

CAPACITY DEVELOPMENT FOR EXTENSION PROFESSIONALS

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VALUES AND COMPETENCIES IN AGRICULTURAL EXTENSION

The contribution of extension could be further accentuated if the extension professionals adopt certain human positive values. A parallel investment for development of positive values through pre-service, induction, and in-service trainings is essential for the success of any agricultural extension worker. In this blog, SVN Rao and PVK Sasidhar emphasise these values which every extension workers must imbibe and internalise.

Values or what we value in our life determine the way we live, as they play an important role in prioritisation of our interests and in decision making. Positive values bring in positive effects and negative ones bring in negative effects on the society. There are certain positive values which we need to cherish for the welfare of the society which we often call as general values (irrespective of the profession). Some values are specific to a particular profession and these values drive our professional behaviour (Advaita, 2010).

In the case of public servants, it is becoming increasingly difficult to maintain moral standards and human values in the conduct of public affairs. This is because of the glamour the society is attaching to material prosperity. Although it is the responsibility of the government to provide a clean administration by inculcating ethics and human values in administration, it hasn't been able to do so in several cases (Sukhwinder, 2012).

Why Values are important for Extension Professionals?

Values are important in all walks of life irrespective of the profession and position in the hierarchy. "These values communicate 'what we stand for' and 'what is important to us' ...values are the soul of the organization" (Hitt, 1988). One sign of a healthy, productive organization is agreement between the organization's values and the daily behaviours of its members. This behaviour is determined both by individuals' personal experiences as well as their experiences in a specific profession.

All professions develop their own self-image based on their member's attitudes, and an external image that depends on how they are seen by non-members. Neither can be considered without referring to moral and ethical questions (Hoffman et al 2009a). Values and attitudes such as faith in rural people, commitment to agricultural development, and concern for the whole community are important for all extension personnel (Vijayaraghavan and Singh, 1997) See <http://www.fao.org/docrep/W5830E/w5830e0g.html>).

Although some of the old Agricultural Extension text books (Reddy, 1971) do mention about some of these values as commandments for extension professionals, these are either ignored or not given the prominence they deserve. In the United States of America, Epsilon Sigma Phi (ESP), an independent not-for-profit organization of extension professionals has developed a creed for extension professionals (Box 1).

Box 1: Extension Professionals' Creed

I believe in people and their hopes, their aspirations, and their faith; in their right to make their own plans and arrive at their own decisions; in their ability and power to enlarge their lives and plan for the happiness of those they love.

I believe that education, of which Extension is an essential part, is basic in stimulating individual initiative, self-determination, and leadership; that these are the keys to democracy and that people when given facts they understand, will act not only in their self-interest, but also in the interest of society.

I believe that education is a lifelong process and the greatest university is the home; that my success as a teacher is proportional to those qualities of mind and spirit that give me welcome entrance to the homes of the families I serve.

I believe in intellectual freedom to search for and present the truth without bias and with courteous tolerance toward the views of others.

I believe that Extension is a link between the people and the ever-changing discoveries in the laboratories.

I believe in the public institutions of which I am a part.

I believe in my own work and in the opportunity I have to make my life useful to humanity.

Because I Believe these things, I am an Extension professional.

<http://espnational.org/en/11-about-us/extension-worker-s-creed/47-esp-written-creed>

Box 2: Effective Vs. Ineffective Extension Workers

Extension experience in different parts of the world has stressed the extension workers' central importance and has highlighted a number of features which distinguish an effective extension worker from a less effective one.

An effective extension worker:

- Spends time in developing the skills and attributes of the farmers themselves, and does not merely concentrate on extension projects,
- Gets out to visit and meet farmers and does not become an office bureaucrat,
- Encourages local initiative and self-reliance, and does not adopt a paternalistic attitude towards farmers,
- Plans for the long term development of his area, and does not seek only quick results.

The work of an extension worker demands the particular values of dedication, humility and hard work. Extension administrators should ensure that extension workers are thoroughly prepared before they begin extension activities.

Source : Oakley and Garforth (1985)

The work of Extension professionals requires in-depth knowledge of the processes of effective formal and informal education and the subject matter discipline in which he/she specializes. All extension workers need abilities to perform a task and their performance is directly related to the following aspects:

- The quantum of knowledge about the task,
- The extent of skills they possess, and
- The type of attitude they have towards work.

These behavioural aspects, called as competencies in a way differentiate an 'effective extension worker' from an 'ineffective one' (Box 2).

Hoffman et al (2009b) noted that "Not every person is equally talented to become a good adviser. People who are strongly oriented towards achievement or motivated by power are less suited compared to those who are motivated

by affiliation. A prerequisite for advisory work is the guarantee of confidentiality. But also patience and the art of listening need to be mastered.

An adviser should be able to perform in flexible roles, should have a high level of tolerance towards ambiguity, and a stable personality. Those who have problems with themselves are unable to concentrate fully on the situation of the partner and are not best helpers. Besides these attitudes and personal traits, a good adviser has learned the basics about human behavior and has diagnostic skills to understand the client and his perception of his situation; he also possesses a larger repertory of techniques of intervention and communication".

Extension workers need to upgrade their competencies to match with the changing demands of their work. Irrespective of the methods (pre-service, induction, in-service trainings,

symposia, workshops, and demonstrations) employed to upgrade their competencies, what matters is the mindset of the trainer as well as the trainee. The trainer must be competent to train and ready to impart the skills to the trainees. At the same time, the trainees must be receptive and ready to acquire the skills. This in turn rests up on the values the trainer and the trainees cherish towards the work.

Though essential, values are not being taught in class rooms. We learn or imbibe these values from our role models or parents or teachers. It is easy to preach these values than to follow. The values need to be respected and inculcate. Today, in the society most of us are not able to imbibe and internalise the values and hence people have no opportunity to learn about them. These values are supposed to be passed on from generation to generation. When majority of the people in a society are dishonest, it is very difficult to avoid its negative impact on the young generation. The person who is a stickler of the values is ideally suitable to preach. There are no attempts to do so mainly because these values were thrown to winds. These values are considered as surreal and obsolete in this present day materialistic world.

Following are some of the values that every extension worker should possess, among others:

- **Work is worship:** The job of extension professionals is to help farmers in several ways and they are expected to do it with utmost sincerity and honesty which is considered equivalent to worshipping the Almighty. Inactivity or not doing the duty or work assigned to them is a sin. We must do our duty as extension professionals to the best of our ability. This reflects upon the effectiveness and efficiency of extension worker in performing extension activities.

Extension workers who cherish this positive value will try to acquire competencies to perform their duties to the best of their ability. It is said that "A man should not be judged by the nature of his duties, but by the manner in which he does them. Every duty is holy, and devotion to duty is the highest form of the worship to God. What is important is not what we are doing but how we are doing it." (Swami Vivekananda, 2003).

- **Help the farmers selflessly and transparently:** The farmers, basically food producers, are the back bone of any country and no country can afford to ignore their contribution. The extension professionals have the unique opportunity of helping the farmers directly in increasing food production to meet

the nation's food requirements as well as export demand. The greatest service to society is to help farmers without any expectations (cash or kind) from them.

Selfishness, 'thinking of ourselves first' is the main sin (Swami Vivekananda, 2003). Many among us are working with a business motive i.e., exchange phenomenon. We help others with an expectation of getting something in lieu of our help. Unselfishness will bring success. Whereas, selfishness leads to greed which is detrimental not only to society but also ruins the individual in question. The degree of unselfishness marks the degree of success everywhere. Extension professional must be a true friend of farmers in helping them to produce more from his crops and livestock to feed our ever increasing population. If an extension worker has no or little concern for the farmers, he or she cannot turn out to be a good extension worker and obviously the farmers cannot derive benefit from him which ultimately reflects on the farmers' poor production.

Inbuilt is the value 'transparency' in dealing with the farmers. It is necessary for us to win the trust and confidence of the farmers to plan and implement various extension programmes which are not possible to accomplish without being transparent in working with them.

- **No wealth without work:** This is a fundamental principle on which the lifestyle of an individual depends. The exponential growth in corruption which cuts across religion, caste, language, sex, profession, etc., is attributed to the gross violation of this "value". We are not supposed to accept anything (cash or kind) for which we have not put our effort. All types of problems we are facing today have their roots in our objective of getting easy money that too without sweating for it. As a result, the cases of "wealth disproportionate to the known sources of income" are on the rise in our society which is growing unabated. Plagiarism (literary theft), which has taken the magnitude of a plague among the scientific community is another example of drastic violation of this principle.

Inaction is considered as a sin. But of late, inaction is indirectly rewarded rather than considering it as a sin (Box 3). Extension professionals must effectively deliver extension services with the sole objective of helping farmers without any expectations from the latter. Quite often than not, our public extension system is criticised for delay in delivery of inputs (seeds, fertilizers, vaccines, etc.,) and services.

Box 3: Where there is no cost for doing nothing

"The primary cause behind the snail paced decision making in the Indian bureaucratic system is the incentive offered for doing nothing. When it comes to career advancement, there are hardly any repercussions for not taking any initiative. Contrast this, there is a likelihood that one may end up paying a very significant cost for taking an initiative or taking a decision that is not reliant upon routine precedents and requires an iota of reasoned thinking. Such a bureaucrat may come under the scrutiny of investigating agencies. A pending enquiry will definitely delay his or her promotion even if no merit is discovered. Till such time, penalising lack of initiative and offering immunity for reasoned decision making, it will be erroneous to assume that the pace of bureaucratic decision making will change in India.

Source: Pandey, 2016.

- **Accountability to society:** Every one of us is accountable to society as we derive lots of benefits from it. Man is basically egalitarian in nature and cannot lead a solitary life and depends upon society for satisfaction of his needs. Many of us do not realise that the every state government spends about. 10 to 15 lakh Rupees for producing a graduate (agriculture, veterinary, home science, dairy science) in addition to what the individual spends to

acquire the degree. Hence, morally we are bound to help society in its development. There are several ways one can be involved in helping society. In addition to helping the farmers in increasing their production, we can also extend our helping hand in nurturing values like "helping the people in distress or natural calamities," "sacrificing comforts with a focus on 'development of community rather than individual development'" (Box 4).

Box 4: Shift from Money making Machine to Social Person

"If you had met me a few months back, you would have been shocked. I used to work like a money making machine. I was never a social person. The floods taught me a great lesson. It was an eye opener for me." These were the words of 26 year old Mohammed Yunus who was recently honoured by the Government of Tamil Nadu for his selfless, noble, and brave act of rescuing nearly 2,100 people during the recent floods that devastated Chennai.

Source: The Hindu, Jan 27, 2016 Chennai edition.

This is the main idea behind the concept of Corporate Social Responsibility (CSR) and companies (established with profit motive) are expected to extend help in addressing the problems experienced by societies by spending some percentage of their income on rural development. Similarly all agricultural extension workers should feel "Individual Social Responsibility" to extend a helping hand to farmers and to justify Government's spending on agriculture education.

- **Wrong means can never justify the right ends:** Means are no less important than ends. There could be several ways and means to accomplish a task or attain a goal. But one should be careful in choosing the right means to attain the goal. Right means in the sense accepted and approved by the society in which one is working. One needs to be wise in discriminating (power of intellect/budhi) between right and wrong means. It is worth adopting the right means even if they fail to attain the goal. It is said that, "If a wrong person chooses the right means, the right means will work in the wrong way." We must refrain from achieving targets by targeting the rich or progressive farmers, making false promises to the farmers, etc.

- **Deceiving others tantamount to deceiving yourself:** The extension professionals (as researchers) are involved in organising field trials to test the improved seeds, fertilizers, medicines, chemicals, etc. In this process of experimentation, we should bring out the facts to the notice of the farmers without any bias (Fig. 1). Sometimes we wish to promote the products with a fervent appeal to the farmers although the product in question is not up to the standards. This happens mainly because the companies give us the sample

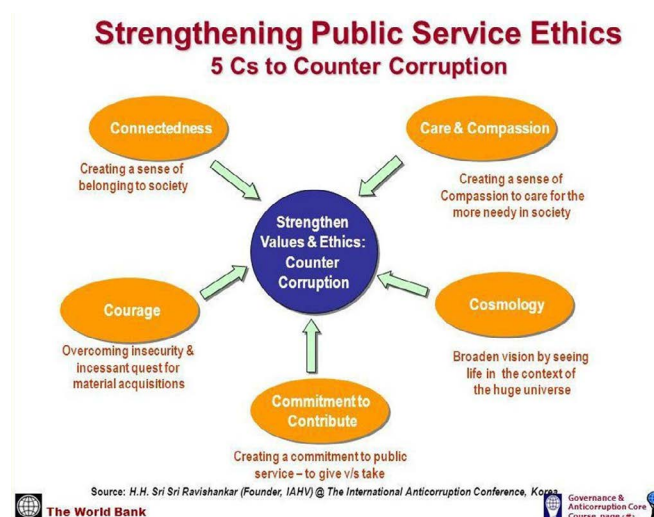


Fig. 1: 5Cs to counter corruption

products with associated freebies to conduct the field trials with an inbuilt expectation that we recommend their products for wider application. Honest reporting of the facts about the worth of a product is very much necessary as it helps us in deriving the peace of not cheating the farmers by giving false reports.

It is not out of context here to quote Michael (2016) who argued that "Considering the political complications in modern-day agriculture, the question that needs answering is this: How do Extension professionals work with people who have polarized agricultural values while respecting those values, not disrespecting the values of any group, and providing unbiased information? This question represents the challenge that faces everyone in agricultural education in the 21st century. We must be able to serve an ever-divided public and respect polarized differences among people, especially when working amid agencies that have more biased agricultural messages". The story of GM seeds (Box 5) is a case in itself.

- **Production by masses but not mass**

production: This is one of the most famous economic principles of Gandhiji (Schumacher, 1973) who insisted on involving more and more people in production to mitigate the problem of unemployment. In India the agricultural production, more so the livestock production, is in the hands of millions of

resource poor farmers who contribute to more than 60% of the agricultural produce in the country. In case of the livestock sector, priority must be given to the landless livestock farmers who need our help the most. Resource poor farmers are slowly deserting farming adding to the problem of unemployment and urban migration. We should be biased towards resource poor farmers in extending all possible help, although it is difficult to achieve targets. We have a tendency to work with few resource-rich farmers for obvious selfish reasons which needs to be curtailed. In response to this, several inclusive and targeted programmes focusing only on the small, marginal and landless farmers emerged over the past few years.

- **Inclusiveness:** Inequality in sharing and using resources is leading to the yawning gap between the rich and the poor. 90% of our resources are being used by 10% of the people and the remaining 10% of the resources are being shared by 90% of our population. The society is groping with the serious problem of social unrest leading to chaos mainly because of the inequality which arises because of greedy people. Gandhiji very rightly pointed out that "there is enough to meet the legitimate needs of every one, but not the greed of any one in the country." Extension workers must aim at reducing the gap between haves and have-nots by consciously working in line with the value of inclusive growth.

Box 5: The Story of Genetically Modified Seeds in India

Monsanto's operation in India illustrates monopolization and manipulation of the market economy, tradition, technology, and mis-governance. The world's largest producer of genetically engineered seeds has been selling genetically modified (GM) in India for the last decade to benefit the Indian farmers – or so the company claims.

Enter Monsanto with its "magic" GM seeds, to transform the lives of the poor Indian farmers. The U.S. agri-business giant took full advantage of its entry into the Indian market. It entered into an agreement with state governments including Rajasthan and Andhra Pradesh to introduce a Memorandum of Understanding (MOU) that dictated the terms of disseminating the GM technology in Indian market. For Monsanto, it is one thing to convince farmers to use artificial seeds for the purposes of enriching their lives, it is quite another to manipulate nature and technology to profit from them.

Source: Vandana Shiva <http://www.navdanya.org/news/423-genetically-modified-seeds-in-india>

Box 6: Changes in the Value Orientation Over a Period of Time

Values in the past

- If character is lost everything is lost and if wealth is lost nothing is lost
- Means are as important as ends
- Inactivity is a sin.
- Righteousness, moral, and ethical values are kept at a high pedestal.

What we value now

- If character is lost nothing is lost and if wealth is lost everything is lost
- Ends justify the means
- Inactivity quite often is rewarded while initiative may invite punishment.
- Righteousness, moral and ethical values are at low

Differences in the value Orientation

People change their values over a period of time. Slowly people are taking to negative values ignoring their serious negative impact on the society. For instance, in the past "character" was considered as the best value one should cherish throughout his life. Now its place is taken by wealth (Box 6). Extension workers must consciously aim at building character among the farmers which is possible only when they value the value of character. Extension professionals with unquestionable character alone can develop trust and confidence among the farmers. In fact the main purpose of education is building character and as professionals of extension education it is still more imperative for us to restore the well deserved place of character – highest value in any society.

- **Individual vs. Organisation Values:** If the value orientation of the individual and organisation is same the probability of accomplishing the objectives is high. On the contrary if they differ or are in disagreement with each other, it may lead to conflict and it may ultimately result in poor performance. Extension professionals may get into conflicts if their personal values and norms clash with those of the clients and the organisation in which they are working (van den Ban and Hawkins, 1996). Same is true with the conflicting values of the employer and employee. If the employer or boss is corrupt and aims at amassing wealth by hook or crook and if the employee or the subordinate is honest to the core, sooner rather than later, the

employee may have to desert the organisation because of the 'value conflict.' If he chooses to toe the line of his boss which is comparatively very easy, it is detrimental to the individual as well as to the society.

- **Value orientation in West and East:** The western society has no issues in slaughtering cows which are suffering with communicable or dreadful diseases like TB, mad cow, BSE (Bovine Spongiform Encephalopathy), FMD, etc. In UK during 2012, millions of cattle were destroyed when they were suspected to be suffering with BSE. Whereas in India, because of the value "cow is holy" we cannot slaughter the cows even if they are suffering with zoonotic diseases (that can be transmitted from man to animal and vice versa). To protect the cows (unproductive) from slaughter goshalas have been established and maintained in India by those who owe their allegiance to gomatha.

Existing situation on value Education

- **Values in School/College Curriculum:** Although values are very important in building a healthy and peaceful society, enough attention has not been paid to inculcate values among students. The fact that Moral Science which speaks of moral values are taught in the schools only up to 9th standard, reflects upon the importance we have been giving to values.
- **IGNOU's Programme On Value Education:** IGNOU has embarked upon a certificate programme to inculcate values among all those associated with education under distance education mode (Box 7).

Box 7: IGNOU's Certificate Programme in Value Education (CPVE)

CPVE is a six months certificate programme designed to inculcate the importance of value education in teaching learning process among teachers, teacher educators, graduates, NGO'S and professionals from the corporate and other sectors.

Course Structure

Course 1: Overview and Perspectives of Values: Deals with the socio-cultural milieu of the present day modern society, reconstructing the society through a holistic development of individuals' - cognitive, physical, affective and moral.

Course 2: Socio Psychological Basis: It analyzes the development of values from various angles: physical, social, intellectual, and spiritual that help in the building up of a holistic personality.

Course 3: Pedagogy of Values: It examines both the normative and descriptive foundations with emphasis on what kind of ethos/value structure could prevail in schools so that they can be considered truly educative institutions and professional communities. It discusses various value models, identification, integration, and transaction of values.

Course 4: Application and Support Skills: It discusses the importance of application skills as means to empower the younger generation and assist them in facing the challenging situations in their lives with an activity component.

Source: <http://www.ignou.ac.in/ignou/aboutignou/school/soeds/programmes/detail/539/2>

Similarly, MANAGE (National Institute of Agricultural Extension Management), Hyderabad has started organising a four day training programme on 'Work Ethics for Development Personnel'. This programme delves on ethics in Public service, understanding and maintaining ethical values in the Public sector, how to developing strong work ethics, how to improve employee work ethics, etc. The reading material for this course could be accessed at <http://www.manage.gov.in/studymaterial/workethics.pdf>.

Values in Curricula: The BVSc and AH curriculum has two courses— Veterinary Jurisprudence & Ethics and Veterinarian in Society— which contain

legal and ethical issues, responsibilities of a vet towards society, and dos and don'ts for a vet; with a focus on human welfare at its centre. Similarly, the vets take the Hippocratic Oath, which lays emphasis on ethical standards, and are expected to honour it while practicing as veterinarians. However, very few graduates (Veterinary, Agriculture, Fisheries, Dairy science) opt for extension profession and neither at graduate nor post graduate level the values required by an extension professional are inculcated. The Fifth Deans Committee Report constituted by the ICAR has proposed a new non-gradual course "Human Value and Ethics" for undergraduate courses in Agriculture (Box 8).

Box 8: Course on Values and Ethics (Credit hours: (1+0): Content

Values and Ethics-An Introduction, Goal and Mission of Life. Vision of Life. Principles and Philosophy. Self Exploration. Self Awareness. Self Satisfaction. Decision Making. Motivation. Sensitivity. Success. Selfless Service. Case Study of Ethical Lives. Positive Spirit. Body, Mind and Soul. Attachment and Detachment. Spirituality Quotient. Examination.

Values in Corporate Sector: The corporate sector increasingly pick up candidates before they graduate (campus recruitment) and train them as per their organisational requirements which include core values and ethos. They usually pick up raw graduates when their minds are comparatively fresh as it is easy to mould them. Every company

has its own unique ethos on which the functioning of the company rests (Bani, 2009). The success of Matsushita (National/Panasonic) is attributed to its company's ethos developed and nurtured by its employees (Box 9). Similarly, civil servants are also given training to maintain certain core values in the interest of the nation.

Box 9: Seven Spiritual Values of Matsushita

The Japanese firm Matsushita has developed its own business philosophy from the founder Konosuke. This philosophy was codified as the "Seven Spiritual Values" of Matsushita that all employees learn today. These values are

- Contribution to society - national service through industry,
- Fairness and honesty,
- Cooperation and team spirit,
- Struggle for betterment,
- Courtesy and humility,
- Adaptability, and
- Gratitude.

Source:<http://www.panasonic.com/global/corporate/management/code-of-conduct/chapter-1.html>

Values in Public Sector Extension Agencies in India

With respect to public sector extension agencies there is nothing like a list of core values (like the extension professionals creed mentioned in Box 1) that need to be imbibed by the extension staff. 'Adherence to the rules' is an important value, which needs to be honoured in public sector organisations even at the cost of the work itself. Public sector extension staff timings quite often do not match with the time convenient to the farmers (before 10 am and after 4 pm). They are expected to perform the task during working hours (10 am

to 5 pm) and that too on week days (Monday to Friday). Transport is also available only during office hours for extension work. This mis-match in the timings has been found to impact extension work.

