from pilot phase. • One event held during the pilot phase.

ANNEX 2: INTERVIEWEES

(All individual interviews unless otherwise specified)

USIU (27 and 28 October)

Ms S. Asena, Prof M. Muniafa, Ms K. Musikoyo Prof G. Nduati, Prof F.W. Wambalaba, Mr W. Wanyama

Student-researchers: Mr B. Lukano, Ms F. Ochieng

Moi (31 October, 1 November)

Mr G. Amusala, Mr K. Chepng'eno, Mr J.. Isaboke, Dr M. Korir, Dr P. Nyangweso

Student-researchers: Mr F. Onyango, Ms C. Uluma, Mr D. Otieo

Students who experienced the OER module (Focus group interview): Beatrice Aiyabei, Chemwok Kipruto, James Kutoyi, Lucina Ndiwa, Abraham Rotich, Benjamin Tarus

AICM (Haramaya) 3 and 4 November

Mr S. Esethu, Mr S. Taye, Dr D. Temesgen

Two focus group interviews with staff who attended advocacy workshops: T. Bezabih, Dr K Chinnaman, T. Getahun, M. Getnet, Prof R. Karippah, E. Okoyo, Dr M. Senepathy, C. Seyoum, G. Shambei, A. Woldu, Dr J. Yousuf

Student-researchers: A. Assefa, E. Getnet, A. Woldu

Makerere (7 & 8 Nov)

Dr G. Elepu, Prof D. Kabasa, Dr S. Kisaka, Dr A. Mugisha, Prof J. Mugisha, Dr P. Ssajjakambwe, Dr A.Tamale

Student-researcher: A. Nkwasibwe

Haramaye CMAAE (10 and 11 November)

Dr G. Abebe, Prof F. Gelaw, Dr J. Haji, Dr L. Zemedu

Student-researchers: A. Hassen, L. Yizzaw

Students who had experienced the OER module: Y. Abuuwork, Z. Lemecha, D. Lemma, E. Tesfaye, Y. Worku

ANNEX 3: EVALUATION OF THE IMPACT OF THE MAKERERE UNIVERSITY PROJECT ON SMALL-SCALE DAIRY PRODUCTION SYSTEMS IN UGANDA

Consultant's report submitted by Prof E.C. Webb[51]

NOTES ON THE QUESTIONNAIRE

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The initial questionnaire was modified to address specific issues. Random groups of respondents' representative of participating farmers in the project were requested to complete the questionnaire, with the assistance of trained interviewers. It is unfortunate that so few questionnaires were completed, but the sample population does seem representative of the group of farmers targeted for the project.

This University-lead project on the dairy value chain was conducted by the Makerere University on small-scale dairies in the Southwest of Uganda. The Makerere University dairy value chain project focused specifically on 'Action research' with the emphasis on finding solutions / recommending interventions based on most critical limitations in small-scale dairy production systems in Uganda. Specific needs included (1) udder health, (2) milk quality, and (3) milk safety, based on base-line indicators for performance. The effectiveness of the University-Lead project on dairy farming in this region was evaluated by means of a structured questionnaire after the completion of the project in December 2011. The purpose of this questionnaire was (1) to evaluate the effectiveness of the University-lead project, (2) assess the contribution of the University-lead project to improved dairy farming and community well-being and (3) economic development. The questionnaire was completed by the same respondents / farmers who participated in the University-Lead project with the assistance of trained interviewers. The purpose of the questionnaire was explained to participants group or individual discussion sessions, before the interviews were done.

Description of respondents and their expectations

The purpose of the questionnaire was explained to respondents via informal discussion sessions. Questionnaires were completed with the assistance of trained interviewers from the Makerere University, and translated in the local language if required. The questionnaire was based on a set of 9 qualitative and quantitative questions, each with sub-questions. A total of 34 questions were asked to assess the impact of the Makerere University dairy project.

[51] For summarized CV, see Annex 5b

Description of respondents and their expectations

The respondents in the Makerere University dairy project were all small-scale farmers in the southwest of Uganda. Most of the participants (42%) got involved through the local cooperative (Amate Gaitu cooperative, which means “our milk”) or project officer, while 25% were involved by friends or family members, 16.5% by the local village chief and 16.5% by local veterinarians. The motivation of 92% of the respondents to get involved in the project was to learn more about dairy production systems, while 8% also indicated that they would like to learn how to add value to the commodity (milk). About 67% of respondents expected to learn more about dairy farming and livestock diseases, while 25% expected to learn more about ways to improve the marketing of dairy products and improve their income, and 8% thought that the project would allow them better access to veterinary medicines.

Multi stakeholder meeting for participating farmers

It is clear from the questionnaire that all respondents (representative of farmers who participated in the project) were clear on the goals of the project, namely to improve dairy production through improved knowledge and skills in terms of managing milk production, diseases that affect dairy cattle and add value to dairy products. At 84% of stakeholder meetings, a number of farmers and interested parties (other family members, neighbors and friends) attended the meetings. In 16% of the cases, one-on-one sessions were arranged to discuss the project with future participants in the project. There was an overwhelmingly positive feedback about the impact of the stakeholder meetings, with all respondents indicating that they benefitted from these sessions.

