



Agricultural Higher Education in the 21st Century: Non-Traditional Models

Transcript

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It is a privilege to speak to such a distinguished audience and I'm very grateful to Prof Ignacio Ramagosa and the organisers for the invitation. I have prepared this presentation with my colleagues Dr Bala and Dr Balaji.

The Commonwealth of Learning or COL is an intergovernmental organization established by Commonwealth Heads of Government. COL believes that access to learning is the key to development.

We have the mandate to work across the Commonwealth which is a diverse association of 53 Member States covering all regions of the globe—from the Pacific to Asia, Africa and the Caribbean.

Our mission is to help Commonwealth member states and institutions to harness the potential of distance learning and technologies for expanding access to education and training.

Our headquarters are in Vancouver, Canada, with a regional office for Asia in New Delhi, India.

I was asked to speak on 'Non-Traditional Models'. I will first look briefly at the global context since this has been discussed thoroughly yesterday and review the growth of agricultural higher education in the developing world. I will then consider the various options of non-traditional modes that have emerged as a response to the growing demand for higher learning. In the last five decades we have seen the emergence of four major models: distance education, online learning, OER and MOOCs. In conclusion, I will suggest how these innovations can be harnessed by the agricultural higher education community to provide the relevant knowledge and skills to our learners, particularly the youth, to deal with the requirements of the twenty first century.

But first the global context.

The world population is growing exponentially with estimates that it will exceed 9 billion by 2050. According to IFAD, there are over 900 million hungry people worldwide and 1.4 billion live in extreme poverty.

There are 1.2 billion young people between the ages of 15-24, most of them in developing countries. There is a high rate of unemployment especially among the youth. How can they be attracted to agriculture as a livelihoods opportunity?

In spite of its critical role, the trend in the agriculture sector has been a decline in terms of its contribution to the GDP. The biggest slump can be seen in South Asia, which pioneered the Green Revolution in the 60's. Unemployment and low productivity imply that the sector needs a serious reconsideration in terms of investment and human resource development. However, the investment seems to be decreasing substantially and according to FAO, 'Between 2001 and 2012, the average national share of government expenditures on agriculture, forestry and fishing (GEA)1 fell from 3% of total government expenditures to just over 2%'.

As IFAD states, the food production needs to be doubled by 2050 in developing countries to assure food security. Equally important is the fact that GDP growth generated by agriculture is up to four times more effective in reducing poverty than growth generated by other sectors. How do we achieve these objectives? What is the role of education?

Agricultural HE in developing countries was introduced in colonial times. The traditional style of indigenous education was transformed into an institutionalized form which provided a link between primary, secondary and tertiary education through schools, colleges, training institutions and universities. The brick and mortar, didactic mode of education began during the 19th century in many developing countries as an important tool for economic growth and social development.

Many Asian and Latin American countries witnessed a growth in higher education in agriculture during the nineteenth and early twentieth centuries. In the Indian subcontinent, departments for agriculture can be traced back to the 19th century which led to the establishment of agriculture and veterinary colleges.

By contrast, Africa made a late start. Post-secondary education in agriculture began in Makerere University in Uganda as a certificate course in 1924 and it was not until the 1960's that the large scale development of agricultural higher education took place in Africa.

The Green Revolution in Asia played a key role in the establishment of new agriculture universities, which were campus-based, based on the land grant model of the US and not designed for very large numbers.

On the other hand, as Bloom et al (2006:ii) point out the development of tertiary education in Africa was neglected due to the belief of the international development community that primary and secondary education were more important for poverty reduction. Public spending on agriculture as a share of agricultural GDP in many Sub-Saharan countries at 4% was significantly lower than that of the transforming economies in East and South Asia which spent 10% during the agricultural growth spurt in the 1980's. Lower investments affected the availability of skilled human capital in African agriculture.

There are only 42 researchers per one million persons economically active in agriculture in Africa (Ayre and Callway, 2005). Similarly in extension, it has been estimated that there is around one extension agent for 30,000 farmers in Mozambique though the situation is better in Tanzania and Nigeria.