In this context, NGOs are better placed than public sector extension organisations. NGOs like PRADAN, BAIF, AWARE, SEVA, MSSRF, have their core values and the strength of these NGOs depend upon the extent to which these values are honoured by their staff. The flexible timings being followed by the NGOs will help in reaching the farmers and maintaining contact with them in an effective manner.

To succeed as a human being (must be more useful to the society than any other creature on this globe) in delivering extension services to the farmers, values discussed above are essential in addition to subject matter competencies and soft skills. Therefore a parallel investment in 'human values development' through pre-service, induction and in-service trainings is essential for the success of any agricultural extension worker.

The important values, if valued and cherished, help not only the farmers and extension professionals, but also the entire society. Ignoring these values leads to disproportionate wealth, conflicts, and social unrest; the signs of which are already visible in our society. Although many scholars in the past cautioned us about the negative consequences of neglecting these values in the society, till date we have not taken it seriously. It is high time we focus our attention to values which must be inculcated and imbibed. Cherish the values and save the society or else perish. It is said "Dharmo rakshati -Protect righteousness (core value) and

righteousness protects you" and we need to practice it which is good for all of us.

Way Forward

1. Identification of core values which do not vary from lower to higher positions in the hierarchy is necessary for extension professionals.
2. Identification of suitable trainers who have been adopting these values.
3. Allocation of an exclusive session for inculcating values while organising training programmes for the extension professionals.
4. Inculcating values especially of general nature must be continued at graduate level irrespective of the specialisation. It must be made part of the core curriculum.
5. The core values adopted and adhered to by great leaders, without compromising on the values, need to be stressed.
6. The core values need to be made available in print as well as electronic media and made accessible to the people.

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02

COMPETENCE DEVELOPMENT THROUGH EDUCATION AND CAPACITY DEVELOPMENT THROUGH EXTENSION

While the concept of capacity development is much discussed in extension literature, little attention is given to competence development, argues Dr Laxmi Prasad Pant. In a paper (see Pant, 2012), we argued that the fields of 'competence development' and 'capacity development' remain isolated in the scholarship of learning and innovation despite the contemporary focus on innovation systems thinking in agriculture and rural development.

While the concept of capacity development through technical cooperation is much hyped in the international development literature, including agricultural extension, this body of literature fails to make a connection with the literature on competence development (e.g., Biemans *et al.*, 2009; Mulder, 2001) (Figure 1). To address this gap, we argue for a need to differentiate technological competence from other types of competence, and suggest that while the focus on input and output indicators of innovation are relevant to assess technological innovation competence development, outcome indicators of innovation, such as measures of positive changes in habits and practices, would better serve the purpose of assessing and developing organizational and institutional learning and innovation competence.



Fig. 1: Learning and innovation competence development framework

Source: Pant (2012)

Our study was conducted in the Krishna district of Andhra Pradesh, India and in the Chitwan district of Nepal. Findings suggest that the task of competence development in food and agriculture involves degrees and diplomas from universities and vocational training institutes that engage students in various levels of theory-based, competence-based and experiential learning. For example, the Agriculture and Forestry University (AFU) of Nepal engages students in various experiential learning activities in addition to theory-based conventional lectures. However, one potential area for agricultural universities is to transform conventional instructional practices engaging current and future farmers in occupational competence development in addition to the ongoing efforts to train future agricultural scientists, extension workers and academics. For this to happen, we need to transform farming into a dignified occupation to attract educated youths in this profession that has serious implications to feed nine billion people by 2050.

In conclusion, crossing the conventional boundaries of competence development and

capacity development serves as a way to renew the role of education within the innovation systems thinking. However, such an attempt to enhance human capabilities and functioning through education should focus on transformation at the systems level. Thus our research demonstrates the

value of crossing the conventional boundaries of the two seemingly unrelated fields—competence development through education and capacity development through extension – to provide new directions to operationalise innovation systems thinking in agricultural education and extension.

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03

TOWARDS EXTENSION EDUCATION REFORMS 2.0: THE REALITIES, EXPECTATIONS AND IMPERATIVES

Being an extension student is currently a matter of fate for many. We need to make this a choice through strengthening research in extension argues, Sreeram Vishnu and Jancy Gupta.

The science of extension is evolving and advancing worldwide. The discipline, primarily aimed at empowering the farming community by the means of education and communication, has undergone vast changes over the years. Generally extension education is considered as a profession. A profession is something which needs to be carried out with skill and expertise. But can we justify the status of extension as a profession in the present context? Has the discipline adjusted and modified itself to cater to the emerging needs of its practitioners, particularly the grooming researchers? Through this paper, we are trying to analyse present status of extension as a professional discipline. Also an attempt is made to examine the needs and expectations of the student community.

The extension policy makers seem to continue with an intuition that "All Is Well". For improvements in any discipline, continued focus on research and quest for advancement are necessary. Changes occurring within and outside the system should be acknowledged. However, the extension science is currently at the crossroads—standing averse and apathetic on many critical issues. There is hardly any attempt to introduce any reforms in the age-old methods and curriculum of this renowned discipline. Often this has led to unsystematic and irrelevant research, especially those carried out by student researchers, with little/no practical implications. "In SAUs, the extension faculty engages mainly in teaching. The extension research that comes out from the universities is mainly from the M.Sc/Ph.D. thesis work, which are mostly micro level investigations with little or no policy relevant findings" (Sulaiman, 2012).

Several extension scientists are raising concerns about the quality and contribution of extension research through AESA (Agricultural Extension in South Asia) blogs. As a "field-oriented" professional discipline, the extension research differs significantly from other social science research in terms of its content and methods. Lack of adequate field-orientation and poor professional standards in research have eroded the credibility of extension research and practice. Adding to these woes, the current research tools in extension are outdated and their continued use has resulted in stereotypic and insignificant outcomes. Due to lack of practical significance and stagnation in theory development, extension research is often criticized by other agricultural disciplines as a "non-performing discipline" (Prasad, 2013; Sethuraman, 2015).

Being a student of such demoralised discipline is less desirable for any scholar, lest to carry out a good research. The extension students are

efforts, a national level database of all the research dissertations from all the SAUs and Deemed Universities (at least with research title, main objectives and findings) should be maintained. Even though some platforms like Krishiprabha and CeRA are available for this purpose, they are not totally inclusive. Similarly there should be a mechanism to promote linkage among student researchers at National level who are doing research on similar fields/ different facets of same topic.

Students need to be encouraged to participate in seminars and conferences. To avoid bias in judging the presentations, a grading system can be introduced to evaluate the presentations. In this model, all the outstanding presenters can be recognised. This motivates the student community to attend conferences and seminars more willingly and enthusiastically. Finally there should be a mechanism to review the functioning of Professional Societies. The societies should be made accountable to its members in publishing the accepted papers within a reasonable period of time. Also prompt communication with the

member authors needs to be ensured.

Way Forward

Extension is yet to fully realize its great potential. It is the duty of every student and young researcher of this discipline to come up with innovative ideas and dedicated efforts to enrich this discipline. Some Universities in India like PAU are showing the exemplary way of improving the student research by inducting foreign experts in the student advisory committee, and thus providing an international exposure. Such pragmatic attempts go a long way in ensuring investigation of relevant researchable issues by a student. This also leads to the development of a cadre of vibrant scholars, with sound research competencies, capable of well-directed research attempts and fruitful outcomes. Being an extension student is a matter of fate for many. If systematic attempts are made to strengthen its research and restructure its curriculum in line with the demands of its practitioners, it would become an esteemed profession, and then it automatically becomes a matter of choice to be a student of extension.

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04

TEACHING IN AGRICULTURAL EXTENSION EDUCATION: CAN WE IMPROVE IT?

Among teaching, research and service in extension, teaching remains the most neglected. If we want to bring improvement in all these different dimensions of extension, we must pay serious attention to improving the quality of teaching in extension education, argues Mahesh Chander.

Extension education basically deals with bringing about desirable changes in the behavior of human beings, through various strategies and programs, focusing more on education and information exchange. It is educational in content and purposive in approach. Its main aim is to assist rural communities in gaining a livelihood, improve the level of living (both physical and psychological), and foster welfare. The success of the extension process requires an atmosphere of mutual trust, helpfulness and respect on the part of both extension workers and rural people. This calls for a great deal of understanding on the part of extension workers, which is possible only when they possess sound knowledge of the subject. To successfully achieve this core objective of extension education, the teachers in extension education must be proficient enough, not only to teach but also to attract and orient students towards making them competent extension professionals.

The discipline of extension education largely draws subject matter, methods and tools from various areas of social science, such as: Sociology, Psychology, Anthropology, Administration, Communication etc. It is an independent full-fledged discipline like any other discipline in agriculture, veterinary sciences, fisheries & home sciences such as agronomy, entomology, agricultural economics, Veterinary medicine, human nutrition etc. (Box 1).

Teaching in Extension Education

Every teacher irrespective of the subject/discipline has his or her own style of teaching. The teaching in extension education is no different. However, in the case of extension education, the main difference is the presence of several laboratories for extension students, such as: farmers' field, the agripreneurs, agro-processing centers, farmer producer organizations, extension and advisory services in the public, private and NGO sectors etc., where practical insights have to be gained by the students. Ideally teachers of extension education must first start with practicals in these laboratories before introducing theoretical aspects.

Teaching extension is about bi-directional learning, implying that the teacher also learns from the students during the course of teaching. The notion that farmers' field are the only laboratories for extension students, is changing as the extension professionals need to address the knowledge and information needs of the actors involved in the entire agricultural value chain. The farmers now ask advice beyond production, more on what to do once they have produced/harvested including opportunities for agripreneurship.

Box 1: Extension Discipline: Evolution and Growth

The word 'extension' is derived from the Latin roots, 'tensio' meaning stretching and 'ex' meaning out. The discipline of extension education has come a long way since 1873, when the term 'extension education' was first formally introduced by Cambridge University in England, describing it as a system dedicated to the dissemination of knowledge to rural people where they lived and worked. The concept later spread to other parts of Britain, Europe and North America. In the USA, 'agricultural extension' was adopted in 1914, when the United States Federal Smith-Lever Act of 1914 formalized a nationwide cooperative federal-state-county program and gave operational responsibility to the land grant colleges and Universities.

Agricultural extension later spread to Africa, the Caribbean, Asia and Latin America mostly due to the involvement of the USA through its several bilateral assistance programs launched after the Second World War. In India, the study of extension education as a subject was introduced for the first time at Agricultural College, Sabour (Bhagalpur), Bihar in 1953. With the establishment of the 1st Agricultural University at Pantnagar, on Land Grant Pattern of American universities with the assistance of the USA, the subject of agricultural extension was integrated as a discipline in Agricultural Universities offering Master's and Doctoral degrees in agriculture in India.

Faster spread of this discipline to meet the increasing demands of teaching departments of agricultural colleges that grew rapidly in the 50's and 60's adversely affected the quality of its content. The subject in fact, had not established its roots on sound foundation, when course outline and quality of teaching became a topic of concern. In 1967, a seminar was organized at IARI where model syllabus for under-graduate courses, was recommended, while, nothing significant was done for post-graduate courses then (Singh, 1981). A national seminar on 'orientation of extension education curriculum and strengthening functional linkages', organized at CSAUAT, Kanpur in 1981 was, perhaps, the first attempt that took stock of the post-graduate curricula and suggested various modifications (Sulaiman, 1996).

Now almost all State Agricultural Universities (62), deemed to be universities (5), Central Agricultural Universities (2) and Central Universities (4) with agriculture faculty either have Departments of Agricultural Extension or at least a few faculty members to teach extension education.

The effort to modernize the Extension and Advisory Services (EAS) programs, requires well-trained field agents and supervisors who know and can practice effective planning, deliver and evaluate teaching and learning. However, the EAS personnel in developing countries, typically have technical knowledge and skills, but very often lack preparation in the necessary teaching and learning skills that enables them to be successful extensionists (MEAS 2013). Extension and advisory services also needs to play a brokering role, promoting interactions and knowledge flows among the wide range of actors in the Agricultural Innovation System. Are we really preparing our students to meet these emerging professional requirements?

Challenges in extension education teaching

Extension education being a 'field-oriented' professional discipline differs from other social science teaching in terms of its content and methods. Lack of adequate field-orientation and poor teaching standards have seriously hampered the credibility of the extension education discipline among educationists and development planners. This should be seen as a worrying point. Moreover, teaching of extension education subjects, at the

undergraduate level has been disappointing and woeful in most of the cases causing a kind of dislike for this discipline among students. It is no secret that many bright students later do not opt this subject for post-graduation.

This situation must be taken seriously and teachers of extension education subjects should try to dispel the negative perception about extension education discipline by teaching the subjects in an interesting and exciting manner. Often, we limit our teaching methods to lectures only, occasionally supported by PowerPoint presentations. Year after year many teachers stick with the same content, same mode of teaching with same examples making it mundane, while teaching requires adapting. Effective teaching involves progressively refining our content based on reflection and feedback.

There are several challenges in teaching of extension in India. These are as follows:

1. Shortage of faculty
2. Teachers burdened with plenty of non-teaching activities
3. Lack of induction training, required to orient faculty on teaching skills
4. Lack of refresher courses

5. Limited opportunities for practical sessions, including field experiences
6. Non-availability of standard text books on various subjects under extension education
7. Lack of adequate field exposure among faculty
8. Outdated methods, tools and techniques
9. Deficient curriculum which does not relate well with contemporary needs

Some of these are discussed in detail below.

Weaknesses in quality of teaching

Many SAUs are struggling with shortage of teachers in general. Extension Education departments in many universities are short of sanctioned strength. No wonder, in many veterinary colleges, non-qualified faculty in extension education subjects are engaged in teaching extension subjects like advanced research methods, Sociology, extension program planning etc. Moreover, at many SAUs & ICAR deemed Universities, extension education faculty is often engaged or pre-occupied in many non-teaching tasks. For instance, at ICAR-Indian Veterinary Research Institute, there are only 4 scientists in the Division of Extension Education, who alongside teaching Master's & PhD students, also look after Krishi Vigyan Kendras (KVKs), and Agricultural Technology Information Centres (ATIC) as In-charges and a number of on-campus & off-campus training programs for various categories of stakeholders including farmers, trainers etc. The involvement of faculty in running KVK and ATIC, including field extension activities, leaves little time for quality teaching. The faculty also lack exposure on ways to provide and supplement their teaching with cases and contemporary examples.

Non-availability of standard text books on various subjects under agricultural extension is yet another serious problem. Many of the available books are just compilation of materials with no original style of writing, thus, making these monotonous to students. The recent initiative of ICAR to write a Handbook of Extension Education is an appreciable step, which may help in improving the content for extension education teachers.

Lack of induction training, required to orient faculty on teaching skills is also missing, though some universities in recent times have taken step in this regard. The University Grants Commission, in pursuance of the National Policy on Education 1986 and its program of action, had set up 66 Academic Staff Colleges in different Universities/ Institutions across the country. The Academic Staff Colleges, regularly conduct specially designed orientation programs for newly appointed lecturers

and refresher courses for in-service teachers. The extension education faculty should be encouraged to avail this good facility to sharpen their teaching skills towards making teaching effective.

Recent initiatives to improve teaching quality

The 5th Dean's committee has emphasized capacity building of teachers in SAUs, specifically recommending, that SAUs should build up facilities for induction trainings of faculty for a period of at least 4 months. This should follow the pattern of ICAR-National Academy of Agricultural Research Management (NAARM) for Agricultural Research Services (ARS) scientists and focus on computer literacy, knowledge about national and international agriculture, curriculum development, financial and administrative rules and procedures, etc.

Appreciably the National Institute of Agricultural Extension Management (MANAGE), Hyderabad has recently initiated internship opportunity for PhD students in extension. Such opportunities can also be offered by Extension Education Institutes (EETs), State Agricultural Management and Extension Training Institute (SAMETIs), Agricultural Technology Application Research Institutes (ATARIs) & KVKs to orient students to various extension practices, research projects and extension programs. In fact, MANAGE, EETs, ATARIs & KVKs can be ideal institutions to impart practical opportunities to help extension students and newly recruited faculty in broadening their understanding and sharpening their skills in handling extension programs.

ICAR-NAARM, Hyderabad has recently launched a 4 week MOOC (Massive Open Online Course) on 'Competency Enhancement for Effective Teaching'. Courses like these could be a good opportunity for extension education faculty, especially to the young and aspiring to become effective teachers by development of psycho-pedagogical competencies (NAARM, 2016). On 30th January 2017, I saw few extension education faculty receiving certificates on completion of the first MOOC at NAARM. The faculty of extension education should avail such opportunities to improve teaching standards.

Many universities give recognition to good teachers. Teachers in extension education may enhance their competencies in teaching and bring prestige to the discipline.

Weaknesses in content

The curriculum needs changes to suit current and future requirements. Despite recent initiatives by ICAR to revise curricula including agricultural

extension, those being followed in general and especially at the master's level are not relevant to meet the present and future challenges in extension. In 1996, a National Workshop on Post-Graduate Teaching in Social Sciences, was organized at NIAP (ICAR-National Institute of Agricultural Economics and Policy Research, New Delhi). This workshop found that the curricula followed at the Master's level was 'insufficient' in view of the changing job scenario and 'lacking in competencies' to tackle emerging professional needs and challenges. The workshop also identified critical gaps in the curricula at master's level and recommended a thorough revision of the entire curriculum for introducing these changes (Sulaiman, 1996). Many of the recommendations from this workshop (NIAP, 2016)¹ have not been implemented till now.

While discussing how extension should be taught at the undergraduate, Master's and Doctoral level in India, Sulaiman and Van Den Ban (2000)² opined that major changes are needed to prepare students to work in a rapidly changing environment. They rightly said that extension education is in a crisis, because it has not yet adjusted to changes. As extension graduates are not prepared to perform the roles the market demands, they have difficulties to find jobs. In order to prepare the students for present needs, more training is needed in participatory extension approaches, organizing farmers' groups, planning extension strategies to meet farmers' needs, human resource development, agriprenuership and the use of information and communication

technologies (ICTs). The students ought to learn how to apply theories in these areas to field situations. For this purpose, not only agricultural graduates, but also other social scientists should participate in teaching extension. It should become clear which students will be trained to become an extension field worker, and extension manager or an extension researcher.

Globally there is an increasing interest in developing new capacities among extension and advisory services. This renewed interest emerged from the publication of 'The New Extensionist' position paper by the Global Forum for Rural Advisory Services (GFRAS). The position paper argues for an expanded role for EAS within agricultural innovation systems (AIS) and development of new capacities at different levels to play this role. 'The New Extensionist' vision implies changes in EAS organizations, systems, and enabling environments, plus re-skilling all types of individuals to better contribute to increasing the productivity and effectiveness of agricultural systems to improve the livelihoods of farmers (GFRAS 2012). GFRAS is currently developing the New Extensionist Learning Kit- a learning resource for individual extension field staff, managers, and lecturers. It contains 13 modules that have been identified by the GFRAS Consortium on Extension Education and Training, as core competencies for individual extension agents³. The kit focuses on functional skills and will be available for self-directed, face-to-face, or blended learning, towards the middle of 2017 (Box 2).

Box2: New Extensionist Learning Kit: List of Modules and Competencies Required (GFRAS, 2016)

Module 1: Introduction to the New Extensionist
Module 2: Extension Approaches and Tools
Module 3: Agricultural Extension Programme Management
Module 4: Professional Ethics
Module 5: Adult Education for Behavior Change
Module 6: Basic Knowledge Management and Extension
Module 7: Introduction to Facilitation for

Module 8: Introduction to the New Extensionist
Module 9: Farmer Organizational Development
Module 10: The Role of Extension in Supporting Value Chains (Part 1)
Module 11: The Role of Extension in Supporting Value Chains (Part 2)
Module 12: Agricultural Entrepreneurship
Module 13: Gender in Extension and Advisory Services
Module 14: Risk Management and Adaptation in Extension and Advisory Services

However, many of these new areas where capacities need to be developed among extension professionals, are yet to figure in the recent curricula reforms in India.

Recent extension curricula reforms in India
 Recognizing the need that agricultural education has to evolve in tune with fast changing national and international scenario, ICAR embarked

¹ http://www.ncap.res.in/upload_files/workshop/wsp3.pdf

² <http://www.tandfonline.com/doi/abs/10.1080/13892240008438808>

³ <https://www.g-fras.org/en/component/phocadownload/category/65-counting-only.html?download=455:new-extensionist-learning-kit-list-of-modules-and-competencies-required>

upon an arduous task of restructuring the undergraduate courses by constituting 5th Dean's Committee. The Committee restructured course curricula to be implemented from the 2016-17 academic session (PIB, 2016).

This shows the intent of ICAR, towards emphasizing a professional approach in agriculture education, right from under-graduate courses of different streams of agriculture. The changes have reoriented the system to develop needed skills and entrepreneurial mindset among the graduates to take up self-employment, contribute to enhanced rural livelihood and food security, sustainability of agriculture and propel agricultural transformation.

The new courses added at the undergraduate level in BSc Agriculture program including restructured content (Table 1), if taught properly, can prepare students to be good extension personnel. The extension teachers will have to play a proactive role in engaging students in such a way that they find the subject interesting and they develop a liking for it. The new courses like 'Entrepreneurship Development' and 'Business Communication', as also the 'Communication Skills and Personality Development', give an edge to extension education faculty over other faculty in agriculture, thus, it should be seen as one good opportunity to draw students to the extension discipline by making teaching and learning an exciting experience for students.

Table 1: Extension courses approved for BSc Agriculture program

No.	Title	Credits	
1	Fundamentals of Agricultural Extension Education	3	(2+1)
2	Rural Sociology & Educational Psychology	2	(2+0)
3	Entrepreneurship Development and Business Communication	2	(1+1)
4	Communication Skills and Personality Development	2	(1+1)

Box 3: Revised Curricula in Agricultural/Veterinary at PG Level in Extension Education

In order to keep pace with changing time and future needs, the courses in Agricultural/Veterinary Extension were redesigned and updated by ICAR in 2009, wherein:

- New courses have been introduced to keep pace with the latest developments. Courses like Entrepreneurship Development and Management in Extension, E-extension, Media Management, Market-led Extension, Gender Sensitization for Development and Disaster Management are added that are truly need based.
- Course objectives and suggested readings have been provided for each course. This is a good effort which may need continuous updating.
- List of Journals have been given to keep pace with latest developments in the area. It can

be further strengthened by incorporating more multidisciplinary journals. An exhaustive list of journals where extension faculty could publish has been compiled by AESA (Agricultural Extension in South Asia⁴).

- Suggested broad areas of research have been added for providing directions to future research in the area^{5 & 6}.