Collection of baseline data

Baseline data was collected by means of questionnaires and discussion sessions during which farmers /respondents were informed about acceptable dairy practices by means of video material and photos. Interventions were identified based on the questionnaires, laboratory reports on diseases and discussions with the farmers. In this way, a list of interventions were compiled and implemented by the farmer and often assisted by project officers and local veterinarians.

Identification of parameters to be improved

Parameters of production that were used as guideline are listed below:

1. Diseases affecting milk production
2. Milk quality and safety
3. Quality and safety of dairy products
4. Milk production levels
5. Production costs
6. Disease prevention and treatment (mastitis and brucellosis)
7. Shipping and processing costs
8. Milk spoilage
9. Milk prices
10. Markets for milk
11. Capital availability
12. Improvements to the enterprise.

All respondents (100%) requested assistance with parameters 1, 2, 3, 6 and 8, while no responses required assistance with the availability of capital. “Improvements to the enterprise” was the 2nd most important aspect, followed by “Milk prices” and “Markets for dairy products”. “Shipping and processing costs” appear to be less important in small-scale dairy systems, although there are some farmers who are starting to focus on these aspects.

Feedback to farmers and other stakeholders

Feedback to farmers was always based on laboratory reports of disease status of the dairy herd and these were discussed on a one-to-one basis with respondents. Discussions also included evaluations of dairy practices, disease prevention and management programs as well as personal and milk hygiene.

All respondents benefitted from the feedback sessions and also learned a lot about their production systems in terms of dairy management and disease control and prevention programs. Respondents were grateful that the project team took time to discuss the feedback with farmers on a one-on-one basis and some indicated that this was one of the flaws of previous projects.

Interventions / plans to address problems in small-scale dairy production systems

Most of the intervention plans proposed to participants in the project included (1) a mastitis management program, (2) Brucellosis testing and vaccination program, and (3) personal and milk hygiene program. About 17% of respondents were also advised to change / improve their milking parlor and / or handling facilities, while 25% of respondents were advised to implement / improve their record keeping system. Almost 58% of the respondents made use of their local veterinarian to test cows for Brucellosis and to help design a vaccination program. Mastitis management was also an important aspect of disease prevention programs and all respondents indicated that project officials (AgShare team, Makerere University officials and students) assisted them with hands-on training on their own farms to improve dairy production and management (mainly Brucellosis prevention and mastitis management). Although only about 58% of respondents were positive about the dairy project at its inception, all respondents gave overwhelmingly positive feedback at its conclusion. Almost all of the respondents reported a decrease in the most common diseases that affect dairy cattle, and in particular mastitis.

Guidelines developed

75% of respondents were aware of the official guidelines that were developed by the project team and shared this information with other stakeholders (neighbors, friends and other family members).

Impact of interventions by project team and students

Almost 92% of all the respondents indicated that the project was beneficial and all the respondents reported improvements in their dairy production systems. These improvements were most noticeable in terms of improved disease management and prevention, hygiene programs and improved record keeping systems. Some farmers benefitted through improvements to the quantitative and qualitative aspects of dairy products (e.g. improved yogurt production and quality). One farmer did not experience

any improvement because he became involved in the project at a later stage than the rest of the respondents, but he indicated that there are already some positive trends in his dairy production system. Despite the overwhelmingly positive response and feedback from respondents, it is clear that there are still many aspects of dairy farming that require attention, which were not addressed in enough detail in the present project. The most important issues raised by respondents that require attention in future projects are (1) the use and availability of veterinary medicines for the treatment of diseases, (2) veterinary services and (3) feed and feeding practices for dairy cattle.

General comments about the interventions identified for small-scale dairy systems

All respondents benefitted most from the information and training on disease prevention in dairy cattle as well as the testing and laboratory feedback from the university. Improved record keeping was another positive spin-off of the project while some respondents also enjoyed the interaction with project members and veterinarians. It is clear that the Makerere University dairy project benefitted small-scale dairy farmers from the southwestern parts of Uganda, who participated in the project tremendously. It seems as if a number of other interested parties (neighbors, friends and other family members) also benefitted from this project by employing similar interventions and methods in their own small-scale dairy production systems. The major recurring remark about the project from all respondents is that the project should be extended over a longer period of time and that government should be encouraged to implement similar projects on a broader scale.

General discussion

The feedback from the farmers who participated in the Makerere University dairy project was overwhelmingly positive, although a relatively small number of respondents completed the questionnaire about the project. Analysis of the most important indicators of the success and impact of the project indicates that the majority of respondents in the project benefitted from the interventions that were identified and implemented by the project team in each small-scale dairy production system. It is clear that most small-scale dairy farmers experienced similar problems and many of these were addressed in this project. The most important problems were (a) Diseases affecting milk production (b) Milk quality and safety, (c) Quality and safety of dairy products, (d) Disease prevention and treatment (mastitis and brucellosis) and (e) Milk spoilage. From an analytical perspective it is clear that aspect (a) and (d) are similar, while (b), (c) and (e) are similar. The major limiting factors to small-scale dairy production in the southwestern parts of Uganda can thus be classified into two main categories namely (1) management of diseases that affect dairy cattle and (2) Milk quality, safety and spoilage.