The enrollments in agricultural higher education are much lower than overall tertiary enrollments in Ghana Kenya and Malawi. In Ghana they constitute 4.3 % of all tertiary enrolments while in Kenya it is 7.4 % and in Malawi 15.4 % of the total share of tertiary enrolments. Africa is the youngest continent on the planet with a need for more education and training opportunities.

The situation is not very different in Asia. A government report in India, points out that while the targeted training capacity by 2022 is 20 million, the present system has less than 2 million. Singh (2013) points out that while India produced 24,000 graduates during 2010, the projected requirement is 54,000 by 2020 necessitating a two fold increase in institutional capacity.

Will it be possible for governments to achieve this? As Philip Altbach points out, you need USD\$ 700 million to build a large research-intensive new Chinese university. How many developing countries will be able to invest such resources? What are the options?

In the previous decade we have seen an unprecedented demand for higher education. In 2007, there were 150 million tertiary students globally. We find that the number has increased to 165 million in 2012 with an estimate that this is expected to rise to 263 million in 2025.

What does this mean in real terms? If we are to accommodate the children who will reach enrolment age between now and 2025, we will need to build four new universities every single week with a capacity of 30,000. Is this a realistic option?

Can technology help? As governments and policy makers seek to expand the access to education, reduce costs and improve standards, it is clear that alternative approaches are needed. In the current economic climate, traditional brick and mortar solutions will not be enough. Let us look at four responses to the growing demand for affordable quality education.

This rising demand for HE gave rise to a new type of provider—the distance education institution. The success of the Open University UK captured the imagination of policy makers around the world but particularly in developing countries.

When the Open University UK was established in 1969, the notion of ‘openness’ was a significant innovation. Lord Crowther, the founding chancellor of the Open University of the UK’s statement of openness in relation to people, places, methods and ideas forms the basis of throwing open the ivory towers of higher education.

Open universities were oriented towards the massification of higher education. Many open universities do not insist on entry qualifications, allow learners to accumulate credits at their own pace and convenience and are flexible enough to allow learners to choose the courses they wish to study towards their qualification

Let us look at the growth of open universities in the Commonwealth. In 1988, there were only 10 open universities in the Commonwealth and twenty five years later, that number has tripled.

Why are open universities so popular? One reason is lower costs. A study by the National Knowledge Commission, India, shows that mega-universities, which achieve economies of scale cost substantially less than campus institutions. Pakistan's AIOU costs 22%; China 40%; India's IGNOU 35% and the OUUK, 50% as compared to campus universities.

What of quality? In 2012, the Open University of the UK ranked first in student satisfaction. In addition the UKOU ranked fifth among the 100 universities surveyed by the Quality Assurance Agency (QAA) in the UK and was one rank higher than Oxford University.

The agricultural education sector has been slow to take advantage of open and distance learning which can increase access, improve quality and cut costs. However examples do exist. In India, the Yashwantrao Chavan Maharashtra Open University (YCMOU) started its School of Agricultural Sciences in 1993 and has continually maintained its certificate, diploma and bachelor degree programs in horticulture. The Indira Gandhi National Open University (IGNOU) launched its School of Agriculture in 2005 and offers certificate and diploma as well as doctoral programs.

COL supports a Lifelong Learning for Farmers programme in seven Commonwealth countries in partnership with agriculture universities. Using basic mobile phones, women goat herders in India have generated assets worth \$9 for every single dollar invested.

In Uganda the programme is offered in collaboration with Makerere University in the local language using basic mobile phones. As World Watch Institute concludes, *'Because L3F Uganda adapts its educational tools to fit farmers' lifestyles and technological capacities, rather than imposing costly or time-intensive educational programs on farmers, the project can make real advances in empowering farmers and improving their livelihoods'*.

What was new in this phase was that learning could take place without a teacher and self-instructional materials were developed to cater to the diverse needs of the learners. There was a greater use of radio and television to supplement print materials. The learner could learn at her own pace and place.

With more access to technologies, there is an increasing trend towards online learning, especially in the developed countries. In fact in 2013, you can see that almost all public and private institutions in the US offer online courses.