While framing the new and restructured post-graduate curricula and syllabi for social sciences in agriculture including agricultural extension, it has been underscored, that the discipline of extension needs proper infrastructure, trained teachers, and computers with internet connections. The facility and availability of equipment, experts/guest lectures with industry, farm and village visits, have been emphasized to provide real life exposure to the students.

⁴<http://www.crispindia.org/Where%20we%20can%20publish%20extension%20research%20-%20Final%20Note%20%281%29.pdf>

⁵<https://drive.google.com/file/d/0B0TX5SvS4IMRNEdVbGpwSFlrWTQ/view>

⁶<https://drive.google.com/file/d/0B0TX5SvS4IMRNEdVbGpwSFlrWTQ/view>

The ICAR appreciably also revised the course curricula and syllabi of post-graduate (master's and doctoral) education in agriculture and allied sciences at the national level during 2009 (ICAR, 2009). In Social Sciences group, the course structure and course contents have been developed for three programs namely Agri-business Management, Agricultural Economics, and Agricultural Extension. Agri-business program has been introduced for the first time, while new courses have been added by updating many existing courses in Agricultural Economics and Agricultural Extension programs in tune with the changing time and future needs (Box 3).

A cursory look at these new courses and updating of content gives an impression that more changes are required to modernize EAS to keep pace with the developments. In this context, modules and competencies required, as identified in New Extensionist Learning Kit of GFRAS (GFRAS, 2016) could be one good guide to shape the courses and content in future.

How to Make Extension Teaching Exciting?

Teaching is a challenging task. If the learner hasn't learnt, the teacher hasn't taught!! A teacher has the major responsibility for making classroom teaching effective and stimulating. As teachers, we need to inspire students right from the UG level that they

get attracted to the discipline and consider it a subject of choice for Master's program.

Be an effective teacher

Extension teachers should be well aware of the general requirements which help in making classroom teaching a rewarding learning experience for both –teachers & students (Box 4). The conditions necessary for effective use of teaching methods include the learning situation, which comprises of the teacher who has clear objectives, knows the subject matter and is able to communicate freely with the learners. For effective teaching, the learning objectives should be clear and focused. Teaching is more effective and student learning is enhanced when (a) we, as instructors, articulate a clear set of learning objectives (i.e., the knowledge and skills that we expect students to demonstrate by the end of a course); (b) the instructional activities (e.g., case studies, labs, discussions, readings) support these learning objectives by providing goal-oriented practice; and (c) the assessments (e.g., tests, papers, problem sets, performances) provide opportunities for students to demonstrate and practice the knowledge and skills articulated in the objectives, and for instructors to offer targeted feedback that can guide further learning. The teachers in extension education, can assess themselves, where they stand vis-à-vis the required traits in a good teacher (Box 4).

Box 4: Qualities of effective teachers

For students, it matters much, that the teacher, in general should possess the following traits:

- Knowledge and understanding of the subject
- Enthusiasm about the subject
- Interest in students
- Knowledge of teaching skills
- Broad interest and engaging personality
- Demanding
- Give respect to students, value their opinion
- Encourages and motivates
- Maintaining oneself good fitness & dressing
- Entertaining by giving interesting examples from day to day life
- Ability to control the class & self control
- Making classes interesting experiences
- Knowing the students well
- Punctuality
- Preparing well for the class
- Knowing well the subject being handled
- Having broader outlook
- Good command over language

Practice what you preach

We the teachers in extension education, often talk of teaching learning situations and using tools and techniques like role play, games and exercises to supplement theoretical concepts. However, often we fail to use and integrate them in our own teaching activities. Also, lack of field exposure or practical opportunities is a serious drawback. The students should be taken to various types of farms and agri-ventures, producer organizations etc. for exposing them to field realities, while explaining the theoretical concepts. Suppose we want to teach them livestock entrepreneurship, they must get an opportunity to meet and interact with some enterprising farmers including agripreneurs to familiarize with the concept. We can add value to teaching by using games, exercises, role plays etc. Also, in classroom teaching, questioning, listening and responding are three important activities, which need to be encouraged. On many counts in many of the colleges we find majority of teachers in extension education, deficient which could make their teaching effective.

Use Reflections and Feedback

We need to continually reflect on our teaching and be ready to make changes whenever appropriate (e.g., something is not working, we want to try something new, the student population has changed, or there are emerging issues in our fields). We need to critically evaluate our own teaching effectiveness on a continuous basis. Much of this information exists in the form of students' work, previous semesters' course evaluations, dynamics of class participation, etc. We can always seek additional feedback with help from the university teaching center (e.g., interpreting early course evaluations, conducting focus group discussions, designing pre- and post-tests). Based on these, we should modify the learning objectives, content, structure/ format of a course, or otherwise adapt our teaching methods and styles.

We must make it a point to take students' feedback on our teaching. It could be during the class, at the end of the class and finally at the end of the course i.e. on the last day of the session. Proforma to procure written feedback are available online, which should be adapted to the situation.

Way Forward

1. The initiative by ICAR on Common Academic Regulations, Course Curricula and Syllabi

for Post-graduate (Masters' and Doctoral) Education in Agriculture and Allied Sciences including implementation of 5th Dean's Committee report on undergraduate agricultural education is laudable. This could at least come out with uniformity in syllabus, courses, content, rules and regulations. However, these need constant monitoring, changes and updating at least on a 5 yearly basis as requirements are changing rapidly. While restructuring courses and content, the global experiences in this area like the initiatives of GFRAS & MEAS should also be considered towards modernizing EAS.

2. Capacity building of teachers needs serious attention, for which induction training, refresher courses including overseas training at known world-class training academies may be facilitated.
3. Standard text books on extension subjects should be written by experienced and accomplished extensionists. The ICAR has provision for text book writing, but many qualified and experienced professionals do not come forward to avail this provision. May be by enhancing the honorarium, they can attract good authors.
4. Shortage of faculty, coupled with burdening teachers with multiple non-teaching assignments hampers quality of teaching. The SAUs should give attention to faculty recruitment.
5. The faculty and students need wide exposure to different organizations concerned with agriculture & rural development, besides, the farmers' field and agri-preneurs.
6. Instead of seminars and conferences, small group meetings of eminent extensionists and workshops may be organized to have focused discussions on improving, refining, updating methods, tools and techniques of extension teaching and research.

We know most of the teachers in extension education or for that matter in many other disciplines, are not teachers by choice but by default. Whatever might have been the reasons or compulsions to become teacher, once we are a teacher we must do justice to the job we are supposed to perform. We need to work hard on preparing ourselves to be good teachers by

“ Go to the people. Live with them. Learn from them. Love them. Start with what they know. Plan with them. Build with what they have. Teach by showing. Learn by doing. When the best leaders' work is done, the task accomplished, the people will say “we have done it ourselves.”

-Lao Tzu, founder of Tao philosophy, 700 B.C. ”

equipping ourselves with the knowledge, skills, art and science of teaching.

Finally, a teacher can Tell, Teach or Inspire!! While teaching in a class. I wish to teach in such a way that I am remembered for my good teaching for many years after the students leave college. Also, when

they are in my class, they should think, if they ever become teachers, they would like to be a teacher like me. If I am successful in giving this feeling to my students then I can feel that I could inspire them and my efforts in teaching were successful. Truly, teaching shouldn't be telling or teaching but INSPIRING!!!

Teaching must inspire!

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05

APPROACHING EXTENSION CURRICULA FROM A DEVELOPMENT PERSPECTIVE

Extension post-graduates in general and agricultural graduates in particular, face several challenges in competing with other development graduates and post-graduates in the job market. In this blog, Sagar Kisan Wadkar, explores the reasons behind this challenge by drawing lessons from courses in the development stream and suggests ways to address the lack of development perspectives in agricultural extension course curricula.

Changing Context of Agriculture and Rural Development

Development is what those who are working for the betterment of people aim for. While at the global level, everyone is trying hard to achieve the UN's "Global Agenda of 2030" i.e., Sustainable Development Goals (SDGs), at the national level, there is an increasing focus on achieving the national agenda of "New Rural India – Doubling Farmers' Income by 2022". This calls for collective action with a common purpose by agencies, having different responsibilities and diverse capabilities that are essential for achieving sustainable growth (Wadkar, 2017).

In rural India agriculture is the main lifeline for transforming the rural economy. However, the agricultural sector faces several unprecedented challenges, especially those related to high price volatility, climate risks, and debt. Since majority of farmers (86%) are small and marginal with declining and fragmented landholdings, they are more vulnerable and risk prone to any type of uncertainty. Moreover, addressing many of these new challenges calls for collective action by farmers and collaboration among different agencies.

New Roles for Extension

Consequently, the demands placed on agricultural extension services have also increased manifold. As the extension system has a crucial role in strengthening and promoting sustainable agricultural practices as well as in enhancing food security and farm income, it needs to enhance its capacities to deal with these new challenges. However, the current course curricula used in extension teaching at the different levels (UG, PG and PhD) in Indian Universities are not supporting students to acquire the necessary competencies to address these types of challenges. Lack of development orientation in the curricula and continued dependence on traditional teaching methods are adversely affecting the job prospects of agriculture graduates and extension post-graduates in the development sector as they face tough competition from graduates and post-graduates from the development stream.

More than a decade back, Leeuwis (2004) pointed that there is a need to reinvent agricultural extension as a professional practice, if it has to remain valid in the changing scenario (Box 1). Since the last two decades, many have been talking about identifying and strengthening core competencies among extension professionals (GFRAS 2012, 2015; Sulaiman et al. 2017). Many have also highlighted the need for revising

extension curricula (Sulaiman 1996; Sulaiman and Van den Ban 2000; Acker and Grieshop 2004) and instructional methods (Chander2017). The need

for redefining the role of social sciences in NARS in general, and agricultural extension scientists in particular, has also been highlighted (NAAS 2015).

Box 1: Changes required for professional extension practice

The valid and relevant changes that may be required in this changing scenario are as follows:

Dealing with collective issues: Management of collective natural resources, chain management, collective input supply and marketing, organization building, multi-functional agriculture and linking farmers to market, value addition, etc.

Co-designing rather than disseminating innovations: Need to play a more active role in the process of innovation design and adaptations.

Matching technical and social dimensions of an innovation: Need for a more pragmatic conception of innovation.

Catering for diverse farming and livelihood strategies: Extension organisations will have to anticipate diversity among farmers, which means that they have to be able to give different advice to different people, and treat diversity as a resource rather than as a burden.

Participation paradox: The extension agent is being squeezed between the farming community and the government system, where actual participation is not taking place in the field. There is still a need to further clarify what exactly participation means in an intervention context, what the role of extensionists can be in participatory processes, and what institutional and funding arrangements may be helpful in ameliorating some of the tensions that extension-cum-development practitioners face.

Coping with dwindling resources: Extension organizations have to devise innovative ways of both working with limited resources as well as accessing new sources of income.

Changing professional identities: The role of the traditional public extension system is now slowly declining and the role of private extension services, Civil Society Organisations (CSOs), Non-Governmental Organisations (NGOs), is gradually increasing. Interestingly, these private players perform extension activities, but they do not consider themselves as 'extension agents', but rather as development workers, or as a marketing employee, an external communication manager, a trainer, a mediator, a process facilitator, a public relation officer, a development consultant, etc.

Source: Leeuwis with van den Ban (2004)

Apart from all these aspects, extension organizations need to formulate a convergence mechanism whereby all relevant stakeholders could come together on one platform to serve people effectively and efficiently. Additionally, students need to acquire a development orientation along with hands-on training in order to build practical skills – to compete with other development graduates.

This would require

- Better understanding of rural livelihoods;
- New and relevant competencies;
- A wider choice of instructional methods that will help in acquiring these competencies.

These are discussed in detail below.

Understanding rural livelihoods

The main aim of 'Extension education' is to assist rural communities in gaining better livelihoods, improved lifestyles, and foster their welfare.

Hence, the first and foremost responsibility of extension professionals is to strengthen and promote sustainable livelihood opportunities for their targeted clientele. Livelihood development is indispensable for eradicating all forms of poverty and to achieve food and nutritional security.

Globally, there are four prominent approaches that underline the sustainable livelihood framework and espouse its principles:

- Sustainable Livelihood Framework by the UK Department for International Development (DFID)¹;
- Household Livelihood Security Approach by the Cooperative for Assistance and Relief (CARE, International NGOs);
- Oxford Committee for Famine Relief (Oxfam) - Sustainable Livelihood Approach;
- United Nations Development Programme (UNDP) - Sustainable Livelihood Approach.

Box 2: Strengthening rural livelihoods

'Livelihood' is about 'the means of gaining a living' (Chambers 1995) and 'a combination of the resources used and the activities undertaken (both on and off-farm) in order to live' (DFID 2001). These means and/or combination of activities undertaken lead to diversified outcomes, and hence, how these activities/strategies affect livelihood pathways or trajectories is an important concern for livelihoods analysis. Thus extension professionals have to understand these perspectives while strategizing sustainable livelihood opportunities for rural people while also keeping in mind their means and resources.

There are two broad approaches to livelihoods, which build on the strength of the rural poor viz., the narrower and the holistic views. The former deals with an economic focus on production, employment and household income, while the latter lays emphasis on the concepts of economic development, vulnerability, and environmental sustainability (Shackleton et al. 2000).

Thus, farmers' socio-economic and bio-physical characteristics, vulnerability context, institutional mechanism, along with the policies and the linkages between rural and urban areas, go into formulating their livelihood strategies. As a result there are differences in interpretation and variations in the livelihood approach, but they all have a common theoretical background, which includes Integrated Rural Development Planning (IRDP) approaches in the 1960s and 1970s; Farming System Research during the 1980s; Rapid Rural Appraisal (RRA); Participatory Rural Appraisal (PRA); Participatory Action and Learning (PLA); Agro-Ecosystem Analysis; Political Ecology; Sustainability and Resilience Studies, etc.

These approach enables us to: a) Identify people's resources/assets, sources of livelihood and what they are already doing to cope with risk and uncertainty; b) Explore the factors that constrain or enhance their livelihoods, and its linkages on the one hand, and policies, processes and institutions in the wider environment; and c) Identify appropriate measures that can strengthen assets, enhance capabilities, and reduce vulnerability. Therefore, the extension professional must know the concept of (sustainable) livelihoods and its components to understand farmers and their environment more competently.

New and Relevant Competencies

To become good development practitioner-cum-extension professionals, one should have the following competencies:

- **Understanding of Self:** to reflect on one's own personality and belief systems as well as one's emotional intelligence;
- **Communication Skills:** counseling, critical thinking, and negotiations, designing media-mix IEC (Information, Education & Communication) strategy for development;
- **Group Behaviour and Dynamics:** power and influence in groups, group decision making, conflict management; understanding leadership and its role in bringing out

positive social change, problem solving skills, etc.

- **Facilitation of Social Capital:** ways to approach villagers, organize meetings and group discussions in the field/villages, sensitization and social mobilization of people, identification of felt & unfelt needs of farmers, group formation – need/interest-based groups to address common issues; selection of lead/progressive farmers, etc.
- **Development Programme Planning and Management:** project planning formulation and report writing, logical framework analysis, stakeholder analysis, policy-gap analysis, etc.
- **Livelihood Management:** development of backward-forward linkages, livelihood mapping, (social) entrepreneurship, market linkages, value addition, etc.
- **Documentation and Data Analytics Skills:** developing data collection tools and its administration, evidence-based research, participatory action research, good/best practice writing, qualitative & quantitative data analytics, etc.

The existing curricula used for teaching extension in India, at all levels, do not sufficiently prepare students in acquiring these competencies, due to which agri-graduates and extension professionals often fail while competing with other development

¹See Carney et al., (1999) *Livelihood approaches compared* (Available on: http://www.start.org/Program/advanced_institute3_web/p3_documents_folder/Carney_et_al.pdf).

graduates. There could be several reasons for this, but I would like to highlight four, which I consider important.

- Lack of development orientation and guidance on future prospects;
- Lack of field exposure and practical skills;
- Lack of content and methodology to understand and deal with contemporary issues;
- Traditional teaching methodologies.

It is time that extension faculty in universities learn how teaching is organized in development courses offered by other universities/institutions. Given below is the experience from the Tata Institute of Social Sciences (TISS), and I hope some of these experiences might be useful in the context of extension curricula reform in India.

New Ways of Delivering Content

Development Teaching at TISS:

The Tata Institute of Social Sciences is a unique institute of social sciences; it focuses on the humanistic aspects of social sciences that is blended with science to nurture imagination, creativity, and rigorous critical thought (Box 3). In general, with reference to agriculture development, it has courses, such as MA in Social Work in Community Organization & Development Practice, Master's in Social Work in Livelihoods and Entrepreneurship, MA in HRM & Labour Relations, MA in Social Entrepreneurship, MA in Development Studies, MA in Women's Studies, MA/MSc in Climate Change and Sustainability—where students are trained and nurtured to understand the nuances of development.

Box 3: Tata Institute of Social Sciences (TISS)

TISS has 45 centres across 21 schools, and 8 independent centers spread across four campuses (Guwahati, Hyderabad, Mumbai, and Tuljapur) and offers a number of BA, MA/ MSc, MPhil and PhD courses related to social sciences and rural development, such as education, (public) health studies, development studies, habitat studies, management & labour studies, media & cultural studies, disaster studies, public policy & governance, livelihoods & development, gender studies, human ecology; laws, rights and constitutional governance, etc.

All programmes attempt to build skills in facilitating change and transformation in rural areas at the level of individuals, groups and communities. Students are exposed to multiple pedagogies of teaching and learning with a strong emphasis on exposure to engagement, along with guided mentoring by the faculty and field-based organisations, together with group-based experiential learning. It also endeavours to strengthen the capacities of students to develop appropriate skills and talents to make them committed and dedicated development professionals.

Instructional Methodologies: The teaching and academic programmes are well blended with field learning, supported and facilitated by development partners and people's institutions. Field learning activities not only help students to enhance their sensitivity to social realities, but also provide different lenses that enable them to see the linkages between theory and practice in a praxis mode. Diverse pedagogical methods, such as lecture-cum-discussion, case method, group work & presentation, simulation exercises, etc., are in use to enrich the entire learning process for both students and teachers.

- **Lecture-cum-Discussion:** It is a two-way process whereby a teacher and students learn from each other and share different perspectives on a particular issue/concept. Generally it is based on prior shared reading materials (articles, research studies and other relevant literature) as per course content.
- **Case Method:** It gives students the ability to quickly make sense of a complex problem,

rapidly arrive at a reasonable solution, and communicate that solution to others in a succinct and effective manner. It provides a lively context, facilitates learning by having a professional dialogue between participants and thereby empowers students to reflect upon the peculiar demands of their profession.

Internship and Fieldwork: Internship and Fieldwork form an integral component of the course curriculum at both the Bachelor's and Master's levels of the academic programme.

Internship -These are 6-8week internships, where students are interned with various government, non-government, civil society or community organisations in all the major states of India. As per their course/degree programme most of the students focus on themes like rural livelihoods, forestry, water resources, human rights, entrepreneurship, delivery of social protection programmes, decentralised governance, including performance of Panchayats, etc., for

their field work and internship. This learning help students in their overall learning process and in formulating their research dissertations/projects.

Fieldwork - is meant to translate knowledge and techniques learnt during the course into action for practical use. The basic purpose is to maintain equilibrium between the academic level of the students and their working capacities with clients. It is not merely visiting an agency or observing what goes on. It is done under the able supervision of a well-equipped faculty supervisor and also, sometimes, under an agency supervisor at particular field sites/agencies/organisations to coordinate a set of activities. The students are helped through supervision so as to enable them for working in a complex, intricate and composite social environment.

Marketing of the Programme and Students:

TISS has a centralised placement cell, where a dedicated team use a multi-pronged approach to build a composite employability picture for each student by linking their aspirations/career expectations of relevant organisations. The cell also undertakes different career development sessions/tests comprising one-to-one counseling sessions, career identification exercises, competency mapping and development area identification, and career path planning to enhance and strengthen their personality.

Implications for Extension Professionals and Course Curricula

There is an urgent need to redesign extension curricula to enable students to become very capable development professionals.

At the UG level, the main objective could be to enhance their practical extension-related skills, and acquire a development perspective; as well as to orient students on future prospects of the (extension) discipline so that they can make a choice-based selection of extension at the PG level.

At the PG levels, there should be core discipline courses + specialized modules/courses in one of the areas of the discipline (as per student's interest and availability of expertise) along with Internship + Research/ Project.

The PhD level training should be about further development of their field-based skills and critical and reflective understanding of the selected specialization. In addition, we should encourage students to take up field-based (participatory) action research.

Other specific suggestions include:

- **Strengthening theoretical and practical skills related to socio-behavioral sciences:** Extension education discipline is based on behavioral change communication and so the teaching should provide some basic grounding on psychology, sociology, social-psychology and anthropology. However, this aspect is neglected in the present curricula which are mainly theoretical, and thus lacking in relevant field extension practice.
- **Introduce understanding of rural livelihood promotion:** We often use livelihood interchangeably with agriculture, however, the livelihood concept is too broad and complex and the application of knowledge and technology is often constrained by socio-economic, institutional and policy challenges. In such a scenario, the livelihood analysis of any particular area/region helps us to understand these interlinked factors and accordingly an appropriate strategy can be developed. Therefore, these aspects of livelihoods need to be introduced in the extension course curricula.
- **Strengthening process skills:** There is a dire need to develop and strengthen the process skills of students from the perspective of peoples' participation, design and action in development. This enables students to apply participatory approaches in evolving and strengthening community-based, people-centered development initiatives. In this context an 'Institutional and stakeholder analysis' is an essential part of any new planning and management initiative, especially where a greater degree of integration is sought. The nature and operation of institutions, and their mode of decision making, will have major implications for the implementation of any strategy or planning related to the promotion of sustainable development.
- **Promote action research, especially at the PhD level:** Being part of the social science discipline, there is a need to promote action research, which is a blend of theory and practice, which focuses on co-creation of knowledge of practice in the collaborative process of solving field problems, for the purpose of bringing change.
- **Promote learning by doing:** While we teach the importance of learning by doing, the same principle is seldom followed in extension teaching. There is need to lay more emphasis on strengthening practicals and field exposure in extension teaching.

Way Forward

The future of extension as a profession and a discipline depends on us. The process of change has to start with us. Waiting for committees which revisit extension curricula once in a decade is not going to help. We need collective action, starting with all of us to develop more appropriate

content and relevant instructional methods; and I hope the recently formed MANAGE-University Alliance for strengthening extension and advisory services will take a lead in this direction. Let us make our discipline of extension more attractive in order to draw in the best talent; and let us devote ourselves to training and nurturing future extension professionals.