The most important interventions proposed to participants in the project included (1) a mastitis management program, (2) Brucellosis testing and vaccination program, and (3) personal and milk hygiene program. These interventions benefitted participants tremendously and the key to the success of the project was undoubtedly the initial multi-stakeholder meetings, followed by careful analysis of production systems (backed by laboratory reports) and feedback sessions, often consisting of on-farm hands-on training sessions. There is a dire need for the continuation of this or a similar project, based on the use of similar methodology as was employed in the present project. It is clear that feedback and

practical training on relevant aspects of the production system are key elements of effective agricultural development projects.

Conclusions

It can be concluded that the Makerere University dairy project was overwhelmingly successful in terms of improving dairy production in small-scale dairy production systems in the southwestern parts of Uganda. It is important that this or similar projects are continued in small-scale livestock production systems and it appears that governments need to be involved in future project.

ANNEX 4: IMPACT OF OER MATERIALS AND TRAINING PROGRAMMES FROM THE POINT OF VIEW OF FARMERS WHO PARTICIPATED IN THE PROGRAMME OFFERED AT USIU (AGRI-BUSINESS FOR FARMERS) AND AT HARAMAYA (AICM, EXTENSION, AND CMAAE, COFFEE)

Consultant's report submitted by Dr Steve Worth[1]

1. Overall evaluation of the OER materials and training

The general sentiment expressed by the farmers interviewed was that they appreciate the AgShare training programme.

The following is the range of key outcomes resulting from the programme. Not all farmers responded to the programme in the same way and thus they did not benefit in the same way. The range of outcomes presented demonstrates the capacity of the programme to improve farming enterprises along a number of lines. It demonstrates that it is not applying a formula approach, but appears to encourage the farmers to learn and then to apply their learning to their unique circumstances.

In compiling this section of the report, a summative or cumulative approach has been adopted. By that is meant that issues identified are not presented as representative of the farmers who participated in the training programmes (i.e. that the majority of the farmers learned this or that). Rather, the report attempts to capture the range of learning experienced across all the farmers. It demonstrates the scope of learning possible given the materials and methods used. It is meant further to demonstrate the capacity of the approach in impacting on knowledge, skills, attitude and behaviour. However, no attempt is made to draw any specific correlation between a specific combination of materials and methods and any particular knowledge, skill, attitude or behaviour learned.

2. Impact on Farmers

Impact can be measured in a number of ways. In this instance, the overarching framework has been to measure impact in terms of knowledge, skills, attitude and behaviour. While most learning programmes focus on the content, which is measured in knowledge and skills, true impact is measured first in attitude and behaviour. The attitude of a farmer drives his or her behaviour. Knowledge and skills can be used to help shape attitude and definitely direct behaviour, but on their own, knowledge and skills have no power. To have power, they require desire (attitude) and action (behaviour).Thus the impact first discusses attitude; it then briefly outlines knowledge and skills. It concludes with behaviour.

Appendix 1 presents a table capturing the knowledge, skills, attitudes and behaviour expressed by the farmers in their interviews. Some of these were explicit and others were implicit – interpolated from the text.

[1] For summarized CV, see Annex 5c

2.1. Attitude

The interviews revealed many changed attitudes expressed by the farmers. Perhaps key among these was a sense of liberation and fulfilment. One group said that through the AgShare programme "they felt relevant and that their views mattered and it was opportunity for them to showcase their ability and be able to monitor their progress". In a learning setting, such an attitude is vital and creates the possibility for learning and ownership of learning. Specific attitudes identified in this study centred on: market-orientation; farming systems/technology options; and farm management.

2.1.1. Market-orientation

The most often repeated impact was that the farmers changed their view of their own farms and their purpose for farming. Prior to participating in the programme, the majority of the farmers produced primarily for food consumption. According to the interviews, after the training, most of the farmers began to see their farms as a business enterprise (the "farm as a firm") which – in addition to producing for the table – should be planned and run with a view to marketing and making profits. Farmers expressed varying degrees of adapting their thinking on this. All the farmers appear to have retained food production as a vital part of their farming operations; some indicated that they retained food as the primary focus of their farms; the majority expressed subordinating food production in favour of market-orientated production as their primary motivation for farming.

Shifting the production paradigm to one of market-orientation is a fundamental shift that impacts on the other impacts that training can have. It opens the door to issues of productivity, investigation of technologies for efficiencies, profitability, quality of products, and farm management – all of which are less likely to be considered if the only (or primary) consideration is to put food on the table.

2.1.2. Farming systems/technology options

A number of the farmers expressed – a direct result of the training – a new willingness to investigate and consider changing farming systems and technology packages. They discovered that production technologies can make them more efficient or make farming easier. They noted that a number of production technologies had been adopted as a result of the programme. The adoption does not appear to be as a result of the training in that technology *per se*, but rather to an awakening to the power of technologies and their new-found willingness to consider them rather than to reject them out of hand.

2.1.3. Farm management

Farm management featured prominently in the farmer interviews. It was the main point of discussion for the USIU farmers, but was everywhere implied in the interviews with the AICM (Extension) farmers that centred primarily on primary production. Both groups discovered the power farm management, and it was less the skill and more the attitude (extending to behaviours) that was affected in this way. Managing their farms (using the knowledge and skills gained) gave them power over their farms. Clearly this awakening was linked to the change to market-orientation. Managing their farms became a conduit for achieving both on-farm and off-farm aspirations (some of which were simply affording school fees for their children).