In 2013, over 33% of all US Higher Education students were taking at least one online course.

What of quality? Over 80% students find the quality of online courses comparable to face to face learning and in some cases rated it as superior.

A survey shows that online education can bend the cost curve.

After North America, Asia has the highest growth rate with developing countries like Myanmar, Thailand and Malaysia leading the continent in elearning. The Open University of Malaysia has over 90,000 online students while Mumbai university enrolls nearly 80,000 online learners. There is a significant number of online learners in industry based IT courses which are recognised towards employment.

Guelph University, Canada, like many other institutions now offer online courses in agriculture. The Certification based on performance in online quizzes and participation in discussions.

Online courses brought in innovations such as authoring tools, learning management systems, unlimited web resources and online self-tests which introduced a greater scope for interactivity. Interactivity is a key aspect with a higher level of personalisation through the use of ICTs. This led to more flexible and blended approaches. Many campus based institutions began to offer both face to face and distance learning programmes, thereby opening up access to newer constituencies.

Let us look at the third trend. With the rise of social media, there has been a global movement towards collaboration in the development and sharing of content and we have seen the rise of Open Education Resources or OER. The fundamental principle is that any materials developed with public funds should be made available free to others.

OER are educational materials which are free and freely available, are suitable not just for higher education but for all levels including primary and secondary education. OER can be reused and repurposed to suit different needs and could be available in any medium, print, audio, video, digital. One key difference between OER and other educational resources is that OER have an open license, which allows adaptation and reuse without having to request the copyright holder.

What are the benefits of OER? Evidence from various institutions suggests that OER can cut costs, increase access and improve the quality of education.

In the USA, under the Utah Open Textbooks project, an OER based textbook can cost \$5 and if accessed online, it can be entirely free. Robinson et al found that students who used open textbooks scored 0.65 points higher on standardized science tests than those using traditional textbooks.

The Jing Pin Ke (National Top Level Courses project of China Ministry of Education) has published agricultural learning materials from 259 undergraduate courses online in Mandarin. These are open to browsing but do not carry an explicit open license. The National Agricultural Innovation Project in India has led to production of course materials of 475 undergraduate courses covering six core areas of agricultural sciences, (ICAR, 2015). This very large resource in a digital format is online but does not have an open license. There is clearly a strong need for concerted efforts to advocate OER in agriculture, to build capacity among faculty to produce online learning materials and to publish them using an open content license.

Why is content important? Professor Bob Bernard of the Educational Technology group at Concordia University, Montreal, and his colleagues carried out a meta-analysis of hundreds of studies in which distance education students were treated in different ways. They distinguished three types of interaction: student – content; student – student; and student – teacher. They then analysed all the studies to find

which type of interaction made the greatest difference to student performance when it was increased. The results were very clear. Increasing *student – content* interaction had much the greatest effect; with *student – student* interaction coming next and *student – teacher* interaction last. This highlights the importance of content.

What implications does this have for pedagogy? The student-content relationship with the focus on networks and collaboration led to the term ‘connectivism’. The emphasis is now on collaboration rather than competition and the learner’s role becomes more significant as s/he marks a shift from being a consumer to a producer of content.

Let us now come to the fourth major trend--the Massive Open Online Courses or MOOCs, a form of distance and online learning. Major consortia of the top universities on both sides of the Atlantic have led the movement.

A survey of MOOCs offered (using MOOC platforms such as Coursera and the online catalogue MOOC List) shows that MOOCs on agricultural topics constitute an insignificant fraction (less than six out of about 3600).

One of the common objectives for adopting MOOCs in developing countries is to democratise access to higher education. The Malaysian Minister has encouraged institutions to leverage new technologies such as MOOCs to democratize access to higher education. The Indian government also wishes to use MOOC platforms to reach the unreached segments of society such as working class people and housewives.

MOOCs have so far been offered in HE. COL offers MOOCs for Development (MOOC4D) with technology options that work within low bandwidth scenarios in developing countries and provide offline-learning possibilities.. There is a need for MOOCs to build awareness among farmers about essential practices that are sound, ecologically and economically. To understand the perception and views of leaders of agricultural education and research community, COL organised a brainstorming event with the National Academy of Agricultural Sciences, India, on the viability of MOOCs in agriculture. The overwhelming opinion was that MOOCs were viable in agricultural education and training .