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06

BEYOND ROGERS: DIFFUSION OF INNOVATIONS AND EXTENSION CURRICULA

Though the “diffusion of innovations” paradigm proposed by Everett M Rogers has largely been criticized by many researchers, the current extension curriculum followed in India has not accommodated any of the new insights that have emerged in this area. Neither have any of the alternate theories supplementing this conceptual paradigm been taken up. In this blog, Archana Bhatt presents these new developments and argues for including these in the extension curricula.

Globally, the agriculture sector is getting ready for a technological revolution with cutting edge technologies – it could be robotics, sensory technology or automated machineries. These new technologies, no doubt, can change the future of agriculture but it is also very important to carefully and efficiently promote these to those who are in greatest need of them. Integrating the right technologies at the right time can bring about radical change in the agriculture sector.

Studies on diffusion of innovation, primarily led by Everett M Rogers, have surely provided several new insights on effective dissemination of technologies to potential adopters by extension services. The practice of extension has been primarily guided by Rogers’ ‘Diffusion of Innovations’ tradition. With time there have been advances in diffusion research, but we as extension scholars still fall behind in terms of updating ourselves with the new insights that have come about globally. Though a lot of interesting reading materials are available online that can help us to upgrade ourselves on this topic, many of us still remain stuck to older textbooks on this topic. This has adversely affected our professional contributions as well as the credibility of our discipline. Moreover, lack of exposure on these advances is also affecting the job prospects of extension students. Therefore, enriching the curricula and research traditions in extension with new insights from diffusion studies is absolutely essential. This blog presents some of these new developments in diffusion studies.

Diffusion of Innovations

Everett M Rogers¹ was among the pioneers who contributed to diffusion research and it would not be an exaggeration to call his publications, ‘Diffusion of Innovations’ (Rogers 1962) or ‘Communication of Innovations’ (Rogers and Shoemaker 1971) the Bible of diffusion studies. This model evolved in a particular institutional context, based on well-known case studies, notably the adoption and diffusion of hybrid corn in the USA in the 1950s. These case studies simplified a complex process into a step-wise, linear sequence of activities that was described without reference to the way agendas of different stakeholders were addressed, and how technology priorities were selected and promoted (Sulaiman

¹ Everett M. Rogers (1931–2004) was a communication scholar and a sociologist. He is best known for originating the diffusion of innovations theory that became widely accepted in communications and technology adoption studies. In 2003, Rogers published the 5th edition of his book “Diffusion of Innovations”, The previous editions were published in 1962, 1971, 1983 and 1995.

and Hall 2002). Innovation was understood as a new technology at that time whereas we now have a better understanding of the term 'innovation' – encompassing as it does the factors affecting demand for, and use of, knowledge in novel and useful ways (World Bank 2006). We must not only be aware of these changes but also upgrade our understanding of these from diffusion and innovation studies. These are discussed below.

a. Hype cycle

Gartner Inc., an American research and advisory firm proposed this theory. This theory explains what happens when an innovation is hyped through a trigger and then how it goes through various stages to full acceptance. Unlike the diffusion curve by Rogers, rather than putting the blame on potential adopters or non-adopters this theory talks about the intrinsic value of the innovation. Gartner's hype cycle gives an insight on how an innovation will evolve over time. It represents the maturity, adoption and business application of new technology. The hype cycle commences with the trigger, and is then followed by a peak of inflated expectations, goes through a trough of disillusionment and a slope of enlightenment, and finally arrives at the plateau of productivity (Fig. 1). It is also worth noting that hype cycle curve will be different for different innovations. Each year the firm comes up with various Hype cycles in various domains for emerging technologies. In practice, some researchers even consider it a better method for studying innovations (Gartner Research 2018; Wikipedia 2018).

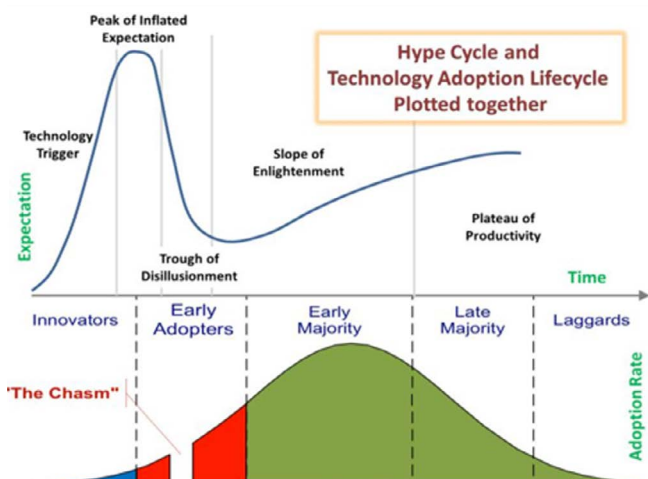


Fig. 1: Hype cycle and technology adoption life cycle plotted together

b. Crossing the chasm

As we look into the bell shaped diffusion curve, the gap lying between the early adopters and the late adopters is termed as the chasm. Geoffrey A Moore (2014) in his book 'Crossing the Chasm', explained that to ensure that an innovation is

taking hold the chasm must be crossed. If the early adopters are able to cross this chasm and help in bridging this critical point then the innovation reaches the tipping point, thus allowing the curve to rise up to where the majority adopt the innovation and then sink again. He also stated that the population lying before the chasm are the people who want the newest things while the population lying after the chasm are the people who want solutions and convenience. The real challenge lies in crossing the chasm, i.e., winning the heart of the 84% who believe in solutions and convenience. Thus, knowing the right time of chasm crossing will certainly help in planning for better adoption of any innovation (Anonymous n.d.).

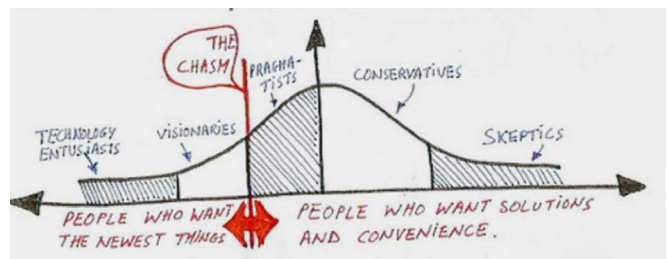


Fig. 2: Crossing the chasm

c. The innovator's dilemma: Sustaining & disruptive innovations

Clayton M Christensen (1997) in his bestselling book 'The Innovator's Dilemma' asks the question as to why successful companies often can't capitalize on the opportunities brought about by major changes in their market. He has mentioned two types of technologies, i.e. sustaining and disrupting technologies. Sustaining technologies are technologies that improve product performance or are the technologies that involve improving an already established product. Disruptive technologies, on the other hand, are innovations that result in worse product performance especially in the near term. He explains that disruptive innovations cause problems as they don't initially satisfy the demands of even the high end market; hence the larger companies ignore them until they become more profitable. These technologies later even surpass the sustainable technologies and satisfy

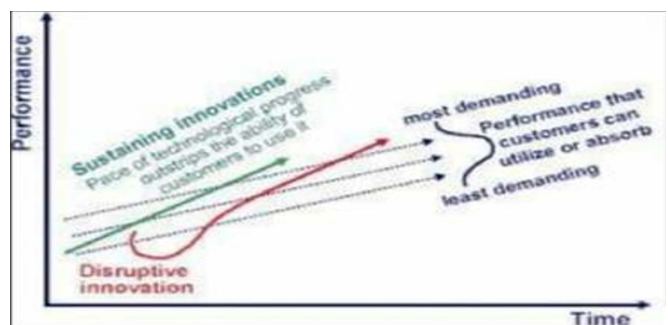


Fig. 3: Innovator's dilemma: Sustaining & disruptive innovations

market demand at lower prices, thus leaving behind the larger companies that didn't invest in disruptive technologies beforehand.

d. The cyclic innovation model

Guus Berkhout conceived of this model and remarked that the successful market introduction of products and services is a cyclic process with interactions between different actors from various disciplines. This model reconciles the 'technology push' model and the 'market pull' model and explains as to why a holistic multi-disciplinary approach is needed to facilitate an effective innovation system (Berkhout 2017).

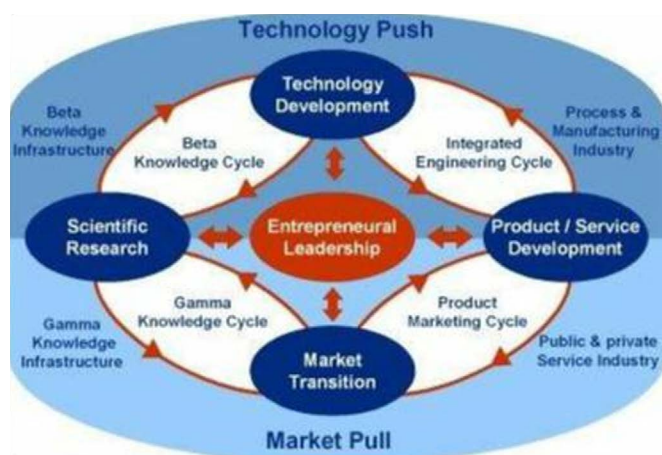


Fig. 4: Cyclic innovation model

e. Open innovation

Henry Chesbrough (2003) in his book 'Open Innovation' describes the transition from the traditional internally focused 'closed' innovation paradigm to an 'open' innovation paradigm. He explains in detail the characteristics of open innovation and the advantages it has over the traditional closed innovation.

f. Maloney's 16% rule

The 'Maloney's 16%' rule is meant for accelerating the diffusion of any innovation. The rule states that once 16% adoption of an innovation has occurred, one must change the media and

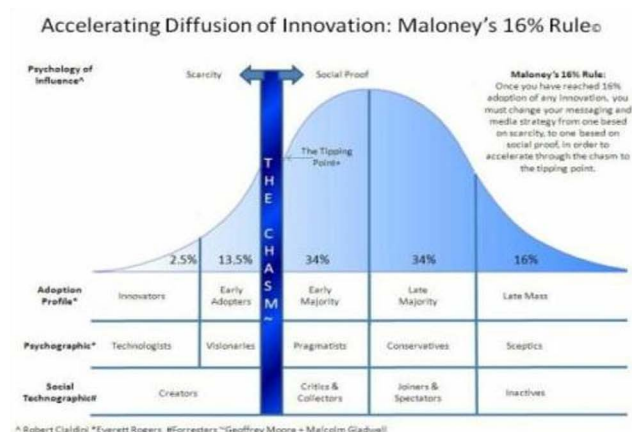


Fig. 5: Accelerating diffusion of innovation: Maloney's 16% rule

messaging strategy from one based on scarcity to one based on social proof in order to accelerate through the chasm to the tipping point (Maloney 2010).

g. Innovation systems

Though originally developed to understand industrial innovation, the innovation systems framework has been increasingly used to understand the process of knowledge generation and used in agriculture. Innovation systems can be defined as 'a network of organisations focussed on bringing new products, new processes and new forms of organisation into social and economic use, together with institutions and policies that affect their behaviour and performance' (World Bank 2006).

Under the framework of Agricultural Innovation Systems (AIS), innovation is currently understood as an interactive process through which knowledge is generated, accessed and put into use. It is not a linear process of science developing new knowledge and transferring it to the extension system for wider dissemination. Innovation requires a combination of technical, organisational and institutional adaptation. New investments and partnerships are required to couple technological innovation with organisational and institutional change (Hall et al, 2010). Central to the innovation process are the interactions among a large number of actors having complementary knowledge and expertise. "This process quite often needs to be facilitated as actors often need an initial push or opportunity to break barriers against joint discussion, action, sharing, and learning (increasingly referred to as brokering) (Klerxx and Leuwis, 2009).

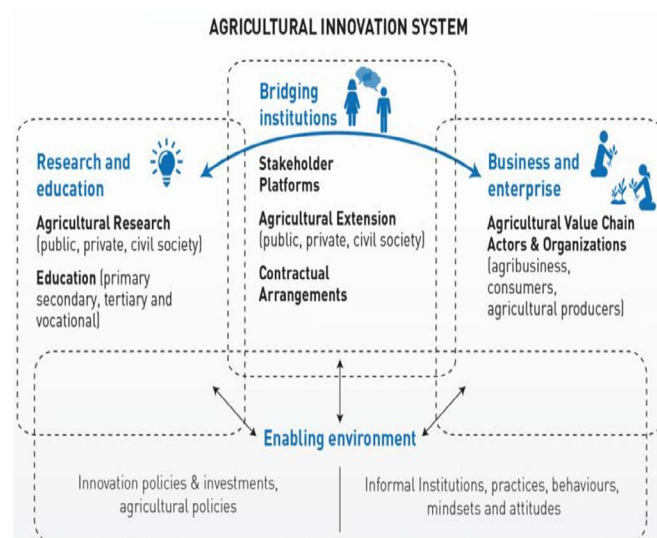


Fig. 6: Agricultural Innovation Systems

Source: Tropical Agriculture Platform (2016)

Extension and advisory services (EAS) are integral to the AIS. Within the AIS, EAS should ideally

play the role of a 'bridging' organization, linking the different bits of knowledge held by different actors, and facilitate its application and use, thereby leading to innovation. But to perform this role, EAS need new capacities at different levels (Sulaiman and Davis 2012). Hence, it becomes pertinent to study AIS when we talk about a particular technology as the adoption of any technology is governed by several other factors, which we generally do not consider under the diffusion of innovations paradigm.

Way Forward

As extension professionals, we need to upgrade and enrich our understanding on diffusion and innovation. Our extension curriculum is currently lagging behind in terms of new insights, from both

the theory as well as the application of diffusion and innovation studies. The existing course on 'diffusion of innovation' for extension scholars doesn't include the current breakthroughs and developments this branch of knowledge has adopted. Curricular reforms in extension are long overdue and these developments in diffusion and innovation studies should figure in such efforts. There are many new topics in extension that have come up recently or been upgraded with, but here I have only touched on the important concepts on diffusion of innovations which I have found useful. As scholars of agriculture extension we should be ready to familiarize ourselves with the ongoing developments in our discipline and share the same with our peers.

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07

DEVELOPING CRITICAL SYSTEMS OF LEARNING COMPETENCE: IS THIS THE WAY OUT?

A few months back, Laxmi Prasad Pant wrote a blog for AESA on learning and innovation competence. Expanding upon the earlier argument on developing 'learning and innovation competence', he developed the framework of 'critical systems of learning and innovation competence'. In this blog, he argues that critical systems of learning and innovation competence involving various levels of thinking and action is equally or more important than mere technological competence.

Albert Einstein's quote goes like this. "We cannot solve our problems with the same level of thinking that created the problem". Our study on critical systems of learning and innovation competence further supports this argument. We found that despite the agro-ecological competitive advantage and modest advancements in agricultural science and technology, Nepal has become a net importer of food grains, and India falls behind the non-conventional mango growers' ability to deliver mango yield, both in terms of quantity as well as quality. Can we address this problem using the same level of thinking that created them? Of course, not! Then what is the way out?

Clearly, the agro-ecological potential of the Indian mango sector and the Nepalese rice sector is not being compromised by the mere lack of advancements in agricultural science and technology in these two countries (and commodities), but more importantly due the failure to engage in critical thinking and action at various levels. Through our decade-long research, we developed the framework of critical systems of learning and innovation competence to address the question about what could be thought and done differently to effectively promote unintended positive consequences of well-meaning interventions, which we here use as examples that entail critical systems of learning competence?

We briefly discuss this key question here using a conceptual framework that have been developed through an expansion of our earlier concept of 'deliberation on dialectical divides' - divides that are more dark and bright than black and white (Pant and Hambly-Odame, 2006). In our newer model, we recommend the use of three levels of deliberation (1) deliberation on development problems, (2) deliberation on the contexts that created the problems, and (3) their philosophical and theoretical underpinnings (Fig. 1).



Fig. 1: Multi-level deliberation on dialectical divides

Deliberation on development (socio-eco technical) problems

Here the key development problem is the poor performance of the mango and rice sector, respectively in the Krishna District of Andhra Pradesh, India, and the Chitwan District of Nepal.

The interventions in mango (post-harvest) and participatory rice improvement have generated impressive outputs, such as improved rice varieties, mango post-harvest technology, and outcomes such as change in stakeholder relationships into more critical systems of learning and innovation. A rare human ingenuity was also evident, such as Nepalese farmers' self-motivated initiatives to improve local rice varieties for dry season planting and Indian farmers' exploration of domestic middle-class mango markets to supply premium quality mangoes to emerging super markets (see Pant and Hambly-Odame, 2009 and Pant *et al.*, 2012 for further details).

But we have seen little impact on economic and social welfare of smallholder farmers even under the existing agro-ecological comparative advantage of growing mango and rice, extensive investment on the part of agricultural and rural development, overseas technical assistance and the existence of farmers' organizations designed, inter alia, to stimulate technological learning and innovation.

For example, in Nepal, LI-BIRD (Local Initiatives for Biodiversity, Research and Development, Nepal) has been highly effective in facilitating multi-stakeholder deliberation on dialectical divides, such as integrating expert and local knowledge of rice varieties, centralized and participatory rice breeding, modern and local rice varieties, and rice varieties with and without regulatory legitimacy. Similarly, in India APEDA (Agricultural and Processed Food Products Export Development Authority, India) together with the State Department of Marketing facilitated stakeholder relationships to promote agro-ecological competence of using mango diversity bringing together farmers, public sector scientists, policy makers and mango traders albeit mostly on technical service delivery.

Despite these interventions, mango and rice diversity in these countries is still underutilized to enhance food security and national competitiveness. This finding implies that multi-stakeholder deliberation on agricultural biodiversity conservation and development problems per se are not enough unless people start questioning the contexts that have created the problems and the broader philosophical and theoretical bases of the problems.

Deliberation of the context of the problems

Although we can argue that multi-stakeholder deliberation on the contexts of the problems of conservation and utilization of agricultural biodiversity was apparently lacking in both cases, thereby seriously compromising agro-ecological competence, some discussions were initiated around the interdependence of technological and institutional issues, and the need for looking at the context of the problems. Despite their modest advancements in agricultural science and technology, stakeholders generally agree that these countries (rather regions in case of India) fail to unleash the technological competence that could more fully utilize the existing crop diversity.

But this was not enough to convince stakeholders from research, policy, extension, and farming domains to deviate from their 'business-as-usual' habits and practices of doing agricultural research and extension, the underlying causes of the problems. What is important to the development of critical systems of learning and innovation competence is the agency of individual and organizational actors to engage in deliberation on dialectical divides, setting up new experiments that are designed to fail, and empowerment of vulnerable actors to challenge the business as usual based on new evidence generated from the new experiments, be they successful or unsuccessful (Ison *et al.*, 2007).

Deliberation on the philosophy and theory of development problems

Stakeholder deliberation not only requires addressing the development problems and their immediate contexts, but it should also look at the higher level of philosophical and theoretical underpinnings. For the purpose of illustration, we bring together independently evolved literature on socio-ecological systems and socio-technical systems.

On the one hand, socio-ecological system thinking has proven important to inform conservation and utilization of agricultural resources. This thinking, however, considers technology as a given entity without necessarily questioning what technology is good for local contexts and communities (van der Brugge & van Raak, 2007; Voß & Bornemann, 2011).

Socio-technical system thinking, on the other hand, explicitly addresses the complexity associated with science, technology and innovation processes with a more recent focus on transition management, particularly about how stakeholder agency for critical learning and innovation interacts with the structure put in place by the socio-technical

regime of a nation, such as National Agricultural Research and Extension Systems (Smith & Stirling, 2010). Moreover, this body of literature focuses on transition experiments that are strategically designed to generate evidence-base to challenge the business as usual of the incumbent regime (Kemp et al, 1998). These experiments can serve as a safe space for critical thinking and radical actions without serious consequences of failure. In classical extension literature, this is akin to the trial phase of adoption process – awareness, interest, trial and adoption, but while the classical adoption process is mostly orchestrated by the incumbent regime, the niche experiments are essentially radical to challenge the business as usual.

As outlined earlier, examples of the radical space of interest in agricultural innovation is the work of the Nepalese farmers who selected rice varieties suitable for dry season production with food quality comparable to the available main season rice varieties, and that of Indian farmers who successfully explored domestic middle-class markets as opposed to increasingly stringent and competitive export markets. Thus, up-scaling of

such local level innovation agency of rural farming communities that are often only possible through strategically designed transition experiments would be important for successfully developing resilient, sovereign and productive local food and agricultural systems. However, up-scaling, if done prematurely, can also wipe out the core values of the niches that have been created by the agency of radical innovators.

To conclude, as implied by the unintended positive consequences of the well-meaning interventions, effectively addressing food insecurity should involve critical systems of learning and innovation, encouraging people to radically question their social, economic, ecological and technical reality – Indian mango growers turned to explore domestic middle-class mango markets, and Nepalese rice farmers challenged university trained plant breeders to select rice varieties for dry season cultivation. Thus, low and middle-income countries that are rich in agricultural resources, irrespective of their economic growth, cannot succeed unless technological competences are complemented by critical systems of 'learning competence'.

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08

50 PUBLICATIONS EVERY EXTENSION PROFESSIONAL SHOULD READ

To remain relevant and to support addressing the rapidly evolving challenges in agriculture, extension professionals need to upgrade their competencies. Sreeram Vishnu and Rasheed Sulaiman V have chosen what they think are the 50 best publications every extension professional should read to enhance their knowledge and skills to remain relevant to the changing times.

The need for performing wider roles by Extension and Advisory Services (EAS) and the need to enhance their capacities to do these well, are well recognized globally (Box 1). Yet there hasn't been much serious efforts in revising the existing extension curricula (both education and training) followed in most countries. Though several new learning resources from the Global Forum for Rural Advisory Services (GFRAS) such as the NewExtensionist Learning Kit (NELK) and Global Good Practice (GGP) Notes are currently available (as freedownloadable resources), new concepts, approaches and tools presented in these publications are yet to find a place in the teachings and trainings of EAS providers. The curricula in most cases remain static and there has been a tendency to continue with the old text books and publications. These to a large extent, constrain the uptake of new and more relevant ideas that could help transforming the extension discipline and develop EAS professionals with skills and knowledge relevant to the current era. The main purpose of this blog therefore is to introduce and promote some relatively newer publications, which we believe every extension professional should read to enhance his/her capacities.

We approached this task by first identifying ten broad themes in extension (relevant to the new challenges and capacities as articulated in Box 1) and then initially thought of selecting one lead resource for each theme. But we realized soon that selecting only one from each theme may result in leaving other equally relevant publications from that theme. So we finally decided to present another four related publications that are also relevant to that particular theme.