3. Knowledge

While some farmers were able to identify knowledge (as opposed to skills) acquired, most were not able to express in clear terms what knowledge they had gained. The key areas, largely gleaned from reading between the lines, are: power of choice; systems; farm management; primary production; and government policy.

3.1. Power of choice

The power of choice was articulated in understanding a number of important relationships that prevail in their farm firms:

- The relationship between value of product and quantity; that often the farmer must decide between these two
- The relationship between time (i.e. efficiency) and technology choices and farming methods; that the farmer must weigh up the choice of technologies and farming methods in terms of its impact on his time. Some methods and technologies reduce the time it takes to complete an operation; other increase that time.
- The relationship between income/profit and technology choices and farming methods; as with time, technology and farming method choices affect profitability.

3.2. Systems

Farmers expressed the sentiment that it actually helped them know that whatever they are doing is part of a larger system (including markets, government policy, etc.) and where they find other farmers as potential partners and competitors. Many realised that they benefit more from collective action. As one report indicated, “individually the farmer cannot be recognized but as a group, they can be registered, they can be able to share information and ideas”.

3.3. Farm management

The USIU farmers spoke primarily of farm management issues. In this they highlighted a number of knowledge, skills and attitudes gained from participating in the programme. They discovered that farm management technologies can make their decision-making easier and help them to stay more in command of the things that affect their farms. Chief among the highlighted learning was the importance of being able to account for decisions made and the need for simple, clear records to support this. Connected to this is the importance of record keeping, costing and accounting practices in relation to their farming enterprises.

3.4. Primary production

The Haramaya farmers spoke primarily about their training in primary production. Such learning is more implied with the USIU farmers. The lessons covered a number of commodities. The farmers highlight various technical details as their key learning in this area including plant spacing, use of herbicides, use of fertilisers, and land preparation. The broad lesson learned was the relatively low productivity levels of traditional farming compared to the farming practices learned in the AgShare programme.

3.5. Government policy

The farmers have come to understand government policies and how they affect their farming businesses. They also understand the link between seeing their farms as firms, farm management and the socio-economic benefits to their families.

4. Skills

The farmers more easily described the skills they acquired than the knowledge they acquired.

Skills were divided primarily into two areas: production skills; and farm management skills.

4.1. Production skills

As with production knowledge, the farmers indicated that they learned a number of practical skills for improving production of specific enterprises. Both plant (crop) and animal production were addressed. These are not recounted here. However, an important aspect of the skills learning was connecting these skills to farm management with the aim of turning his or her farming practice into a profit-making venture and to increase his yield.

4.2. Farm Management skills

In the context of farm management, the farmers identified learning the following skills:

- Record keeping
- Business management skills
- Networking skills
- Planning skills
- ICT skills: Internet.

The underpinning learning regarding these skills was their impact on farming profits. And among these, record keeping emerged as one of the most powerful tools for decision-making. Chief among the highlighted learning was the importance of being able to account for decisions made and the need for simple, clear records to support this.

5. Behaviour

In this instance, behaviour is discussed in terms of application of learning and “sharing it forward”.

Application of learning: Of course, application of learning on one’s own farm is a strong indicator for impact of learning. Most farmers indicated that they had actually applied what they learned to their individual farm businesses. They were able to see for themselves the ‘truth’ of what they had learned. For several farmers, applying the learning was a life-changing experience and it is in this aspect of the programme that the greatest impact was made in changing their farming paradigm “from farm to firm”. Farmers noted, however, that it was often difficult to apply what they had learned fully without additional post-training accompaniment and mentoring. While such accompaniment was provided to a limited degree, farmers felt that it needed to continue.

Sharing it forward: Similarly, one of the signs of the strength of any learning programme is the "share it forward" indicator. When farmers truly take the learning on board, they will actively seek to share what they have learned with others. Several of the farmers indicated that this was happening with respect to the AgShare modules. Some witnessed other farmers sharing their learning; others expressed their own efforts to help other farmers learn what they had learned.

6. Training materials and methods

The farmers almost universally identified the practical training aspects – the field visits – are the most valuable and understandable aspects of the programme. While they acknowledge the good quality of the materials, they indicated that the presentation of the materials was often hard for them to follow and understand. Next in rank after the field visits, the farmers most often appreciated the video/DVD presentations as they were able to recognise more readily their own circumstances in what they were watching. This was much more difficult to do with the written materials or the PowerPoint presentations.

It appears that some of the materials were produced in local languages. This was much appreciated by the farmers who were literate in those languages. Those who were not literate acknowledged that the materials were developed by experts (thus making them "good"), but expressed frustration at not being able to engage with them.

It was noted that while the materials were often in local languages, a number of the actual training sessions were conducted in English, which many of the participating farmers did not speak. Several farmers indicated that they could not understand or learn from such presentations

It was further noted that the farmers enjoyed the idea of computer-based learning, but indicated that it was hampered by basic illiteracy, computer illiteracy, electricity supply problems, and availability of computers and internet bandwidth.

As noted earlier, a key element in the programme is the post formal training accompaniment of the farmers in the application of what they have learned to their own farming enterprises. They feel that without continuous accompaniment, their overall immediate learning is compromised, and sustained learning is even more compromised.