COL has offered two MOOCs covering students and faculty in agricultural universities as well as smallholder farmers in sub Saharan Africa and South Asia. The MOOC for gardeners in India was unique in many ways. A gardener or “mali” (in Hindi) is a semi-skilled farmer who normally owns little by way of land and water assets. This group of farmers contribute much to horticultural and floricultural production. Since this group has practically no access to the Internet and is likely to be unfamiliar with online learning, COL’s partner, the Indian Institute of Technology- Kanpur (IITK), built a complete suite of MOOC technologies to enable access to learning materials using a basic, voice-only cell phone. The content of this MOOC comprised sets of audio clips on farming practices. A key aspect of this course was the availability of a call center operated by the course team. A comprehensive survey of learners showed that most of them were 25-29 years; their education level was mostly limited to secondary school. The learners ranked the content as high quality and relevant. Learners particularly appreciated the conciseness of the lessons and the clarity of the voice and the weekly quizzes.

MOOCs mark yet another shift in teaching and learning—by putting greater responsibility on the learner to construct knowledge and to move from teaching a small class to a massive group around the world.

Will MOOCs transform the way we teach and learn? A significant difference is the emergence of the flipped classroom as the standard practice. There is a greater emphasis on peer-to-peer learning.

The use of Learning Analytics, a component of the MOOC platform, can help us to collect and analyse data about how learning is taking place. Because of this, predictive systems can be developed to identify potential dropouts and provide the necessary support to help them overcome their difficulties. It can also highlight those areas where many students struggle so that the tutors get the feedback to take remedial measures.

As we have seen, distance and online learning have grown and evolved over the last fifty years, keeping pace with and taking advantage of the various technologies. Distance and online learning has also opened up access to millions of learners and is a viable option for addressing issues of access, costs, equity and quality.

What then is the way forward for agricultural higher education in the 21st century? Non-traditional educational models, supported by developments in technology, will have a major role to play.

What are the emergent trends of the future? The recent Horizon report estimates that in the next two years, blended learning would be used increasingly, and institutions will redesign their learning spaces. Over the next three to five years, the focus will shift to measuring learning outcomes and OER will be available in more subject areas. From technology perspectives adaptive learning technologies and the internet of things would be visible in educational practices (Johnson et al, 2015).

Today the world has changed and knowledge is multiplying at a rapid pace. Has the curriculum changed to keep pace with these developments? Are we harnessing emerging technologies to improve teaching and learning? Are we giving our youth the skills they need for employment and entrepreneurship? While professional education such as engineering and medical education are rapidly adopting distance and blended learning, agricultural education institutions in developing countries are yet to optimize the opportunities and models that technology provides. The following steps can be considered:

First, agricultural universities can adopt ODL and online provision. By becoming dual mode, campus based institutions can offer two streams of provision that provide flexible options to learners, who can study at their own pace, place or time. In this case, ODL can supplement and complement rather than replace existing institutions and models.

When making this transition, policy makers would need to take a holistic approach. Rather than introduce ODL as an add-on, there would be a need to review existing policies and systems to integrate the approach for optimal efficiency and effectiveness. It would be important to develop QA processes so that the credibility of the system is maintained. One key dimension would be capacity building of all levels of staff to take ownership of ODL and to contribute to its effective delivery.

ODL and online provision can contribute to the ongoing professional development of the agriculture community and institutional personnel as well as provide opportunities for lifelong learning in this critical sector.

Agricultural universities can embrace openness in a systematic manner. This would include adopting and adapting OER as well as open access policies for sharing and collaborating on research locally and globally.

As the international community gets ready to adopt the Sustainable Development Goals this year, the agriculture education community will need to adopt non-traditional and innovative approaches for human resource development if Goal 2, which aims to ‘end hunger achieve food security and improved nutrition and promote sustainable agriculture’ is to be achieved by 2030

Thank you for your kind attention.