While doing this exercise, we noted that some of the publications could be relevant for more than one theme. For instance the NELK and GGP Notes cover a wide range of topics such as gender, entrepreneurship, Agricultural Innovation Systems (AIS), use of different ICTs, etc. Some publications have to be adjusted in a related theme as other publications relevant under that particular theme were not found. For instance, the publication Shaping Change could have ideally been placed under a theme called NRM (Natural Resource Management) extension, but finally we have to place it under the theme climate change as the book is more about dealing with similar increasingly complex challenges.

While we were looking for more recent publications, we also included relatively older, but equally relevant book such as Agricultural Extension by van Den Ban and Hawkins (2002) that serves as a standard text book especially for beginners. With all these challenges, we finally organized the list according to our own professional experience and judgment on the utility and relevance of these publications.

Box 1: New challenges before EAS and new capacities to address these

Extension and Advisory Services (EAS) currently supports farmers in dealing with several new challenges beyond enhancing access to new technologies. Farmers do need support to deal with uncertain markets, changing consumer demands, declining and deteriorating common property resources such as land and water, and adapt better to climate change. International agencies and national governments currently look forward to EAS to support the large number of women engaged in agricultural activities; address nutrition related issues and encourage, support and train rural youth to effectively engage in agriculture. Addressing many of these challenges would mean, supporting farmers to be organized into collectives (farmer groups, producer organizations etc.) at different levels.

Ideas around communication and innovation have considerably evolved over the past two decades. Innovation is no longer considered as a linear process of science developing new knowledge and transferring it on to extension for wider dissemination. Innovation is currently understood as an interactive process through which knowledge is generated, accessed and put to use. If EAS have to meaningfully support farmers in addressing the above challenges, EAS need to widen their agenda and emerge as a “bridging organization” linking several actors in the Agricultural Innovation Systems (AIS) rather than being an intermediary between research and farmers. Apart from these new insights, EAS providers must be aware of the changing tools and approaches to extension, the use of wide range of Information Communication Technologies (ICTs) and be able to assess and select the appropriate ones to suit the conditions they work in.

With the increasing participation of private sector and civil society organizations, EAS delivery has become pluralistic in many countries. While pluralism brought new capacities and additional funding for EAS, it has also brought new challenges for EAS, mainly related to co-ordination, knowledge management, policy alignment and sustainable financing. All these would involve developing capacities of EAS at the individual, the organizational and the enabling environment levels as articulated in the GFRAS (2012) Position Paper, “The New Extensionist”. Apart from these, extension professionals need new insights and learning to sharpen and enhance their knowledge and skills for effectively solving both field problems and operational challenges and this would involve strengthening research and evaluation in EAS.

1. Basic Concepts, Approaches and Tools in Extension

Lead Source

The New Extensionist Learning Kit (NELK)

NELK is a learning resource, developed by GFRAS (2017)¹ for individual extension field staff, managers and lecturers. It focuses on functional skills and contains 13 modules that have been identified by the GFRAS Consortium on Extension Education and Training as core competencies for individual extension agents. The aim of this kit is to produce or equip extension professional who can effectively interact and work with all different actors within the AIS with an ultimate aim of benefitting producers and related actors. While the contents of the learning kit will be primarily aimed at self-directed learners, it is also suitable for use in face to face settings. The materials can be downloaded and used for face to face and blended learning. The learning kit can help top up the knowledge of existing professionals, but also be taken up by learning institutions as foundational course material for the certificates or degree.

Other Important Source

The Rural Extension Series by Hoffman *et al.*, (2009)² is published in three volumes. The first



in the series is *Basics Concepts and Methods in Extension* which gives specialists the opportunity to supplement their training by acquiring the fundamentals of the methodology and theory of agricultural extension. The volume two basically deals with *Examples and Background Material* like case studies, checklists and practical guidelines. Last in the series, *Training concepts and Tools* is dedicated exclusively to the training needs of both staff members at various levels of extension advisory services and students in higher education.

Agricultural Extension by van den Ban and Hawkins (2002)³ is a thorough, practical handbook that explains the purpose, importance and far-reaching effects of agricultural extension

throughout the world. It covers a range of topics from different extension philosophies, the functions of extension agencies, strategies and methods appropriate to rural development in less industrialized countries, through theories underlying extension processes to professional ethics for extension workers.

The publication, **What Every Extension Worker Should Know: The Core Competency Handbook**, by Suvedi and Kaplowitz (2016)⁴ is designed as a reference manual for front-line extension staff to use in their day-to-day work. It offers a set of tools for effective communication, program planning and evaluation.

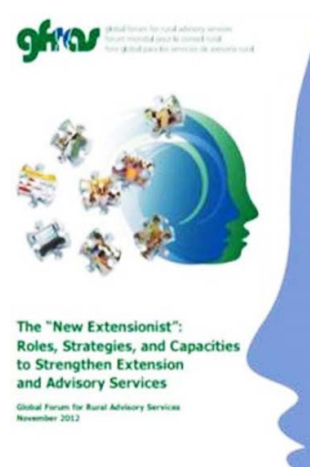
The FAO publication, **A Decision Guide for Rural Advisory Methods** by David and Cofini (2017)⁵ is intended to help extension professionals and their organizations make informed decisions about which extension method and approach to use for providing information, technologies and services to rural producers and to facilitate interactions and knowledge flow. Expected users include field-based rural advisors, extension managers and programme planners.

2. Extension and Innovation

Lead Source

The “New Extensionist”: Roles, Strategies and Capacities to Strengthen Extension and Advisory Services

This GFRAS position paper from Sulaiman and Davis (2012)⁶ presents a global view of extension and advisory services (EAS) and it reinvents and clearly articulates the role of EAS in the rapidly-changing rural context. It argues for an expanded role for EAS within agricultural innovation systems (AIS) and development of new capacities at different levels (individual, organizational and system levels) to play this role. The paper also discusses ways of developing capacities needed for operationalizing this vision at these levels.



Other Important Source

Communication for Rural Innovation (Rethinking Agricultural Extension)

by Leeuw is with van den Ban (2004)⁷ broadened the traditional communication functions of extension. The role of the communicator has shifted from, initially that of a disseminator of information to subsequently that of a facilitator of interaction and more recently, as a broker or an agent playing a wider range of intermediation tasks at a range of interfaces situated within (and between) networks of stakeholders operating in different societal spheres. The book discusses in detail the major roles communication can play in supporting the three essential processes relevant to innovation: network building, supporting social learning and dealing with dynamics of power and conflict.

Agricultural Innovation System: An Investment Sourcebook

(World Bank, 2012)⁸ is an important resource for those interested in understanding the role of extension within the AIS. Module 3 of this of this source book on investment in extension and advisory services as part of agricultural innovation systems" (Davis and Heemskerk, 2012)⁹ describes key principles for developing demand driven, pluralistic advisory services (including the technical, entrepreneurial and organizational aspects of this process) capable of supporting the heterogeneous client base of an AIS.

The World Bank publication, **Agricultural Innovation Systems: From Diagnostics Toward Operational Practices** by Rajalahti *et al.*, (2008)¹⁰ presents the emerging agenda for an AIS approach, through a set of case studies and other materials that illuminates the important contextual factors affecting the innovation process. It builds on the World Bank (2006)¹¹ paper, **Enhancing Agricultural Innovation: How to Go beyond Strengthening Research Systems** and the converging views of participants of an international workshop on AIS organized by the Agriculture and Rural Development Department of the World Bank in 2007.

The CTA publication **Innovation Systems: Towards Effective Strategies in Support of Small holder Farmers** by Francis *et al.*, (2016)¹², provides a collection of papers, commentaries, expert opinions and reflections on state-of-the-art innovation systems thinking and approaches in agriculture. It attempts to respond to perplexing questions which continue to dominate the agricultural innovation agenda, particularly in the context of smallholder farming systems.

3. Climate Change and EAS

Lead Source

Climate Smart Agriculture (CSA) Sourcebook C-3 module of the FAO (2017)¹³ Climate Smart Agriculture Sourcebook, Supporting Rural Producers with Knowledge of CSA by Chuluunbaatar *et al.*, (2017)¹⁴ highlights the key role EAS can play in promoting climate-smart agriculture and provides some guidance on how, through strategic capacity development, they can better carry out this role. Currently EAS is unable to meet these new demands. Access to adequate EAS is crucial for ensuring that agricultural producers are sufficiently informed about changing conditions and can adopt sustainable agricultural practices. EAS will require increased institutional and financial support, and their capacities will need to be upgraded to support agricultural producers in reducing climate-related risks.



Other Important Source

Adaptation Under the “New normal” of Climate Change: The Future of Agricultural Extension and Advisory Services by Simpson and Burpee (2014)¹⁵ outlines the nature of the adaptation challenge, identifies past and present points of EAS engagement, and proposes future responses. The paper focuses on the constraints and conditions of smallholder farmers in the tropics, as well as the natural resource base upon which agriculture depends.

The pocket guide, **Extension Practice for Agricultural Adaptation** by Simpson (2016)¹⁶, details out the concepts, information and practices meant to support working with farm families in helping them to reduce their risks from changes in the weather. Also it details practical methods that meet the objectives outlined by the UNFAO for climate-smart agriculture. It provides examples of practices that illustrate important principles and adaptive options that are meant to be used by extension field agents.

The book, **Shaping Change: Natural Resource Management, Agriculture and the Role of Extension**, by Jennings *et al.*, (2011)¹⁷ provides fresh perspectives and practices to extension professionals who have to adjust to the rapidly changing demands of natural resource management and agro-food industry. Though written from the perspectives of challenges primarily faced in the Australasia Pacific Region, the chapters offer several new insights for students and practitioners of extension on principles and practices for enabling change, and building social capital to deal with the new challenges.

The manual, **Gender and Inclusion Toolbox: Participatory Research in Climate Change and Agriculture** by Ferdous and Spicer (2014)¹⁸ introduces a wide range of participatory strategies and tools for research to guide the implementation of CSA and is intended for NGO practitioners and program designers interested in diagnostic and action research for gender sensitive and socially inclusive climate change programs.

4. Linking Farmers to Markets

Lead Source

Linking Smallholder Farmers to Markets and the Implications for Extension and Advisory Services

The MEAS discussion paper by Ferris *et al.*, (2014)¹⁹ contains a review of EAS best practices drawn from the global body of experience in successfully reaching out to resource-limited farmers. Further, this paper explores the changing role of agricultural extension services and the growing focus on marketing and business needs of smallholder farmers. Key issues in this debate include finding better means of coordinating and sustaining services, and generating policies that build farmers capabilities to raise incomes by linking to various types of markets — including informal domestic and regional markets, traditional cash crop market, formal and higher



value markets, and emerging food aid and structured public markets.

Other Important Source

The Business of Agricultural Business Service: Working with Smallholders in Africa, by Wongschowski *et al.*, (2014)²⁰ identifies different ways that the public and private sectors have been working together and sheds light on the pluralistic extension system. Practitioners working in the value chain and enterprise development, development partners who finance projects and policy makers will find this book useful for orienting their support to the agricultural sector.

A Guide to Strengthening Business Development Services in Rural Areas by Best *et al.*, (2015)²¹ demonstrates how a variety of support services not only improve the performance of individual producer organizations and agro-enterprises, but how they also strengthen entire agricultural sub-sectors and market chains and fuel new employment opportunities in rural areas.

Market-oriented Advisory Services in Asia – a Review and Lessons Learned, by Kahan (2011)²² presents the findings of a regional study in Asia on the design and delivery of Market Oriented Advisory Services (MOAS) to farmers and rural entrepreneurs. The publication is directed at those institutions involved in extension, value chain/market linkages and business development.

The book, **Knowledge Driven Development: Private Extension and Global Lessons**, by Zhou and Babu (2015)²³ uses actual cases written specifically to study the role and capacity of private companies in knowledge sharing and intensification through agricultural extension. Descriptions of specific models and approaches are teased out of complex situations exhibiting a range of agricultural, regulatory, socio-economic variables. Illustrative cases focus on a particular agricultural value chain and elaborate the special feature of the associated private extension system.

5. Producer Organizations in EAS

Lead Source

Producer Organizations in Rural Advisory Services: Evidences and Experiences

This position paper from GFRAS (2012)²⁴ was written to raise awareness on the roles of producer organizations in rural advisory services. Further discussion is built upon, how their effectiveness in these roles can be increased so that they contribute to improved livelihoods and poverty reduction. The position paper also

presents examples of the different ways that producer organizations are involved in the supply of and demand for rural advisory services. The paper ends with a series of recommendations to different actors involved in the provision of rural advisory services about how to strengthen producer organizations and make them more demand-oriented.

Other Important Source

The MEAS discussion paper, **Farmer Organizations and Modernizing Extension and Advisory Services: A Framework and Reflection on Cases from Sub-Saharan Africa** by Bingen and Simpson (2015)²⁵ discusses cases from sub-Saharan Africa and strives to give a better understanding of the role of farmer organizations in development outcomes which are critical to identifying options and strategies for promoting successful rural advisory services (RAS).



Organizing and Managing Farmers' Groups, jointly published by CRS and MEAS (2015)²⁶ presents an integrated and sequential approach to building vulnerable farmers' capacity to link with markets. The guide is intended for use by development facilitators, field extension agents and community leaders working with poor rural communities and it aims to provide them with a broader understanding and the skills needed to help local people work together, manage their resources and understand how to develop a sustainable and profitable agro-enterprise.

The case study-based publication **Good Practices in Building Innovative Rural Institutions to Increase Food Security** by Herbel *et al.*, (2012)²⁷, presents a collection of thirty-five cases of successful small-scale producer innovative organizations and institutional arrangements, from different regions in the world. While highlighting the success factors for small producer organizations to thrive, these good practices allow development practitioners and other stakeholders to learn from successful

initiatives in various countries, to support and replicate them.

The paper, **Making Change Happen - What can Governments do to Strengthen Forest Producer Organizations?** By deMarsh *et al.*, (2014)²⁸ explores the factors that help build constructive relationships with government counterparts, and the policy and institutional conditions that encourage or hinder forest producer organizations (FPO) development.

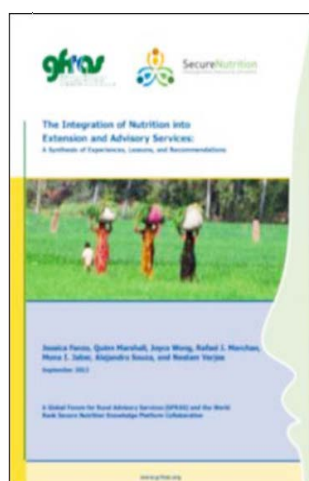
6. Addressing Gender and Nutrition by EAS

Lead Source

Integration of Nutrition into Extension and Advisory Services: A Synthesis of Experiences, Lessons and Recommendations

The need for nutrition-sensitive agriculture is well recognized and of growing interest to global development players. This report by Fanzo *et al.*, (2013)²⁹ summarizes the current state of knowledge on the role of nutrition in EAS, resulting from an extensive literature review, analyzing survey responses and conducting interviews with actors from worldwide development organizations, governmental agencies, educational and research institutions, and the private sector. Also the paper analyzed and documented past, current and future role of EAS, with regard to human nutrition.

Other Important Source



The publication, **Gender in Agriculture: Sourcebook** jointly developed by World Bank, UNFAO and IFAD (2009)³⁰, aims to deliver practical advice, guidelines, principles and descriptions and illustrations of approaches that have worked so far to achieve the goal of effective gender mainstreaming in the agricultural operations of development agencies. Module 7 of the source book is particularly relevant to EAS stakeholders as it covers the topics like

Gender in Extension Organizations, Gender and participatory Research, Gender Approaches in Agricultural Extension and Training as well as well documented case studies.

The INGENAES publication, **Assessing How Agricultural Technologies can Change Gender Dynamics and Food Security** by Manfre *et al.*, (2017)³¹ introduces a framework that considers the social context of the agricultural technologies and the specific challenges that women and men farmers face in using the technology. The *first part* of the toolkit discusses the relationships between gender, nutrition and agricultural technologies. The *second part* introduces a framework that considers the social context of the agricultural technologies and the specific challenges that women and men farmers face in using the technology and the *third part* is a guide for facilitators to design and conduct a workshop on the methodology, including slides and exercises.

The occasional paper from FAO, **Enhancing the Potential of Family Farming for Poverty Reduction and Food Security Through Gender-sensitive Rural Advisory Services** by Petrics *et al.*, (2015)³², offers a reflection on actions needed to ensure that good practices and lessons learnt, translate into the design and provision of a demand-driven and gender-sensitive RAS, for improved food security and poverty reduction.

The MEAS discussion paper, **Reducing the Gender gap in Agricultural Extension and Advisory Services: How to Find the Best Fit for Men and Women Farmers** by Manfre *et al.*, (2013)³³, talks about the importance of reducing the gender inequalities in EAS, as it is important not only for poverty reduction and food security but also for more efficient EAS practices.

7. Research and Evaluation in EAS

Lead Source

Manual on Good Practices in Extension Research & Evaluation

This joint publication from the ICAR-NAARM, CRISP, AESA, ICAR-CTCRI and MANAGE by Sivakumar *et al.*, (2017)³⁴ is developed as hands on reference manual to help young researchers, research students and field extension functionaries in choosing the right research methods for conducting quality research and evaluation in extension. It covers basic aspects of extension research process, various qualitative and quantitative methods with appropriate statistical tools and advanced modeling techniques with practical guidelines in choosing and using various methods. Researchers could

use to refine and update their knowledge on how to approach research in extension in a more systematic and scientific manner.

Other Important Source



Research Methodology: A Step-by-Step Guide for Beginners, by Kumar (2014)³⁵ is written specifically for those with no previous experience of research or research methodology. Written in a logical and accessible style and providing helpful techniques and examples, it breaks the process of designing and doing a research project into eight manageable operational steps.

The book, **Multivariate Data Analysis** by Hair *et al.*, (2009)³⁶, provides an applications-oriented introduction to multivariate analysis. By reducing heavy statistical research into fundamental concepts, the text explains how to understand and make use of the results from specific statistical techniques. In this Seventh Edition, new chapters have been added on structural equations modeling, and all sections have been updated to reflect advances in technology, capability, and mathematical techniques.

The purpose of the guide, **Evaluating Rural Extension** by Christoplos *et al.*, (2012)³⁷, is to support those involved in extension evaluation to choose how to conduct more comprehensive, rigorous, credible and useful evaluations. It helps the readers to understand different types of evaluation, to make decisions on what is most appropriate for their circumstances and to access further sources of theoretical and practical information.

The purpose of the MEAS training module, **Evaluation of Agricultural Extension and Advisory Services**³⁸ by Suvedi (2011) attempts to expose national level policy makers, project managers and funding agency personnel to various models and theories of program evaluation. With exposure to evaluation methods and procedures, they could contribute significantly in guiding program evaluation and

use the results to improve future programs.

8. ICTs and Knowledge management in EAS

Lead Source

ICT in Agriculture: Connecting Smallholders to Knowledge, Networks and Institutions

This World Bank publication by George *et al.*, (2017)³⁹ is designed to support practitioners, decision-makers and development partners who work at the intersection of ICT and agriculture. It is a practical guide in understanding current trends, implementing appropriate interventions and evaluating the impact of those programs. Extension professionals would find Module 6 (ICTs, Digital tools and Agricultural Knowledge and Information Systems) of this publication especially interesting. This module discusses the use and impact of ICT and digital tools in research, extension and advisory services, and activities related to agricultural learning.

Other Important Source



Improved availability of and access to information and communication technologies (ICTs) – especially mobile phones, computers, radio, internet and social media – has provided many more opportunities for collection, processing, storage, retrieval, managing and sharing of information in multiple formats. However, the high number and rapidly changing availability of ICTs may leave extension managers confused as to which methods are available and when to use them. The GFRAS Good Practice note, **Navigating ICTs for Extension and Advisory Services** by Saravanan *et al.*, (2016)⁴⁰, explains how to navigate the many types and gives tips on when to use them. In addition to this, many other good practice notes are published by GFRAS, on other strands of ICT applications like social media, m-extension and web portals for RAS.

The guide, **Effective Tools for Knowledge Management and Learning in Agriculture**

and Rural Development by Bheenick and Bionyi (2017)⁴¹ helps to understand Knowledge Management (KM), various KM methods and tools, providing a useful starting point for beginning KM practitioners. It also complements the resources on KM4ARD which CTA is making available through its knowledge management blog at <http://km4ard.cta.int>.

The paper, **Harnessing ICT for Agricultural Extension** from Royal Tropical Institute by Barber *et al.*, (2016)⁴² summarizes key issues, challenges and lessons derived from literature, case studies and practice, concerning the role ICT can play in extension systems. It elaborates on recurring issues and describes innovative experiences and emerging practices that enhance the delivery of timely information fitting the needs of farmers.

The MEAS publication **Options and Strategies for Information and Communication Technologies within Agricultural Extension and Advisory Services**, by Vignare (2013)⁴³ highlights the important role of ICT in the provision of EAS and give critical insights for practitioners to understand ICT so that they can align technology options and strategies to design effective communication for farmers.

9. Financing, Policy, Pluralism and Governance in EAS

Lead Source

Policy Compendium on Rural Extension and Advisory Services



For all those working on and advocating for an enabling policy environment for RAS, the Policy Compendium on Rural Extension and Advisory Services from GFRAS (2014)⁴⁴ is a very good resource. It is intended to be a one-stop shop for those working on, advocating for and implementing extension policy and provides background information, inputs, ideas and hands-on guidance for decision-making and facilitation of successful policy processes for RAS.

Other Important Source

For development planners and analysts, particularly at the level where decision-makers consider agricultural development policy and strategy within a country, it is critical to ask, "How is it best to finance extension activities?" Answering this question well within a given country is key to having a sustainable system of extension that delivers essential extension services to the targeted groups to meet the country's agricultural development goals. The MEAS discussion paper, **A Review of Sustainable Financing of Extension Services in Developing Countries** by McNamara (2014)⁴⁵, attempts to answer this vital question by reviewing various financing options operational in the developing countries.

The working paper **Governance of Agricultural Extension Systems** by Bitzer *et al.*, (2016)⁴⁶, from Royal Tropical Institute (KIT) provides an overview of the governance structure and processes of extension services dominant in many developing countries, including the most governance failures, recent efforts targeted at governance reform and promising processes in strengthening governance (public coordination, public-private partnerships and farmer involvement in extension service provision).