7. SWOT analysis assessing the overall strength and potential of the programme

A brief SWOT analysis was done based on the interview reports submitted. The complete SWOT is contained in Appendix 2. For the purposes of this exercise, the following definitions are used:

> ***Strength:*** Internal (positive) aspects of the programme over which it has immediate control that contribute to the efficacy of the programme
>
> ***Weakness:*** Internal (negative) aspects of the programme over which it has immediate control that detract from the efficacy of the programme
>
> ***Opportunity:*** External (positive) potential/existing linkages over which the programme does not

have immediate control that can enhance the success of the programme

Threat: External (negative) elements over which the programme does not have immediate control that can limit or decrease the efficacy of the programme.

Many of the strengths and weaknesses of the programme are directly related to the materials and methods which were discussed in the previous section. A brief discussion of opportunities and threats will help round out the learning from the interviews conducted.

7.1. Opportunities

Some of the key opportunities which can be capitalised upon are:

- The farmers' desire to share the programme with other farmers
  This can help build capacity to reach out to other farmers through developing formal training and accompaniment programmes to foster farmer-to-farmer training.

- The knowledge bases they have attained have been transformed into profits and the expansion of their ventures
  Farmers have clearly taken on board the new attitude of market-orientated farming and applied their technical learning to it. This 'bridge' is a powerful walkway for making inroads into increasing the sustainability of the farmers' farm businesses and in keeping them on a pathway of advancing prosperity.

- Interest on the part of the farmers in the use of video and DVD, workshops and seminars, and print media (e.g. newsletters) as means of learning
  Farmers expressed keen interest in the use of interactive learning approaches. They also indicated interest in participating in creating these. This could greatly enhance the engagement with farmers and accelerate learning.

- First-hand experiential learning
  Farmers expressed a strong preference for learning by seeing and doing. This, coupled with the three previous opportunities can create a powerful vehicle for rapid diffusion of learning.

- Areas of further training
  The farmers identified a number of areas which they would like to learn about:
  - *Food storage*
  - *Value-adding (processing)*
  - *Harvesting and use of silt on their lands*
  - *Computers*
  - *Coping with increases in prices for inputs and transport*
  - *Overcoming fear of the unknown, resistance to change and risk aversion*
  - *Additional training in: crop and livestock specialisations; cooperative action*

7.2. Threats

The key threats identified by the farmers were as follows:

- The low level of farmer literacy.
  This, coupled to the low levels of IT literacy and the accompanying issues of access to computers and bandwidth, constitutes the largest threat to the programme. This is exacerbated by the farmers' lack time to 'go back to school' to learn computer skills.

- Lack of use of English among target farmers.
  So long as the presentations are conducted in English, the lack of English marginalises many farmers.

- Some farmers would not want to share what they learnt from the AgShare OER site for fear of competition.
  Contrary to the opportunity created by those farmers who are keen to share what they have learned, there are apparently a number of farmers who do not want to share what they have learned with other farmers. The extent of this should be measured and, if significant, issues of benefiting from sharing knowledge should be formally incorporated into the training programme.

- The fear that they will not be able to put into practice what they have learnt.
  This is related to accompaniment. Some of the farmers left the programme confident that they could apply what they learnt immediately to their own farms. Others expressed fear in doing so. Perhaps the programme can address this more explicitly and ensure that those farmers who are less confident are given support.

- Getting materials was a challenge since government websites had not updated the right information on different farming methods.
  This was interpreted to mean two things: one, that government websites are not uploading the AgShare materials; and two, that farmers might find instead out-dated information that will not reinforce what they have learned on the AgShare programme.

Appendix 1

Table I : Knowledge, skills, attitudes and behaviours identified by the farmers interviewed

Knowledge	Accountability is primary to the success of a business
	They have come to understand government policies and are in the process of educating other farmers so as to sustainably carry out their practice
	Treating the farm as a firm
	Information about farming methods in different parts of Kenya, on t*he fact that a **farm** can be run as a **firm***

	It actually helped them know that whatever they are doing is in the system and other farmers as well
	They realized that individually the farmer cannot be recognized but as a group, they can be registered, they can be able to share information and ideas
	Record keeping, costing and accounting practices in relation to the farming practices they engage
	How to cost labour, payments according to every input of the farm have helped all groups
	Understand the importance of having a valuable product other than quantity
	Potato (and other specific crop/livestock) production
	Understanding of the relationship between time (i.e. efficiency) and technology choices and farming methods
	Understanding of the relationship between income/profit and technology choices and farming methods
	Not specifically articulated: the power of choices.
Skills	Record keeping
	Business management skills
	Networking skills
	Planning skills
	ICT skills: Internet
	Diverse planning skills in his area of livestock breeding, planning for his feeds for the animals, planning for his diversification into other segments that dairy farming brings along
	Management to turn his farming practice into a profit making venture and to increase his yield
	Cross breeding
Attitude	Importance of saving
	Less risk averse; signs of wise use of debt