The publication from FAO and KIT, **Towards inclusive Pluralistic Service Systems - Insights for Innovative Thinking** by Bitzer *et al.*, (2016)⁴⁷ examines the need for demand-driven service provision, the diverse providers and approaches to service delivery, the policy considerations and institutional challenges constraining the operation of inclusive pluralistic service systems. FAO and KIT jointly organized an expert consultation on this topic in 2016 and a synthesis of deliberation, policy recommendations and priority actions for strengthening pluralistic service systems are also currently available⁴⁸.

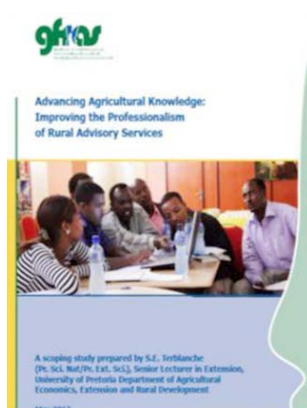
The publication, **Strengthening Agricultural Extension and Advisory Systems: Procedures for Assessing, Transforming and Evaluating Extension Systems** by Swanson and Rajalahti (2010)⁴⁹ discusses about comparative analysis of different extension strategies, organizational models, institutional innovations and resource constraints, and how an extension system might be transformed and strengthened through specific policy and organizational changes as well as needed investments.

10. Professionalism and Capacity Development of EAS

Lead Source

Advancing Agricultural Knowledge: Improving the Professionalism of Rural Advisory Services

Many countries are seeking to professionalize their extension and advisory services and they need strengthened capacities to initiate this process. This GFRAS publication by Terblanche (2017)⁵⁰ is based on a scoping study to examine the current levels of professionalism in its 11 regional networks. The aim was to provide evidence that would guide the activities and tools offered by GFRAS as well as to promote inter-regional learning and information exchange with a specific focus on training, talent and career



development, performance incentives, certification and registration and, mentoring and standards.

Other Important Source

The CRISP publication, **Assessing Capacity Needs of Extension and Advisory Services: A Guide for Facilitators**, by Mittal *et al.*, (2016)⁵¹ is a stand-alone document / procedure to assist facilitators in conducting a workshop with EAS providers for assessing the capacity needs.

The trainer's manual, **Facilitating Capacity Needs Assessment**, by D'Aquino *et al.*, (2017)⁵² was prepared under the project Capacity Development for Agricultural Innovation

Systems (CDAIS), a global partnership that aims to strengthen the capacity of countries and key stakeholders to innovate in complex agricultural systems, thereby achieving improved rural livelihoods. Elements of the manual such as the facilitation tools may also be useful in other contexts and the modular design allows for parts of it to be extracted and adapted for use as necessary.

The TAP publication, **Common Framework on Capacity Development for Agricultural Innovation Systems** (FAO, 2016)⁵³, promotes a shift of mindsets and attitudes among the main actors and provides concepts, principles, methodologies and tools to understand better the architecture of AIS, to assess capacity development needs and to plan, implement, monitor and evaluate capacity development interventions.

The publication, **Assessment of Core Competencies of Livestock Extension Professionals in India**, by Sasidhar and Suvedi (2016)⁵⁴, operationalized and assessed the core competencies of livestock extension professionals in India through a survey. This publication could be of great interest to those who are keen to do similar type of assessment elsewhere. The key survey questions were on the core areas viz. specific livestock extension and subject matter competencies, technical subject matter application competencies, livestock extension program development, implementation and evaluation competencies, communication, education and informational technology competencies, personal, professional development and diversity competencies.

Way Forward

Though some of you may fault us for not including some publications which you would like to see in a list like this, we believe that there will be very little disagreement on the publications we selected in this blog as a "must-read" for all extension professionals.

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09

SKILLS, SCALE AND SPEED: HARNESSING MOOCS FOR LARGE SCALE CAPACITY DEVELOPMENT

Many agencies are experimenting with MOOCs (Massive Open Online Courses) for enhancing the capacities of rural communities and knowledge intermediaries. MOOCs offer huge potential for enhancing the capacities of extension and advisory service providers. In this blog, V Balaji shares his experience of using MOOCs in the area of Mobiles for Development.

Skills development is a policy priority in all countries irrespective of their status in the global economy. Not only should skills be developed, they should be developed at scale and at speed, as articulated by the Prime Minister of India recently. MOOCs have showed the potential for delivering learning to hundreds of thousands of people in a single offering. There is a need to build prototypes and programs to harness them in enhancing the capacities of farmers and the intermediaries in the farm to market value chain.

Box 1: What is MOOC?

The MOOC (Massive Open Online Course) is a recent development in the area of technology mediated learning. It is, in its fundamentals, an internet technology. It combines a host of online content management techniques with a host of workflows, and further provides components of social networking. An important advantage of the MOOC is its scale: a single course offering can be availed with the course duration by literally hundreds of thousands of people. With the MOOC, a handful of people- the instructor and a group of teaching assistants -can offer a course to thousands of learners in a single offering.

The first MOOC was offered in Canada in 2007 to a couple of thousand individuals. However, it received wider notice, especially in global media, only in the year 2012 when a MOOC offered by the Massachusetts Institute of Technology (MIT) on an advanced topic in digital circuits had attracted about 200,000 joiners. The same course, in a classroom setting, would have enrolled less than 100 students. Globally renowned research universities such as the MIT, Harvard and Stanford have been pioneers in developing MOOCs.

The media coverage and scholarly analysis tend to create a broad view that MOOCs are branded services, requiring elite research universities and venture capital-driven Internet companies to organize and offer them. Secondly, these analyses have tended to look at the MOOC as a development affecting only the Higher Education sector, that too, only in North America. However, MOOC has huge potential in other sectors too.

MOOC and COL

In Commonwealth of Learning (COL), we observed the scene closely and arrived at a view that MOOC is primarily a collection of Internet technologies. The brands were unimportant since any capable group can similarly put relevant Internet technologies together. The scale advantage in the MOOC was an attraction, for it can potentially be used to reach out thousands if not tens of thousands of learners that lacked training and capacity building services. Thus, MOOC could be used in support of human development if the components can be put together and scaled up in an affordable manner.

Box 2: Commonwealth of Learning

Hosted by the Government of Canada and headquartered in Vancouver, Canada, the Commonwealth of Learning (COL) is the world's only intergovernmental organisation solely concerned with the promotion and development of distance education and open learning. COL was created by Commonwealth Heads of Government to encourage the development and sharing of open learning/distance education knowledge, resources and technologies.

The Commonwealth of Learning helps governments and institutions to expand the scope, scale and quality of learning by using new approaches. COL promotes policies and systems to make innovation sustainable and works with international partners to build models, create materials, enhance organisational capacity and nurture networks that facilitate learning in support of development goals (www.col.org)

We worked closely with Professor TV Prabhakar of Indian Institute of Technology Kanpur arriving at this understanding. Professor Prabhakar further proposed that we consider the MOOC as the equivalent of an event, a media event especially and to work with it as a virtual conference rather than as a virtual classroom.

In a parallel track, COL had been consulting development partners in various countries about the role of mobile communication technology in producing viable benefits for human development. Two consultations were organized in India during 2012-13 and they both revealed that partners in development felt the need for a neutral platform to learn about key issues and developments in that area of technology that can have an influence on human development. Thus, we decided that it would be useful to organize a MOOC on Mobiles for Development (M4D).

We invited IITK to partner with us and take the lead in designing and offering this MOOC. Since certification is important for learners that invest their own time and resources (such as costs of accessing Internet from their homes, offices and other workplaces), the course team sought to offer certificates of participation or competence to eligible participants. IITK (Center for Continuing Education) and COL agreed to co-sign the certificates.

Mooc on Mobiles for development (M4D)

The course, in English, was offered during Oct-Nov 2013 and the efforts to market it started in late August 2013. At the start of the course, there were 2282 joiners from 116 countries. The top five countries were India, Nepal, Mauritius, Grenada and South Africa. Almost 500 joiners were from countries in the Africa-Caribbean-Pacific regions. About 200 joiners were from OECD countries and from the Eastern European region.

Core faculty

The course, led by Professor Prabhakar, was designed as a knowledge enrichment course in

technology topics for non-technology people. IITK faculty covered the core technology topics. Topics related to education, banking/financial inclusion and agricultural extension were also covered during the course. The Agropedia/vKVK team at IITK also covered topics in mobiles in agriculture. Professor Mohamed Ally, an internationally renowned expert in m-learning based at the Athabasca University, served as the lead for the section on mobiles in education. A group of experts from the National Institute of Bank Management, India, covered the topics on financial inclusion. COL led the marketing of the MOOC and coordinated participation of non-IITK faculty. IITK which led the course also managed the platform and technology components.

Methodology

The course material was delivered as videos. These were supplemented by PPT slides and scripts of video talks (to help offset accent variations). Those who could not access the online videos consistently were able to use the PPT slides and scripts. The MOOC provided for a chat room where any learner could post a comment or a question. There was a forum available online with tracks for specific topics.

The participants were expected to spend about four hours per week for six weeks to gain a reasonable knowledge of mobiles in development. In all, a total of 92 videos (ranging in length from two to 25 minutes) were generated, along with all the associated PPT slides and scripts. These have been released as Open Education Resources once the course was over and are meant for re-use and adaptation by any interested individual or organization anywhere.

Out of the joiners, a total of 1461 individuals or about 62% of joiners were active through the course. There were frequent assignments and two quizzes were offered. Instructors joined the chat room and discussion forums on a daily basis and answered queries and wrote individual participants that needed help. They also were available once a week for real-time chats. Since the participants came from 18 time zones, the

instructors joined in at different times in India and Canada to support as many participants as possible.

Participants who had viewed a minimum percentage of videos and PPT were eligible for a participation certificate; those who participated above minimum and received scores above a certain percentage in the quizzes were eligible to receive a competence certificate. At the conclusion of the MOOC, a total of 333 certificates were issued (244 competence certificates and 89 participation certificates). Of these just over 90% were from developing countries.

Feedback

A survey of participants after the course revealed very high levels of satisfaction. The content was rated relevant and the competence of instructors also received an excellent rating. More than 90 percent of the participants stated that they would recommend the course to others if offered again. An external evaluation of this MOOC from a pedagogic perspective was carried out during March-April 2014. This evaluation noted that the "M4D online course demonstrated that a low-cost, open source software delivery platform combined with open educational resources (OER) could be used effectively to provide a hybrid MOOC environment that served over 1,400 learners" (COL, 2014). The report of this evaluation has been published as an Open Access document on COL's web site.

LEARNING from MOOCS for M4D

Needs own flexible pedagogy

To be effective, MOOC requires its own pedagogy. MOOC is a new medium in learning technology and is still an emerging area. IITK team had organized a previous MOOC in software topics and was able to use that learning, along

with COL expertise in instructional design, in building an effective pedagogy. A key aspect of this is the "chunking" of content, avoiding long "talking heads" videos. Faculty from research universities need time to ingrain this teaching attitude. Weekly summaries were provided to participants via email. Cross-media approaches were adopted: for example, when three groups of participants in Sierra Leone, Zambia and Nepal had difficulty in Internet access, the course team couriered the material on DVDs. These groups were then able to attempt the quizzes.

New topics for MOOCS

The participants from the MOOC on M4D suggested the following topics for coverage in future MOOCs:

- **Educational topics:** instructional design, applications of mobile technologies for teaching and for use in libraries
- **Agricultural topics:** GPS, GIS, meteorology, fuzzy logic, mobile use in agriculture with expanded cases studies from other areas of the world
- **Management:** knowledge management, management skills, technology transfer
- **Research:** research methods, research methods employing mobile technologies
- **Digital media:** web development, media production, HTML5, media storage preservation
- **Entrepreneurship:** small business development, small business development in rural settings
- **Finance:** banking, alternative banking systems, micro-finance, organization and management of cooperatives
- **Gender:** gender equity, gender issues



Up-scaling MOOC

COL organized a brain storming session with the National Academy of Agricultural Sciences (NAAS), New Delhi, on the relevance of MOOCs in Indian agriculture (March 2014).

The participants recommended that MOOC-for-Development should be a movement in India and that MOOCs should be built from the perspective of skills development in agriculture at all levels. It is also useful to note that the BRICS summit in Brazil decided to form a Network University of BRICS while the Prime Minister of India, in his speech in the same context, identified MOOC as a channel for Youth Engagement. The policy environment thus is favorable to build a paradigm of MOOC for Development, covering agriculture and food, rural development and well-being of farmers.

It is possible that further efforts in MOOC for Development are more likely to be led by national agencies or NARES than by international agencies. The latter have, for over a decade, de-emphasized training and capacity strengthening as autonomous activities that contribute to creating institutional impact. Training is viewed as a component of research programs, thus diminishing incentives for deploying pedagogic

and process-oriented innovations in capacity development. There are no clear incentives for the for-profit international organizations in agriculture to engage in training and capacity building where definite revenue streams are unavailable.

MOOC on MOOC

COL and IITK are organizing a MOOC on MOOC (<http://mooconmooc.org/>) aimed at educators and policy makers in development institutions who are interested in creating social and economic impact through mass training. This course is partly an outcome of the discussions organized with the NAAS in India earlier in 2014. The course is meant to acquaint the learner with all the basic concepts, processes and procedures associated with the MOOC and will give a flavor of the technology matters. It is meant for teachers in any institution of higher education at any level, for administrators of colleges and universities and students and professionals who wish to take advantage of MOOC for career development. This course will be in English. It starts on 5th September 2014 and will run for four weeks. Learners are expected to commit up to four hours per week. Registration is free and open to anyone interested and there are no pre-requisites.



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10

MASSIVE OPPORTUNITIES FOR KNOWLEDGE UPSCALING: THE UNHARNESSED POTENTIAL OF MASSIVE OPEN ONLINE COURSES (MOOCS)

Breaking the barriers of space, time, and cost, MOOCs redefined the global educational landscape by making content more universal. Though the debate is still going on regarding the success of MOOCs in addressing the knowledge divide, they are surely undervalued by the present agricultural curricula and underutilized by the student community. In this blog, Sreeram Vishnu makes an attempt to highlight the present status of MOOCs and compiles some of the interesting and informative MOOCs offered by some of the popular MOOC platforms that are relevant to social science professionals in agriculture.

The term Massive Open Online Courses (MOOCs) is not new to most of us. Simply stated they are a form of creative disruption in the field of education (Box 1). Hailed as an educational revolution, MOOC describes an evolving ecosystem of open online learning environments, encompassing a spectrum of course designs (Emanuel 2013; Rodriguez 2012). MOOCs are a model of learning that offer open enrolment free of cost, which can lead to 'massive' levels of participation in terms of numbers and diversity. On an average, the shortest MOOCs are two weeks in duration, and the longest, sixteen weeks. The modus operandi of most of the MOOC platforms is simple – learners can access all the content free of charge, but need to pay a fee to access assignments and get the necessary certification for the course (Mallya 2017; Higher Education Academy 2017). Essentially, they challenge the conventional learning evaluation practices that rate course completion as greater than the quality of learning (Higher Education Academy 2017). Disruptions created by MOOCs in the global educational arena even prompted The New York Times to name 2012 as the 'Year of MOOCs' (New York Times 2012).

Box 1: Massive Open Online Courses (MOOCs)

Who and Where

The term 'MOOC' was originally articulated by Dave Cormier (University of Prince Edward Island, Canada) to describe a course developed by George Siemens and Stephen Downes on 'Connectivism and Connectivity in Knowledge' in 2008.

When

Though the origins of MOOCs can be traced back to the early 2000s when open source, open access and open courseware movements appeared (Zawacki-Richter & Naidu 2016), it was in 2008, when the first MOOC was started, which is hailed as a landmark for networked learning.

Why

MOOCs evolved from the open educational resources (OER) movement as a way to connect open access digital materials to networks of learners, and may be considered a continuation in the development of distance education (Daniel 2014).

How

Every course is taught by highly-qualified instructors in a format that may include recorded video lectures, graded assignments, quizzes, discussion forums, and peer-to-peer/peer-to-instructor learning.

The disruptions created by MOOCs in the field of distance education are huge. MOOCs are now more ubiquitous in the sense that they have covered each and every corner of the knowledge sphere, like Science, Art, Religion, Culture, Education, Language, and Technology. Apart from the expected learning, outcomes vary greatly in MOOCs – depending on whether it is designed for language learning, machine learning, for development of soft skills, or with a focus on pure academic topics. So each MOOC is designed uniquely, driven by a particular pedagogical approach, teaching style and content. Interestingly, MOOCs have moved beyond pure academic

topics and ventured into fields, such as Film industry (Hollywood: History, Industry, Art on the EdX platform), Business (Digital marketing on the Coursera platform), Tourism (Tourism and travel management on the EdX platform), Automobile industry (Electric cars: Introduction on the EdX platform), Governance (Improving leadership and governance in nonprofit organizations on the Coursera platform) and Religion (Buddhism through its scriptures on the EdX platform). However, MOOCs are basically categorized into two, based on the pedagogical principles followed, which in itself is an interesting topic. It is briefly discussed Box 2 below.

Box 2: Types of MOOCs

A review of the whole discourse on MOOCs is dominated by two terms, viz., cMOOCs and xMOOCs (Bayne and Ross 2014). Connectivist MOOCs (cMOOCs) are considered as primitive forms, which are loosely structured, built around the interaction of the participants and based on the connectivist pedagogical principles of learning socially from others, within distributed networks. xMOOCs are more advanced, designed and launched by many commercial platforms (Coursera, EdX, Udacity) by sensing the possibilities for teaching and learning on scale. They are distinct from the cMOOCs in that they follow the instructivist pedagogy. They rely heavily on short videos and quiz assessments with limited interaction between learners. However, high dropout rates of the participants and uncertain business models considerably stymied the smooth progress of MOOCs. This led some of the universities to redesign their online courses, which were then directed towards a smaller audience with restricted access, that was named as Small Private Online Courses (SPOCs) (Higher Education Academy 2017). Another example are blended MOOCs, a hybrid proposal that offers both online and classroom teaching (Olazabalaga et al. 2016).

Harnessing the Potential of MOOCs

In this blog, I have tried to compile some of the useful courses relevant to the agricultural social science professionals from two major MOOC Platforms, viz., Coursera and EdX. The courses are put under various categories so that those interested can sign in to the platform, figure out the desired courses and get enrolled easily. Besides, upon registration with these MOOC platforms, we can stay tuned with the latest courses offered by them through regular email notifications.

Coursera¹

Coursera, founded in 2012 by Stanford professors Daphne Koller and Andrew NG, is an online education company that now offers courses, specialisations, and degrees from 150 of the world's top universities and educational institutions (Mallya 2017). Logging into the respective course pages would give a brief account of the course, with an overview, a syllabus and other FAQs, including the pricing and prerequisites to attend the course, if any. Some of the interesting courses from this platform are listed below.

¹ <https://www.coursera.org/>

Table 1: Courses offered by Coursera relevant to social scientists

Category of course	Course title
Economics	1. Agriculture, Economics and Nature https://www.coursera.org/learn/agriculture-economics-nature 2. The Economics of Agro food value chains https://www.coursera.org/learn/valuechains
Education	1. What future for education? https://www.coursera.org/learn/future-education 2. Introduction to multilingual and multicultural education https://www.coursera.org/learn/multilingual-multicultural-education 3. Assessment in Higher Education: Professional Development for Teachers https://www.coursera.org/learn/assessment-higher-education 4. Powerful Tools for Teaching and Learning: Web 2.0 Tools https://www.coursera.org/learn/teaching-learning-tools
Governance and Society	1. Methods and Statistics in Social Sciences Specialization https://www.coursera.org/specializations/social-science 2. Become a Journalist: Report the News! Specialization https://www.coursera.org/specializations/become-a-journalist
Psychology	1. Foundations of Positive Psychology Specialization https://www.coursera.org/specializations/positivepsychology 2. Positive Psychology: Applications and Interventions https://www.coursera.org/learn/positive-psychology-applications
Philosophy	1. Philosophy, Science and Religion: Science and Philosophy https://www.coursera.org/learn/philosophy-science-religion-1 2. Philosophy and the Sciences: Introduction to the Philosophy of Cognitive Sciences https://www.coursera.org/learn/philosophy-cognitive-sciences
Personal Development	1. Effective Communication in the Globalised Workplace Specialization https://www.coursera.org/specializations/effective-communication 2. Photography Techniques: Light, Content, and Sharing https://www.coursera.org/learn/photography-techniques 3. Creative Problem Solving https://www.coursera.org/learn/creative-problem-solving 4. Leadership in 21st Century Organizations https://www.coursera.org/learn/leadership-21st-century 5. Coaching Skills for Managers Specialization https://www.coursera.org/specializations/coaching-skills-manager 6. Presentation Skills: Designing Presentation Slides https://www.coursera.org/learn/slides 7. Learning How to Learn: Powerful mental tools to help you master tough subjects https://www.coursera.org/learn/learning-how-to-learn 8. Conflict Transformation https://www.coursera.org/learn/conflict-transformation 9. Teamwork Skills: Communicating Effectively in Groups https://www.coursera.org/learn/teamwork-skills-effective-communication 10. Creating Innovation https://www.coursera.org/learn/creating-innovation 11. Virtual Teacher Specialization https://www.coursera.org/specializations/virtual-teacher
Data Science	1. Data Analysis and Interpretation Specialization https://www.coursera.org/specializations/data-analysis 2. Exploratory Data Analysis https://www.coursera.org/learn/exploratory-data-analysis 3. Introduction to Data Analysis Using Excel https://www.coursera.org/learn/excel-data-analysis

Probability and Statistics	1. Methods and Statistics in Social Sciences Specialization (https://www.coursera.org/specializations/social-science)
	2. Regression Modeling in Practice (https://www.coursera.org/learn/regression-modeling-practice)
	3. Statistical Reasoning for Public Health 1: Estimation, Inference, & Interpretation (https://www.coursera.org/learn/statistical-reasoning-1)
	4. Introduction to Probability and Data (https://www.coursera.org/learn/probability-intro)

Note: The courses listed are presently announced in the Coursera website. However, this list is not exhaustive, as Coursera introduces and updates courses periodically.

Nowadays, MOOC developers are closely taking into account the demands and needs of their user community. One such example that comes to mind is a MOOC on Coursera, which is particularly dedicated to provide better insights on how to apply to Universities in the United States². The platform even launched an online course in entrepreneurship, titled 'Master's in Innovation and Entrepreneurship' (OMIE), which demands teamwork from the participants and mentoring support from experienced entrepreneurs. Successful graduates were eligible to get seed funding from HEC Paris, the course partner of Coursera, and can then work at the HEC's incubator. In 2016, Coursera diversified its focus from individual learners to new arenas – 'Coursera for Business' and 'Coursera for Governments

and Non-profits' – where it aims to work with startups and enterprises, and local governments, respectively. The platform even invested heavily on developing mobile-friendly platforms for those who don't have access to desktops (Mallya 2017).