	More market/profit orientated (instead of home food consumption) Management to turn the farming practice into a profit making venture and to increase the yield
	The fear that they will not be able to put into practice what they have learnt.
	Some farmers would not want to share what they learnt from the AgShare OER site for fear of competition
	Farmers feel confident that they are able to carry out sustainable farming practices in their farms
	They will share what they had gleaned from the workshop with their colleagues
	(Financial) accountability is primary to the success of a business
	Record keeping was a major part they had ignored on their part and to many it has actually shown their progress and some have admitted to having thoughts of diversification since their initial practice was not producing much to sustain their subsistence and to provide enough to save in the process
Behaviour	Taking up loans to expand their practices
	Reaching out to others with the material
	Using assets as leverage and being cautious enough to get into a required debt repayment plan to follow to ensure that dues are paid to the full
	Currently undergo faster policy formulation and take advantage of opportunities the marketing environment poses to them

Appendix 2

Table II : SWOT analysis

Strengths[2]	Materials easy to read and understand linked to good use of picture, words and videos
	Language simple and easy to comprehend (written and video voice-overs)

[2] Internal (positive) aspects of the programme over which it has immediate control that contribute to the efficacy of the programme

	Program was run in user-friendly manner as it was very interactive
	Accompaniment for the training was very detailed
	The lectures and farmer interaction is very good
	Visits to their farms empowered the farmers; made them feel special & relevant
	The interaction of farmers from different regions was a good dynamic
	OER materials and training program is excellent, as it was well prepared, easy to access, easy to understand
	AgShare team has faith in them
	There's constant communication on what's new and the way forward
Weaknesses[3]	Reliance on ICT beyond immediate capacity of the farmers
	Reliance on English literacy
	Some materials are in English. In such cases, farmers who are familiar with the language have to translate into mother tongue. Some won't take initiative to ask
Opportunities[4]	Farmers' desire to share the programme with other farmers
	The knowledge bases they have attained have transformed into profits and the expansion of their ventures
	Using management to turn his farming practice into a profit making venture and to increase his yield
	Desire on the part of the farmers for (additional) training in: crop & livestock specialisations; cooperative action
	Interest on the part of the farmers in the use of video and DVD, workshops and seminars, and print media (e.g. newsletters) as a means of learning

[3] Internal (negative) aspects of the programme over which it has immediate control that detract from the efficacy of the programme

[4] External (positive) potential/existing linkages over which the programme does not have immediate control that can enhance the success of the programme

Threats[5]	Low level of farmer literacy
	Language barrier, lack of use of English among target farmers
	Low level of farmer IT literacy
	Lack time on the part of the farmers to 'go back to school' to learn computer skills
	Accessibility to internet services
	Some farmers would not want to share what they learnt from the AgShare OER site for fear of competition
	The fear that they will not be able to put into practice what they have learnt
	Getting materials was a challenge since government websites had not updated the right information on different farming methods

[5] External (negative) elements over which the programme does not have immediate control that can limit or decrease the efficacy of the programme.

ANNEX 5: SUMMARIZED CURRICULUM VITAE OF THE EVALUATOR AND CONTRIBUTING AGRICULTURAL EXPERTS

ANNEX 5A: SUMMARIZED CURRICULUM VITAE OF THE EVALUATOR

1. **Name :** KENNETH LEE HARLEY
2. **Date of birth:** 23 May1943
3. **Nationality:** South African
4. **Education:** BA, U.E.D, B.Ed (*cum laude*), M.Ed, PhD (University of Natal)
5. **Countries of work experience:** Ghana, Kenya, South Africa, Uganda, UK, USA
6. **Professional experience:**

Institution [Dates]	**Positions**
Independent Consultant since 2004	Currently co-editing a UNESCO/ COL book: *OER as a catalyst for educational change in higher education: Case studies and reflections from practice;* Three evaluations for OER Africa and University of Michigan (2009, 2010, 2011); Review and development of B.Ed programmes (University of Pretoria and Central University of Technology, 2009 and 2011); Team Leader of EU-funded HIV Pilot project infusing HIV/AIDS education into education faculties in SA, 2008–2009; Manager of National Teacher Education Review, Council on Higher Education, SA, 2005 – 2008.
University of Natal, 1991 - 2004	Senior Lecturer, Professor of Education, Director of School of Education, Interim Dean of Education. Title of Emeritus Professor conferred in 2004
Natal Education Department, 1986-1990	Senior Researcher in Curriculum Development
Edgewood College of Education, 1985	Lecturer in Sociology of Education
Various Secondary Schools in South Africa & Kent, UK (1969 only), 1966-1984	Teacher/ Head of Department /Acting Deputy Principal; Matriculation Chief Examiner, English Second Language (Natal Education Department) 1975-1984.

7 Scholarly work:

- Editorial activity: Editor of *Journal of Education,* 1993 – 2006; Editorial Board 2007 – present
- Publications related to teaching and teacher education: 3 books (one school text book, and two sets of learning materials for teacher education programmes); 6 chapters in books; 21 articles in refereed journals.

8 Developing and supporting teacher education:

- Supporting teacher education in Africa: Convenor of Education Studies, www.oerafrica.org, 2009 – ; Profiling distance education experts for African Council on Distance Education, Kenya, April 2009)
- SA National Review of Teacher Education: Drew up criteria; trained 150 peer review evaluators; managed the review of 24 ACE, 15 B.Ed, 19 M.Ed, 22 PGCE programmes. Followed up on accreditation outcomes; Co-authored the publication: Council on Higher Education (August 2010). *Report on the National Review of Academic and Professional Programmes in Education.* Pretoria: CHE, HE Monitor No. 11.
- Governance in teacher education (between 1993 and 1999 served on Councils of four Colleges of Education; Chairman and Vice Chairman Council of Rectors and Deans of Teacher Education, KwaZulu-Natal (CORDTEK), 1997 – 1998
- Leading and managing programme and curriculum developments: University of Natal School of Education initiative in establishing a national open learning B.Ed (Hons) programme, 1993-1999).

9. Evaluations of funded projects:

- Three DFID school-based projects in Uganda (INSSTEP, 1999) & Kenya (PRISM 2000; SPRED III, 2002)
- The Zikhulise Educator Empowerment & Curriculum Materials Development Project (USAID, 2001)
- Two Health OER evaluations in Ghana and South Africa for OER Africa and University of Michigan (the William and Flora Hewlett Foundation, 2009 and 2010).
- OER Africa and University of Michigan (2011) AgShare Planning and Pilot Project: Impact Study (Bill and Belinda Gates Foundation)

ANNEX 5B: SUMMARIZED CURRICULUM VITAE OF AGRICULTURAL EXPERT PROFESSOR E. C. WEBB

Edward Cottington Webb

Position:	Head and Professor: Department of Animal and Wildlife Sciences, University of Pretoria
Specialisation:	Animal Physiology / Meat Science / Livestock Production systems
Qualifications:	BSc(Agric) Anim. Sci. (Pret.) BSc(Agric) Hons.*cum laude* (Pret.) MSc(Agric) *cum laude* (Pret.) PhD (Anim. Sci.) (Pret.)
Postdoctoral studies:	University of Gent, Belgium and Nutreco, The Nethlands
Professional registration:	South African Council for Natural and Scientific Professions (SACNASP) South African Association for Professional Animal Scientists South African Society for Animal Science
Teaching responsibilities:	
Undergraduate teaching:	Responsible for courses in Animal anatomy and physiology, Growth Physiology, Reproduction Physiology, Animal Ecology
Postgraduate teaching:	Responsible for courses in Animal Production Physiology and Ecology and Meat Science
NRF Evaluation:	C1 rating; H-factor = 9
Postgraduate students:	31 Masters students completed studies since 1997 (two cum laude) 8 Masters students currently registered 8 PhD students completed studies; 4 PhD students currently registered
Scientific Publications:	71 papers in peer reviewed scientific journals
Congresses, Conferences and Symposia:	
	85 papers, short papers or poster contributions at national and international conferences
Popular papers:	23 popular-scientific papers
Book / chapters in books:	12 contributions
Technical Reports:	25 Technical reports

Seminars Presented: 4 invited lectures at international symposia and universities

Involvement with other universities/scientific institutions

- President: South African Society of Animal Science (2008 – current)
- Sub-editor: SA Journal of Animal Science (1999 – current)
- Special editor: Meat Science Special ICOMST 2008 issue.
- Editorial board member: Small Ruminant Research (Elsevier publication, 2007 - current)
- Editorial board member: SA Journal of Animal Science
- Alternate member: South African Council for Natural and Scientific Professions (SACNASP)
- Advisor to academic appointments committee, PU for CHE
- External examiner: PhD and Master's theses from other universities and colleges
- Moderator and External examiner: Technikon SA & National Private Colleges Member / Convenor / Chairperson at Symposia: South African Society of Animal Science
- Organising committee and Special Editor: 2008 International Conference for Meat Science and Technology, Cape Town, South Africa
- Chair / Organiser: Physiology session of 2008 World Conference on Animal Production
- Member / Convenor / Chairperson at Symposia: South African Society of Animal Science
- Editor: Proceedings of the 1995 Annual Symposium of SASAS (Tvl-Branch),
- Member: ARC Advisory Committee on Meat Science Research
- Editor: Proceedings of a workshop on Research and training strategies for goat production systems in South Africa, (ed. EC Webb, PB Cronje & EF Donkin), 22-26 November 1998, Kings Lodge, Eastern Cape, South Africa.
- Co-editor: Proc. of 37th Nat. Cong. SA Soc. Anim. Sci., 27-29 July 1999, ARC-Central Office, SA
- Chairperson: Scientific committee of the 8th International Congress on Goats (ICG, 2004)

Refereeing duties

- Referee: Various manuscripts for Meat Science (Elsevier publication)(1999-current)
- Referee: Various manuscripts for Small Ruminant Research (Elsevier publication)(1999-current)
- Referee: Various manuscripts for Journal of Animal Science (2009 – current)
- Referee: Various manuscripts for SA Journal for Animal Science (1999-current)
- Referee: Manuscripts for SA Journal of Food Science and Technology (1998, 2002, 2003)
- Referee: Manuscripts for the Proc. 37th Nat. Cong. SA Soc. Anim. Sci.
- Referee: Manuscripts for the Proc. IX Int. Symp. Rum. Phys. (1999)
- Referee: NRF Advisory Panel Meeting, Indigenous Knowledge Systems (2000-2002)
- Referee: NRF applications for funding (2000-2003)
- Referee: NRF scientific outputs of researchers (2000-2003)

Private practice

- Professional Animal Scientist since 1992.
- Consulting Animal Scientist for Webgro Santa (Beef cattle stud (1988-2006).
- Managing director: Nguni Boerdery Pty. Ltd., (Beef cattle stud) (2007-2009)