EdX³

Founded by Harvard University and MIT in 2012, EdX is the only leading MOOC provider that is both non-profit and open source. EdX courses are powered by the open sources platform, Open Edx, which allows educators to build learning tools and add new features to the platform, creating novel solutions for the learners (EdX 2012). Given below are some of the courses offered by EdX, found to be useful to social science researchers/scholars.

Table 2: Courses offered by edX relevant to social scientists

Category of course	Course title
Data Analysis and Statistics	1. Statistics and R (https://www.edx.org/course/statistics-r-harvardx-ph525-1x-1)
	2. Data Visualization for All (https://www.edx.org/course/data-visualization-all-trinityx-t005x)
	3. Big Data Analytics (https://www.edx.org/course/big-data-analytics-adelaidx-analyticsx)
	4. Big Data Fundamentals (https://www.edx.org/course/big-data-fundamentals-adelaidx-bigdatax)
	5. Analytics for Decision Making (https://www.edx.org/course/analytics-decision-making-babsonx-bpet-statx-0)
	6. Analytics for the Classroom Teacher (https://www.edx.org/course/analytics-classroom-teacher-curtinx-edu1x-0)
	7. Analyzing and Visualizing Data with Excel (https://www.edx.org/course/analyzing-and-visualizing-data-with-excel)
	8. Cluster Analysis (https://www.edx.org/course/cluster-analysis-utarlingtonx-link-la-cax)
	9. Theory of Change for Development (https://www.edx.org/course/theory-change-development-witsx-tocx)
	10. Introduction to Statistics: Descriptive Statistics (https://www.edx.org/course/introduction-statistics-descriptive-uc-berkeleyx-stat2-1x)

² With over 4,000 universities and no standard application system, the U.S. admission process can be confusing for everyone, especially for students applying from other countries. This course will help international students to navigate the U.S. university admission process by offering practical information about the documents and sections that make up a U.S. university application. (<https://www.coursera.org/learn/study-in-usa>).

³ <https://www.edx.org/>

Business and Management	<ol style="list-style-type: none"> 1. Project Management for Development (https://www.edx.org/course/project-management-techniques-for-development-professionals) 2. Communication Skills and Teamwork (https://www.edx.org/course/communication-skills-and-teamwork) 3. Problem Solving and Critical Thinking Skills (https://www.edx.org/course/problem-solving-and-critical-thinking-skill) 4. Business and Data Analysis Skills (https://www.edx.org/course/business-and-data-analysis-skills) 5. Supply Chain Management: A Decision-Making Framework (https://www.edx.org/course/supply-chain-management-a-decision-making-framework) 6. Entrepreneurship in Emerging Economies (https://www.edx.org/course/entrepreneurship-in-emerging-economies) 7. Business Communication (https://www.edx.org/course/business-communication-ritx-skills101x-0) 8. Project Risk Assessment (https://www.edx.org/course/project-risk-assessment-michiganx-fin402x) 9. Visual Presentation (https://www.edx.org/course/visual-presentation-ritx-skills106x-0) 10. Writing for Social Media (https://www.edx.org/course/writing-social-media-uc-berkeleyx-buswri3x)
Economics and Finance	<ol style="list-style-type: none"> 1. Data for Effective Policy Making (https://www.edx.org/course/data-for-effective-policy-making) 2. Intellectual Property Law and Policy (https://www.edx.org/course/intellectual-property-law-policy-part-2-pennx-iplaw2x-0) 3. Introduction to Project Management (https://www.edx.org/course/introduction-project-management-adelaide-x-project101x) 4. Behavioural Economics in Action (https://www.edx.org/course/behavioural-economics-in-action) 5. Global Sociology (https://www.edx.org/course/global-sociology-wellesleyx-soc101x) 6. Foundations of Development Policy (https://www.edx.org/course/foundations-of-development-policy) 7. Data Analysis for Social Scientists (https://www.edx.org/course/data-analysis-for-social-scientists) 8. Evaluating Social Programs (https://www.edx.org/course/evaluating-social-programs-mitx-jpal101x-6) 9. AGRIMONITOR: Agricultural Policy, Food Security and Climate Change (https://www.edx.org/course/agrimonitor-agricultural-policy-food-idbx-idb13-1x-0)
Humanities	<ol style="list-style-type: none"> 1. Critical Development Perspectives (https://www.edx.org/course/critical-development-perspectives-uqx-lgdm4x-1) 2. Working in Teams: A Practical Guide (https://www.edx.org/course/working-teams-practical-guide-uqx-teams101x-2) 3. How Media Got Social (https://www.edx.org/course/how-media-got-social-curtinx-net1x)
Biology and Life Sciences	<ol style="list-style-type: none"> 1. Introduction to Psychology (https://www.edx.org/course/introduction-psychology-st-margarets-episcopal-school-psych101x-0) 2. Sustainable Food Security: The Value of Systems Thinking (https://www.edx.org/course/sustainable-food-security-the-value-of-systems-thinking)

Note: The courses listed are presently announced in the Coursera website. However, this list is not exhaustive, as Coursera introduces and updates courses periodically.

Free Online Courses

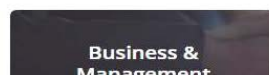
Advance Your Career. Improve Your Life.

What do you want to learn?

Search: 



POPULAR SUBJECTS



Specialised MOOC Platforms

There are even specialized MOOC platforms for dedicated topics. For instance, a platform called Data Camp⁴ offers specialized online courses on data science. The courses are designed to learn data management and analytical skills online, which are much demanded by the present day labor market. The courses are categorized into various domains, such as programming, data manipulation, machine learning, data visualization, probability and statistics, etc. A total of 111 courses are offered on this platform and some of the popular courses are: Introduction to R, Deep Learning in Python, and Introduction to Data Visualization with Python, etc.

MOOC Platforms in India

There are many MOOC platforms in India which provide customized courses to a diverse audience. Unacademy⁵ is India's largest learning platform, which offers 2,400 online courses. The platform is unique in its approach as it provides custom-made courses for preparing for various competitive examinations, such as UPSC Civil Service, GATE, CBSE UGC NET, Common Admission Test (CAT), as well as Bank PO. Another platform, Khan Academy⁶ from the Agha Khan Foundation, deals with many interesting courses on Mathematics, Science and Engineering, Arts and Humanities, etc., dealt at the basic level. Some of the IITs in India also have

launched their own MOOC platforms recently (for example, agMOOCs⁷ from IIT Kanpur), to benefit agricultural professionals. Further on, National Programming on Technology Enhanced Learning (NPTEL)⁸ is a collaborative effort of the seven Indian Institutes of Technology (Bombay, Delhi, Guwahati, Kanpur, Kharagpur, Madras and Roorkee) and Indian Institute of Science Bangalore (IISc) for creating video and web course contents in various fields. The platform delivers a variety of courses covering a range of topics from social sciences, including many advanced courses (one example is Artificial Intelligence: Knowledge Representation and Reasoning). The courses are free for all and participants can earn a certificate by paying a nominal charge.

Unanth,⁹ a popular Indian online platform describes itself as an online learning marketplace, providing students with a unique learning experience while offering instructors an opportunity to expand their market reach. In addition to giving access to a number of MOOCs, the platform also provides unique opportunities to its members, for example a chance to provide mentorship to others and to design and launch online courses in order to monetize their expertise. Also it is worth mentioning here that in 2017 the Government of India had launched its own MOOC platform called *Swayam*,¹⁰ to provide 'best teaching learning resources to all' online. The courses range from high school to post graduate

⁴ <https://www.datacamp.com/>

⁵ <https://unacademy.com/>

⁶ <https://www.khanacademy.org/>

⁷ <https://www.agmoocs.in/>

⁸ <https://onlinecourses.nptel.ac.in/>

⁹ <https://www.unanth.com/>

¹⁰ <https://swayam.gov.in/>

level. Any academic institution in India can offer up to 20 percent of its catalog in a particular program via *Swayam*. Hence, there is ample scope for integrating selected MOOCs with the course syllabus so as to supplement and enhance knowledge and skills of the learners.

MOOCs: Still an Underutilized Resource in Agricultural Education?

Though MOOCs offer a variety of courses useful to the scholars of a variety of disciplines, it is still debatable whether they have been utilized to the fullest possible extent. If we look at the present curricula in agricultural universities, we can safely conclude that the potential of MOOCs have still not been realized. Usually the curricula for the different courses would give a set of suggested readings, helpful for understanding the topic in depth. At this juncture, it would add to the experience if MOOCs were also listed as these would supplement the reading and impart associated skills to the respective course. For instance, the online course, 'Digital Story Telling' offered by Michigan State University (in the Coursera platform) can be made a suggested MOOC for the students of e-extension. This course teaches how to make attractive teaching videos –

starting with story board writing – and facilitate the learning by showing demonstration videos. The course also covers various open source platforms of music files and high quality images for use in making the videos and publishing guidelines. The learning will also be assessed by a compulsory practical, in which the learners are required to make and publish a small video for evaluation. Hence, by the end of the course, a scholar of e-extension would get a clear idea on how to make a teaching video and would be equipped to make one by himself/herself. Similarly, the MOOC, 'Survey, Data Collection and Analytics' (<https://www.coursera.org/specializations/data-collection>) offered by Michigan State University through Coursera is a course that many agricultural social science scholars may be looking for, before commencing their research study.

Recently a MOOC run by NPTEL on 'Mobile Applications' generated huge interest among the audience as evident from the waiting list of candidates for registration in the programme. Figure 1 shows the upward trend over the years on Google search with respect to MOOC-related terms, worldwide. If this trend is any indication, the interest in MOOCs is peaking across the globe.

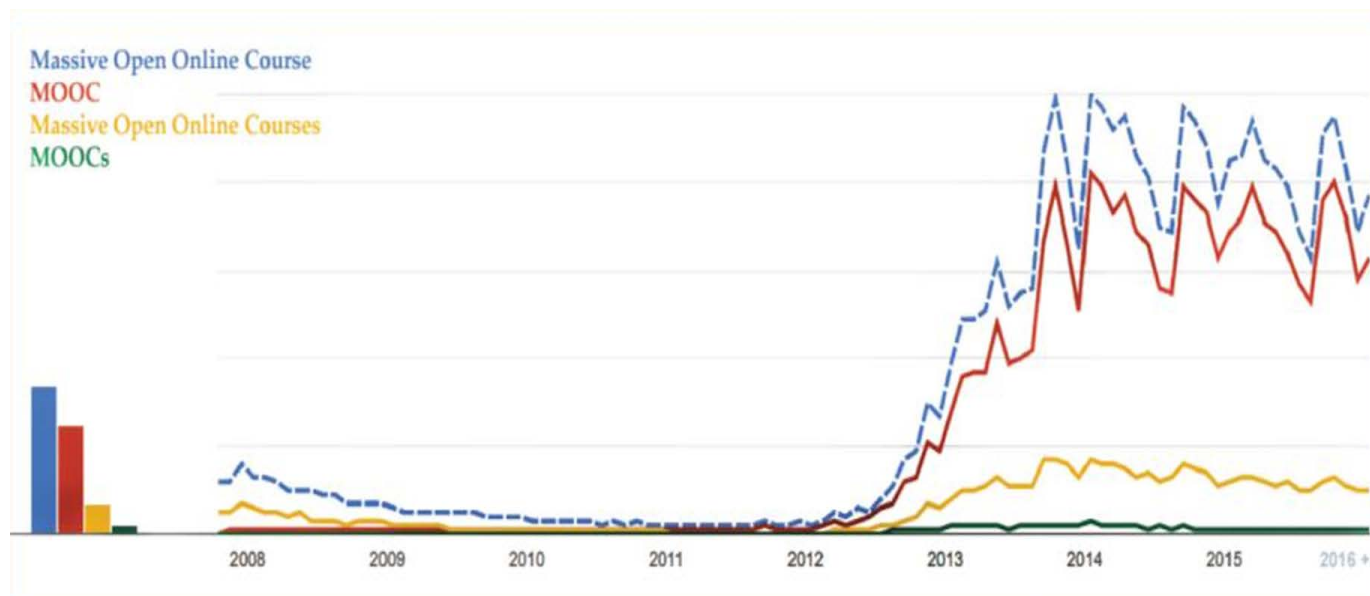


Fig. 1: Google Trends for MOOC-related keywords

Source: Bozkurt et al. (2016)

MOOCs were basically introduced to cater to the educational needs of the masses, who are otherwise disadvantaged. However, a survey of active MOOC users in more than 200 countries revealed that most people signing up to do free online courses were already highly educated and

80 percent of them already held a degree. This strengthens the argument that MOOCs seem to be reinforcing the advantages of the 'haves' rather than educating the 'have-nots' (Emanuel 2013). According to this survey, India is one among those countries where, almost 80 percent of MOOC

students come from the wealthiest and most well-educated six percent of the population. In other words, MOOCs have fallen short of democratizing education, and instead, have widened the gaps in access to education instead of shrinking them, at least for the time being (Hollands and Tirthali 2014). Access to internet, recent trends in commercializing MOOCs by putting a price on accessing course content, etc., are some of the other issues, which question the very rationale of MOOCs itself.

Way Forward

MOOCs are not an isolated development, but rather form part of a wider landscape of changes in higher education to supplement classroom teaching, which should possibly be aimed at specific targets, namely, university students with a chance to validate credits, professional development courses for teachers, or as a channel for corporate training (Yuan and Powell 2013; Hollands and Tirthali 2014). Unfortunately, the present curricula has not accorded due emphasis to MOOC-based learning or utilizing them as supplementary learning materials. Giving incentives (credit requirements, weightage in the score cards, etc.) would motivate young scholars to enroll into more MOOC programmes and acquire new skills. The concerned departments in each university can prepare a database of various MOOCs relevant to their courses, and make them

a part of the curricula. However, course pricing may be a deterrent factor for many of the learners, especially young scholars. In order to overcome the cost factor, ICAR organizations can start their own MOOCs with assured quality to rival the global MOOC platforms. Thereby, common courses can be developed across these institutions, which can be shared, and these MOOC materials can be used multiple times. However, the courses should be designed based on the demand from the user community, and quality of the content should be certified for better learning outcomes.

Already, organizations like MANAGE and NAARM, have launched their own MOOC platforms. Furthermore, radical changes witnessed in the telecom sector, such as access to internet data at nominal prices and its universal coverage in the country, is expected to give a big boost to the progress of MOOCs. The advances related to improvements in technological solutions, such as machine learning, natural language processing, human-computer interaction, adapting machines in line with the student's progress, or the development of new tools such as video annotations, which allow for greater multimedia interaction and collaboration between students, are surely expected to revolutionize MOOC-based learning in the coming days (Vargas 2014; Monedero, Cebrián and Desenne 2015).

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11

WHAT IS WRONG WITH OUR FORESTRY EDUCATION?

New courses related to socio-economic faculties including extension needs to be developed and promoted in forestry education, argues Binoo P Bonny.

Forestry forms the second largest land use category in India after agriculture, catering to 16% of the human and 18% of the cattle population needs. The Indian population directly dependent on forests is roughly estimated at 275 million (27%) which include both tribal and non-tribal forest users (World Bank, 2002). This covers the 200,000 Indian villages declared as forests dependent for timber and non-timber forest products (NTFP) for their livelihood (Raveendranath and Sudha, 2004). Forests also meet about 40% of the energy needs including more than 80% of the rural energy requirements mostly in the form of fuel wood. However, the challenges of growing population and rapid industrialization have skewed the demand – supply curve against forest resources leading to over-harvesting and degradation of ecosystems. Poor conservation outcomes have forced planners to reconsider the role of the forest community in resource use and conservation through policy revisions and enactments with little tangible outcome.

The Challenge

In fact, most of the forests and forests management problems in India can be categorized under the class of human problems which Hardin (1968) called as no-technical solution problems. No-technical solution problems demand change in human values or attitudes and requires little change in techniques of the natural sciences. Unfortunately the underlying philosophy that guides contemporary forestry research and education has been based on bionomics of forests. It remains skewed towards conservation, ecosystem management and resource use optimization. The research domains remain dictated by the economic theory of natural resource utilization that are owned in common and exploited under conditions of individualistic competition. The model lacks integration with behavioral components of the forest dependent population and matching soft skill competencies in the regulatory systems.

The mismatch emanates from the fact that historically Indian forest policies followed an exclusive management regime in which adaptive livelihood use of forest and grazing land were not tolerated. Moreover, the general attitudinal disposition favors forests resources as free goods for the individual but scarce goods for the society. Therefore it involves social, political and economic dimensions that shape behavior, opportunities, rights and power relations of people concerned. The challenge is to evolve institutional innovations that have inbuilt mechanisms to resolve the problems related to tenure rights, ownership, control and management of forest resources at local level. The responsibility rests predominantly

with the regulatory system that involves officials of the public sector Forest Department and to some extent nongovernmental organizations working in this sector.

Forest Research & Education System in India

Indian Council of Forest Research and Education (ICFRE), the apex autonomous body under the Ministry of Environment and Forests (MOEF)

governs the National Forestry Research and Education System. It is aimed at developing holistic forestry research through planning, promoting, conducting and coordinating research, education and extension on all aspects of forestry for ensuring scientific management of forest, tree improvement, and forestry productivity. An overview of the major institutions that forms components of the national forestry system is illustrated in Fig 1.

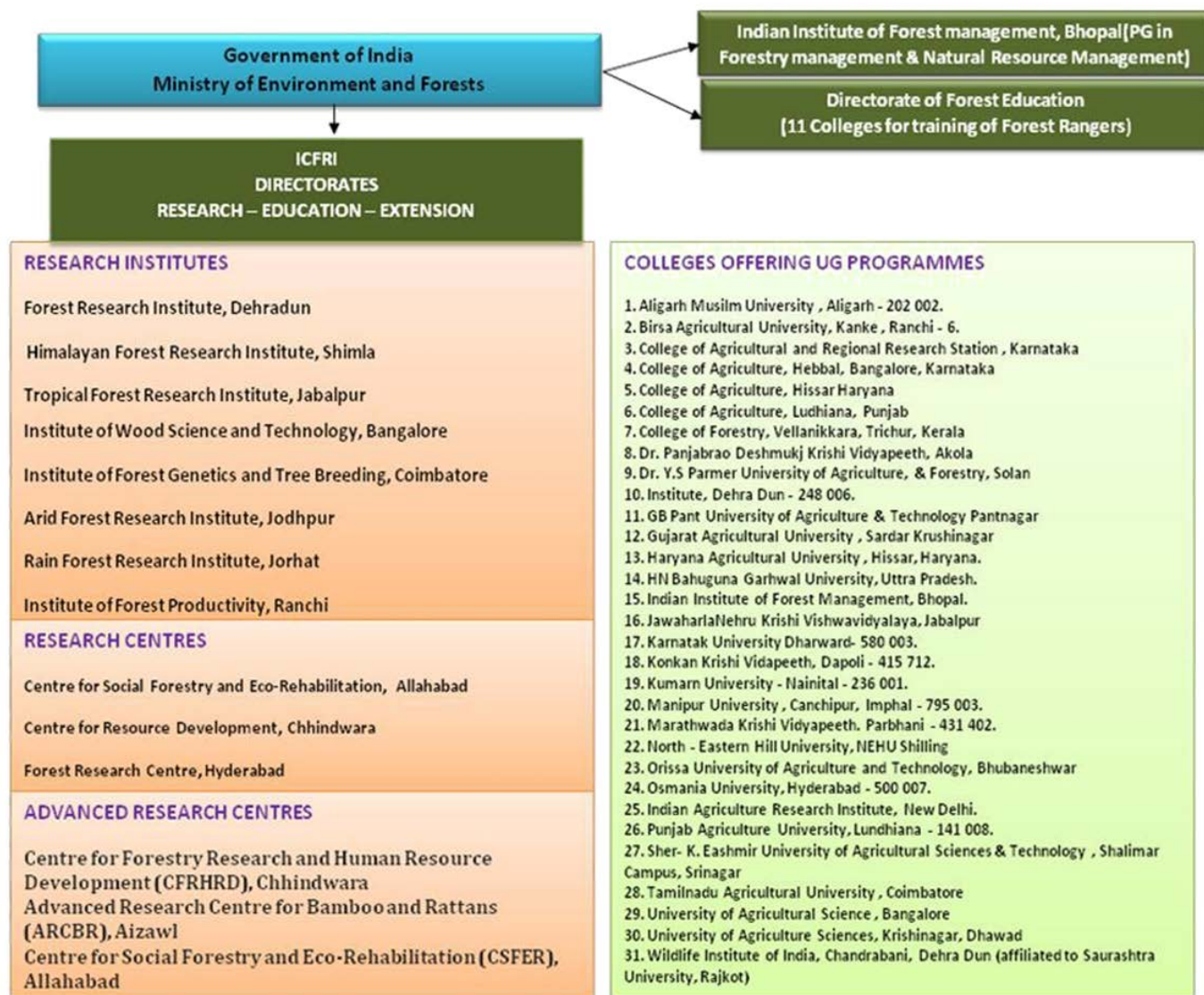


Fig. 1: Forestry Research and Education Institutions in India

The Directorate of Forest Education (under the MOEF) is involved in induction and in-service training of State Forest Officers. There are four colleges under the Union government and four colleges under the various State governments. Indian Institute of Forest Management (IIFM) is another premier autonomous Institute under the MOEF established in 1982. The Institute has four main activities, namely research, teaching, training and consulting in the forestry and allied sectors. It offers Post Graduate courses in Forestry Management and Natural Resource Management.

The UG programmes in Forestry are run by Colleges affiliated to various Universities and receive grant-in-aid from ICFRE for development of facilities and infrastructure.

“Extension” in Forestry

Though Research, Education and Extension form the three main building blocks (along with several other actors) of the National Forestry Innovation System, Extension continues to remain as one of its weakest links. Right from the days of colonial rule that enacted the first Indian Forest Act of

1865, attempt has been to establish government's claims over forests. All local rights on forests were abolished and even those accepted were treated as privileges offered under law (ADB, 2009). No effective mechanism has been evolved that could disseminate the adaptable research findings to the user groups including farming community. Even adaptation of research to suit the local needs could not be pursued due to absence of a proper dissemination mechanism including trained and skilled extension staff.

The onus of the scenario rests mostly with the traditional forestry education model emulated

from other nations (Ratnasingam et al, 2011). The system appears to be ill equipped to produce human capital with necessary skills to cope with the challenges. The stakeholders in the forestry sector, especially the change agents in the sector who work more closely at the ground level need to be equipped with required expertise and skills in promoting linkages & collaboration; organizing awareness campaigns & demonstrations and co-coordinating the forestry innovation system. To develop these skills and expertise, Forestry Extension Education and related disciplines should form a major constituency of forestry education. However, in reality, this is not the case.