ANNEX 5C: SUMMARIZED CURRICULUM VITAE OF AGRICULTURAL EXPERT DR S. WORTH

Steven Worth (PhD): Curriculum Vitae

Box 1547, Howick, 3290, KwaZulu-Natal, South Africa

Tel: +27 (0) 83 7442490 * Fax: +27 (0) 33 2606118 * E-mail: wordsworth@futurenet.co.za

Date of Birth: 1 February 1956 Nationality: South African/USA (Dual citizen)

EDUCATION

2009: PhD in Agricultural Extension and Rural Resource Management: University of KwaZulu-Natal, South Africa

1994: Master of Agricultural Management: University of Natal, South Africa

1978: Bachelor of Science (Cum Laude) Agricultural Business, California State University at Fresno, California, USA

EMPLOYMENT RECORD/PROFESSIONAL HISTORY

2001-Present: University of KwaZulu-Natal, South Africa

Full-time Senior Lecturer: Teaching, research and community engagement in Agricultural Extension and Rural Resource Management; Academic Coordinator: Agricultural Extension and Rural Resource Management; Supervisor for 18 masters candidates and supervisor/co-supervisor for 6 doctoral candidates

1996-2001: Worth Consulting

Full-time consulting work in agricultural and rural development

1979-1996: Agricor, South Africa

Served 17 years in agricultural and rural development and agricultural extension in previously disadvantaged areas. The district and regional management positions were responsible for managing a staff of 150 at district level and 450 at regional level in the provision of farmer support services to small-holder farmers; services included agricultural extension, project management, veterinary services and agro-technical specialist services. An overview of this service is set out below:

1993-1996: Regional Manager : Western Region

1991-1993: District Manager : Ditsobotla District

1988-1991: District Manager : Molopo District

1986-1988: Group Cooperative Development Coord.

1981-1985: Public Relations Officer

1979-1981: Agricultural Economist

1978-1979: Bahá'í National Teaching Office, USA: Administrative Assistant

1976-1978: Fresno County Department of Agriculture, California, USA: Seasonal Agricultural Inspector

CONSULTANCIES

Worth Consulting, Howick, KwaZulu-Natal, South Africa

Providing a range of consultancy services in the field of agricultural and rural development, and agricultural education and training summarised as follows:

Agricultural Policy (Extension and Education)

- Numerous consultancies (2002 to present) with the South African National Department of Agriculture and South African Colleges of Agriculture including strategic plans and intervention strategies for Agricultural Colleges; Norms and Standards for Agricultural Colleges; Placement of colleges of agriculture for the future; National Strategy for Agricultural Education and Training

Agricultural Training

- Numerous technical books and training manuals with the FAO of the United Nations including: Farm Management Extension Guide: Market-oriented Farming; Farm Business Schools: training manual; Farm Economics Hand Book: Risk Management; Market-oriented farming in Africa
- Unit Standards and Qualifications for Agricultural Extension NQF Levels 6&7 (AgriSETA)

EDUCATIONAL & TRAINING PROGRAMMES DEVELOPED

Bachelor of Agriculture (Agricultural Extension and Rural Resource Management)

- A three-year undergraduate university degree designed under new educational policy in South Africa. (University of KwaZulu-Natal; accredited by the South African Council on Higher Education); Bachelor of Agriculture Honours (Agricultural Extension and Rural Resource Management)
- A one-year post-graduate university degree designed in the framework of the South African Qualifications Authority Framework. (University of KwaZulu-Natal; accredited by the South African Council on Higher Education)

Farm Management

- Market oriented farm management training materials aimed at smallholder farmers in Africa (2007) (Principal author in collaboration with the FAO)
- Farm Business School training materials aim Ed at smallholder farmers in Africa (currently in production) (Principal author in collaboration with the FAO)
- Economics for Market-oriented Farming (Farm Management Extension Guide) (2008) (Editor)
- Managing Risk in Farming (Farm Management Extension Guide) (2008) (Editor)
- Farm Management Specialist (Farm Management Extension Guide) (Editor)

Advanced Agricultural Extension (2009)

- Short course on agricultural extension theory and practice

Organisation and Project Management (2001-2009)

- Core module of the Bachelor of Agriculture degree; University of KwaZulu-Natal

Extension Placement (2001-2009)

- Core/Capstone module of the Bachelor of Agriculture; University of KwaZulu-Natal.

Rural Wealth Creation and Rural Economic Systems (2001-2009)

- Core modules of the Bachelor of Agriculture; University of KwaZulu-Natal.

Advanced Agricultural Extension Theory and Practice (2009)

- Core module of the Bachelor of Agriculture Honours degree programme at the University of KwaZulu-Natal Agricultural Extension Training - Bachelor of Agriculture (Agricultural Extension) (2009) New qualification at SA NQF Level designed in compliance with the South African Higher Education Qualifications Framework and approved by the South African Council for Higher Education.

PAPERS PUBLISHED

Twelve (12) papers (sole and co-authored) published in peer reviewed journals (2004-2010)

Three (3) papers (co-authored) accepted for publication in peer reviewed journals (2011)

MEMBERSHIP IN PROFESSIONAL SOCIETIES

- Association of International Agricultural Extension and Education
- International Environment Forum
- South African Society for Agricultural Extension
- South African Association for Agricultural Educators