Box 1: Forestry Research & Education in India - A brief history

Scientific forest management in India started in 1864 with the appointment of Sir Dietrich Brandis as the first Inspector General of Forests (Aggarwal, 1954). Following his recommendations, trained foresters from Germany and France were appointed to manage the country's forests, and the Imperial Forest Service was initiated in 1866. However the history of professional forestry education in India starts with the establishment of the Forest School for training rangers and foresters at Dehra Dun in 1878 by the British Provisional Government. It offered a two year Ranger Course for over thirty years which was the highest degree in forestry offered in India at that time. The Forest School was transferred to the Government of India in 1884 and became the Imperial Forest College and later the Indian Council of Forest Research and Education (ICFRE).

The first Forest Research Institute came into being as an adjunct to the Imperial Forest College in 1906. With the opening of recruitment for the Provincial Gazetted Services to Indians in 1912, the Forest Research Institute started offering Provincial Forestry Course. Though of two year duration, it was of higher standard and only graduates in science with a good university record was eligible for it (Ranganathan, 2000).

In 1920 Indian Forests Services too (IFS) were made open to Indians. However, the probationary training of these IFS officers was done in British universities till 1926 when it was started at Dehra Dun. The Provincial Forest Service Course was terminated and replaced with the new Indian Forest Service Course, which too ended in 1932 due to lack of demand and political uncertainties that existed at that time. The Indian Forest College was started in 1938 to train personnel for the gazetted forest services in the provinces and states and has since been evolved to meet the forestry research and education demands of the country and was renamed as Indira Gandhi National Forest Academy (IGNFA) in 1987.

The curriculum

The present course content especially at the undergraduate level of B Sc (Hons) in Forestry mostly covers topics on forest biology and regulatory and protective methods designed for the conservation of forest stock. In the total class room credits of 132 hrs spread in 8 semesters, courses related to socio-economic faculties comprise a meager 6.8% (KAU, 2007). There is only one course in Forestry Extension Education of 2 credits in the sixth semester.

The sea change in policy reforms from the regulatory regimes of the Forest Policy of 1894 to the participatory reforms through Forest Rights Act of 2006 is rarely reflected in the course content. This forms a major constraint in the development of human capital in forestry sector that requires knowledge and skill sets suitable to translate participatory management and cost sharing policies into main stream forest management strategy. Even the successes reported in joint and

participatory forest management, eco-tourism and forest based entrepreneurial development remain as ad-hoc cases of sporadic individual or team efforts. In fact the challenge is to incorporate technical competence along with business, advocacy and organizational capabilities through effective curriculum revision and reorientation.

Curricula Reforms

To develop effective and relevant human resources in forestry, the current curriculum of forestry science undergraduate courses needs thorough revision. New courses that can build on human faculties from an expert regulatory role to a facilitation role need to be promoted. Courses on property rights and land tenure statuses including group tenure practices in primitive societies, community and group property rights on indigenous knowledge has to be included (rather than extending the blue prints of successful activities from agriculture and related sectors which follow different property

rights and tenure regimes). This will be important in developing unique strategies in forestry. Yet the complementarities of non-farm activities like forest use and pastoralism with agriculture on rural livelihoods need to be retained.

Apart from these, specialized courses on group dynamics and conflict management; micro-finance and credit linkages; development communication; and basics of forest policies, laws/enactments and enforcement issues need to be included in the curriculum. Emphasis on climate smart integrated models of forests and family farms; Public Private Partnerships (PPPs) in ecotourism; concepts and experiences of forest based producer organizations; indigenous knowledge in biodiversity conservation; project evaluation and monitoring techniques; and participatory need assessment also have to be promoted.

Way Forward

The growing crisis of forest loss and related problems seem to be aggravated by the

command and control bureaucratic model followed by the Indian forest department. Demand for meeting the mutually exclusive goals of environment, economy and society has made forestry a multidisciplinary domain where coordination and collaboration skills have unprecedented importance. Though the Joint Forest Management (JFM) initiatives (since the early 80's) tried to legitimize participatory rights of local population in profit sharing from forest resources, it failed in institutionalizing the rights. Even the implementation of Forest Right Act (FRA) as an enabling legislation (to redress the historical deprivations) depend on the capacity of Forest Department to play facilitation roles and evolve strategies to organize and institutionalize the reforms utilizing formal and informal sources of local power including Panchayat Raj institutions. The implementation process requires dynamic leadership, substantial resourcing and academic training in related social science faculties and soft skills along with technical competence.



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12

DICHOTOMIES IN VETERINARY EDUCATION AND SERVICES DELIVERY – IMPLICATIONS FOR POLICY DECISIONS IN INDIA

There are several dichotomies which often interfere in the process of 'making veterinarians' and delivery of services by them. These dichotomies need correction for smooth functioning of veterinary institutions in the country and for producing quality veterinary graduates and postgraduates as per the requirement of different stakeholders, argue SVN Rao, PVK Sasidhar and D Thammi Raju in this blog post.

Veterinarians perform several roles including those of field veterinarians, teachers, researchers, extension agents, civil servants, defence personnel, entrepreneurs and so on. The extent to which they are able to perform these roles depends on:

- The way they are groomed in veterinary colleges
- The aptitude of the individual concerned
- The ethos/philosophy of the organisation they serve.

Several dichotomies however interfere in the process of 'making veterinarians' and delivery of services by them.

A distinct division of things or ideas into two contradictory parts is usually referred to as dichotomy. In the academic field, dichotomies are a subject of interest as the contradicting divisions may lead to uncertainty (Box 1).

Box 1: Dichotomy

The term dichotomy is derived from the Greek 'dichotomia', which means 'dividing in two'. A dichotomy is a partition of a whole or a set into two parts/subsets. In other words, this couple of parts must be jointly exhaustive: everything must belong to one part or the other, and mutually exclusive: nothing can belong simultaneously to both parts. Such a partition is also frequently called a bipartition. The two parts thus formed are complements. In logic, the partitions are opposites if there exists a proposition such that it holds over one and not the other.
(<https://en.wikipedia.org/wiki/Dichotomy>)

Discussed below are some of the dichotomies that need correction for smooth functioning of veterinary institutions in the country and for producing quality veterinary graduates and postgraduates as per the requirement of different stakeholders.

1. Two Regulatory Bodies - Veterinary Council of India and Indian Council of Agricultural Research

There are two regulatory bodies for veterinary education in India: the Veterinary Council of India (VCI) and the Indian Council of Agricultural Research (ICAR) (Boxes 2 & 3) for graduate and postgraduate education, respectively. The VCI enforces minimum standards of veterinary education; i.e. 2016 regulations for the degree course Bachelor of Veterinary Science and Animal Husbandry (BVSc & AH) which include faculty, infrastructure needed, course curriculum, syllabus etc. to be adopted by all the veterinary colleges in the country. It deputes veterinary inspectors

consisting of veterinary academicians of repute to inspect the veterinary colleges to see if they have the required facilities to impart graduate veterinary education as envisaged by the VCI. Based on inspection reports, the VCI either accords recognition or suggests improvements or provides conditional recognition to the colleges. The VCI also prescribes the number of students to be admitted to a college based on availability of faculty and infrastructure. It has the authority to derecognise a college if prescribed minimum standards are not adopted. As of today, there are 48 veterinary colleges recognised by the VCI, including three colleges (in the states of Punjab and Rajasthan) in the private sector. In addition, the Indian Veterinary Research Institute has also started offering an undergraduate programme (UG) from the academic year 2015-16 with an idea to develop a model veterinary college in the country. In India, except for two institutions – the Rajiv Gandhi Institute of Veterinary Education and Research, wholly funded by the Govt. of Puducherry and affiliated to Central University, Pondicherry; and the College

of Veterinary Science and Animal Husbandry, Agartala, affiliated to Tripura Central University – all veterinary colleges are either affiliated to the State Agricultural Universities (SAUs), State Veterinary Universities (SVUs) or Central Agricultural Universities (CAUs). There are 13 SVUs in the country today catering to the educational, research and extension requirements in the domain of Veterinary, Animal Husbandry, Dairy and Fishery Sciences.

The VCI also selects candidates based on the All India Common Entrance Examination conducted by it to fill 15 % of the total seats in recognised colleges. However, during the current academic year the VCI quota is being filled with the candidates based on their NEET score. The rest of the 85 % seats are filled by state entrance tests and/or marks in higher secondary examination or equivalent. Although the VCI has full authority to streamline veterinary education at graduate level in the country, it is not empowered to sanction grants or aid to the colleges.

Box 2: Veterinary Council of India

Indian Veterinary Council Act, 1984 (52 of 1984) was enacted in 1984 and was published in the Extraordinary Gazette of India dated 21st August, 1984 to regulate veterinary practice and to provide for that purpose, for the establishment of Veterinary Council of India and State Veterinary Councils and maintenance of Registers of veterinary practitioners and for matters connected therewith.

Subsequent to enactment of the Indian Veterinary Council Act, 1984, the Central Government (Ministry of Agriculture) vide Gazette Notification dated 2nd August, 1989 for the first time constituted the Veterinary Council of India by nominating the Members as per the provisions of section 4 read with section 3 of the Act. Further, nominations were made by the Central Government from time to time, to fill up the vacancies (www.vci.nic.in).

The ICAR is the apex body for coordinating, guiding and managing research and education in agriculture, including veterinary and animal sciences, dairy, horticulture, home science and fisheries in the entire country (ICAR, 2009). SAUs, SVUs and CAUs are accredited by the ICAR based on self-evaluation reports submitted by the respective colleges and also on the recommendations of accreditation committees deputed by the ICAR. The ICAR conducts entrance examinations for Junior and Senior

Research Fellowships to select talented candidates to pursue Masters and Doctoral research in the selected disciplines in ICAR institutes or SAUs, SVUs and CAUs. Although agriculture education falls under the state subject, ICAR has the authority to prescribe the syllabus, and faculty and infrastructure requirements for postgraduate (PG) courses. The ICAR sanctions grants for the development of veterinary colleges in addition to financing various schemes in SAUs/ SVUs.

Box 3: Indian Council of Agricultural Research

The ICAR is an autonomous organisation under the Department of Agricultural Research and Education (DARE), Ministry of Agriculture and Farmers Welfare, Government of India. Formerly known as Imperial Council of Agricultural Research, it was established on 16 July 1929 as a registered society under the Societies Registration Act, 1860 in pursuance of the report of the Royal Commission on Agriculture. The ICAR is the apex body for co-ordinating, guiding and managing research and education in agriculture including horticulture, fisheries and animal sciences in the entire country. The ICAR has its headquarters at New Delhi. With 101 ICAR institutes and 71 agricultural universities spread across the country, this is one of the largest national agricultural systems in the world (www.icar.org)

The dichotomy here is that veterinary colleges have to get recognition from VCI for the undergraduate (UG) programme and from ICAR for the PG programme. Also, the bone of contention between the VCI and the ICAR is on who should conduct the common entrance examination for filling up 15% seats for BVSc & AH programme in the veterinary colleges and for formulating syllabus and curriculum for the UG and PG programmes. Another dichotomy in the pipeline is that although currently ICAR is

regulating veterinary PG programmes, in 2015, VCI also revised minimum standards of PG veterinary education regulations, which are yet to be notified (VCI, 2015).

2. Animal Health Vs Animal Production

Dichotomy in this context means two major facets of the subject are dealt with at the undergraduate level. The first is veterinary sciences and the second is animal sciences. The third minor facet is social sciences (Box 4).

Box 4: Subjects Covered in BVSc & AH Degree Course	
Veterinary Sciences	Animal Sciences
<ul style="list-style-type: none">• Veterinary Anatomy• Veterinary Physiology• Veterinary Biochemistry• Veterinary Pharmacology and Toxicology• Veterinary Parasitology• Veterinary Microbiology• Veterinary Pathology• Veterinary Public Health and Epidemiology• Veterinary Gynaecology and Obstetrics• Veterinary Surgery and Radiology• Veterinary Medicine• Veterinary Clinical Practices	<ul style="list-style-type: none">• Animal Nutrition• Animal Genetics and Breeding• Livestock Production Management• Livestock Products Technology• Livestock Farm Practices.
	Social Sciences
	Veterinary and Animal Husbandry Extension Education

The degree awarded to the graduates is BVSc & AH as the focus is on both animal health as well as animal production. The course is very comprehensive, covering several aspects of livestock production and management, preparation of livestock products, disease diagnosis and veterinary health care in addition to livestock extension and economics of livestock farms with an idea to develop a vet into a “Jack of all trades and master of none”. This five-and-a-half-year course (including internship programme) is basically to develop skills in both animal production and animal health as the country cannot afford to have two streams of graduates, one for production and the other for animal health, as is in vogue in many developed nations.

Unlike human medicine, where productive life is not the deciding factor while giving treatment, in the case of animals being maintained mostly for production (other than pet animals) the animal owners certainly look for economics before proceeding to get their animals treated. Animal owners, barring a few with emotional attachment to animals, would like to maintain productive animals and dispose of the animals when their production is zero or very low as in the case of cows with mastitis (all teats are blind); old animals not in production; very sick animal with grave prognosis; animals suffering from chronic diseases such as tuberculosis (TB) and Johne’s disease (JD) ;

and recumbent animals due to accidents or injuries etc. Hence, the productivity of the animal is a very important consideration; animal owners are prepared to spend on treatment of diseases only when they perceive that their sick animals are likely to recover and regain production capacity.

The rate of knowledge explosion in veterinary and animal sciences is making it difficult to incorporate all the emerging aspects in the five-and-a-half-year-long programme during curricular revisions.

The dichotomy here is to continue offering the BVSc & AH degree programme with equal emphasis on animal health and production without increasing the duration of the programme.

3. Establishing New Veterinary Universities/ Colleges Vs Strengthening Established Veterinary Universities/Colleges

In the recent past, many state governments have either established new veterinary colleges or converted the established veterinary colleges into veterinary universities without concomitant increase in the faculty, infrastructure or budgets. The new veterinary universities were carved out of existing agricultural universities. Some of the new colleges are yet to get recognition from VCI for want of faculty, deficiencies in infrastructure or both. There were instances where temporary transfers of the faculty and equipment from the

old colleges (already recognised by the VCI) to new colleges were attempted in a bid to satisfy the observers of the VCI and to get recognition by the VCI. Due to paucity of funds, some of the colleges are unable to fill the required posts with qualified teachers. This spurt in the new universities and colleges is mostly at the cost of the old or established colleges which led to the dilution of the standards and compromised the quality of the students coming out of the portals of these academic institutions.

The dichotomy here is whether to strengthen the existing colleges instead of diverting the limited funds for the establishment of new colleges or establish new colleges (mostly out of political considerations) at the cost of the old colleges.

4. Public or Private Sector Veterinary Colleges

Although there is no ban on establishing private veterinary colleges, there is very little interest shown by the entrepreneurs in setting up veterinary colleges in the private sector. Many entrepreneurs are of the opinion that it may not be economically sound to set up veterinary colleges in the private sector as it becomes very expensive to satisfy the VCI minimum requirements prescribed (VCI, 2017). As a result there are only three veterinary colleges under private sector as against 45 colleges in public sector. Ironically, some of the veterinary colleges/SVUs (RIVER, TANUVAS, KVASU

etc) admit students under NRI/NRI sponsored quota by charging from Rs. 8 lakhs to Rs. 30 lakhs for the entire course in addition to regular fee and other charges. This NRI quota for every college is fixed at a maximum of 5 % of the total seats approved by the VCI and is permitted in order to encourage colleges to generate revenue for improving their infrastructure.

Private colleges have a grouse that VCI is soft on public sector veterinary colleges in enforcing the standards, compared to private colleges, indirectly indicting the VCI that the latter is discouraging privatisation of veterinary education in the country, although there is a lot of scope for privatisation. There is a severe shortage of veterinarians in the country. India needs about 72,000 veterinarians as against the availability of 43,000. It was suggested that the intake of students in existing colleges be increased and establishment of veterinary colleges under public-private partnership be encouraged (Rao *et al.*, 2015). The situation demands that, as in the case of medical, technical and management education, private entrepreneurs need to be motivated to participate in veterinary education (Chaudhary, 2009).

The dichotomy here is that on the one hand, several reports recommend private sector participation, while on the other, prescribe very expensive conditions to satisfy the VCI minimum requirements, which are summarised in Box 5.

Box 5: Requirements to Establish a Veterinary College

- Resources to establish and maintain College and Teaching Veterinary Hospital (in single contiguous plot of land) & Instructional Livestock Farm Complex (within a 20-km radius) as per VCI 2016 regulations.
- Recruit teaching & non-teaching staff for the first academic year and prepare a manpower programme for implementation after receipt of the letter of permission.
- Fixed deposit proof for an amount equivalent to salaries payable to the teaching staff for the second academic year.
- Bank guarantee for Rs. 5 crores in favour of VCI.
- Recommendation from an advisory committee comprising a member from ICAR, VCs of two Universities, Dean or Associate Dean of a recognized Veterinary College and Principal Secretary, AHD of the concerned state.
- 15 acres of land (owned/on 30-year lease) for college of which 5 acres for fodder production.
- Administrative block, departments, labs and equipment (phased manner), lecture halls, hostels, play ground, transport vehicles, and manpower as per VCI 2016 standards.

Source: VCI, 2017

5. Theory vs. Practice

Instructive lectures in veterinary colleges provide knowledge relating to both veterinary and animal sciences, whereas the practical/clinical cases and field exposure provide from day-one the skills needed for jobs, primarily in AHDs. Students, with assistance from faculty, are expected to make links between these two and develop the ability

to apply their knowledge and skills to job needs. The VCI curriculum no doubt provides good theoretical knowledge, but technical skills relating to veterinary and animal sciences vary across 48 colleges across the country due to several reasons.

The dichotomy in this context is that the veterinary colleges have been devoting time to the technical content of the curriculum rather than providing

adequate practical hands-on experiences needed for entry-level job and self-employment ventures. This is resulting in another dichotomy of job preference by the graduates towards government jobs compared to private jobs.

6. Government Jobs vs Private Enterprises

It is a common observation that a majority of veterinary graduates want to be 'job seekers' rather than 'job givers'. Most graduates join AHDs as field veterinarians for reasons of job security, no risk of investment, stable income and the scope of working in the same state/district to which they belong. As there are lot of vacancies in the AHDs, the prospects of getting the graduates employed in the departments without much of a waiting period (maximum of two to three years) are high.

On the contrary, the number of graduates venturing to establish their own enterprises (livestock farms, processing units, private clinics, manufacturing units etc.) is negligible. This is due to lack of confidence among fresh graduates owing to lack of proper exposure in the colleges. Although, 'earn while you learn' projects are made compulsory in the course curriculum, the scale of operation (number of animals, number of cases attended, quantum of product processed, etc.) is so small that the experience with such small-scale projects fail to develop the required confidence among the students. It is unfortunate that many colleges fail to establish the livestock farm complex with large number of animals of different species as prescribed by the VCI. Similarly, the Teaching Veterinary Clinical Complex is also deficient in getting more number of different types of cases of both large and small animals required for

providing good exposure to the students.

Unless students get good initial exposure to management practices being followed in the livestock farm of the college (from egg to layer bird; from calf to cow) and to different cases in the teaching hospital of the college, they cannot acquire skills during the one- year internship programme (Earlier the internship was of six months' duration, which has now been raised to one year under the new regulations). This problem is accentuated where teaching hospitals located in urban areas do not get many large animal cases (as opposed to pet animal cases) resulting in poor exposure to large animal cases, including animals in heat for Artificial Insemination (AI) and for pregnancy diagnosis. Realising this, VCI introduced a course 'Livestock Entrepreneurship' in the 2008 regulations and the same is continued in 2016 as well in order to orient the UG students towards various aspects of entrepreneurship (Box 6).

Hence, it is necessary to provide an option to the interns going for the one-year internship programme to choose between farm training and veterinary hospital training, so as to enable them to opt for production jobs (farm manager, advisor etc.) or veterinary health jobs (disease diagnosis, clinician etc.). This long duration of internship also helps the graduates develop confidence in establishing livestock farms or animal health centres as entrepreneurs.

This one-year mandatory internship programme needs to be reoriented, taking into consideration the aptitude of the students and the infrastructure facilities available in the colleges and nearby organised farms.

Box 6: Entrepreneurship Orientation in Veterinary and Animal Science Education

The changing nature of livestock service delivery, manpower requirements and opportunities in the private sector provide both push and pull dynamics for veterinary graduates to engage in entrepreneurial, public and private service activities. Unfortunately, the support given by veterinary colleges is inadequate in this transition by integrating entrepreneurship and private service orientation in the curriculum.

Examples:

1. Clinical subjects are taught, but not how to establish a private veterinary clinic.
2. Students are taught how to manage and improve the production of livestock, but not how to establish a poultry/dairy farm.
3. Biochemistry and para-clinical subjects are taught, but not how to establish a veterinary disease diagnostic laboratory.

This transition is a quite challenging task, as the core content of the VCI curriculum consists of basic, production, para-clinical and clinical subjects with little emphasis on entrepreneurship aspects. Merely introducing a one-off intervention such as a semester course on entrepreneurship may not be sufficient. What is required is a two-pronged integrative approach: i) introduce the functional entrepreneurship discipline into curriculum; and ii) integrate the entrepreneurial and private service philosophy into each of the production, para-clinical and clinical courses. This integrative approach is expected to produce graduates as job givers rather than job seekers by mastering both the science of veterinary and animal husbandry and the art of entrepreneurship (Sasidhar and Van den ban, 2006).

The dichotomy here is that in spite of several entrepreneurial opportunities, the majority of veterinary graduates are trained as job seekers rather than job givers because instructional design and curriculum transaction is more on theoretical aspects than practical hands-on experiences.

7. Producer (Veterinary Colleges/Universities) vs Consumer (AHDs)

Veterinary Colleges/Universities are responsible for producing quality veterinary graduates by adopting the minimum standards of veterinary education and the syllabus of VCI. All the colleges put together produce about 1707 graduates in a year whereas the demand for graduates is about 2500/year – a shortfall of 31.72 % (Sasidhar and Reddy,

2013). A majority of these graduates are absorbed as field veterinarians in the AHDs. The AHDs perceive the training given to veterinary graduates in colleges/universities is not in tune with the job responsibilities of the field veterinarians (Rao *et al.*, 2015). The field vets are involved in implementation of various Central-/State-sponsored schemes to promote animal production as well as helping the livestock owners improve their income through increased production. The field vets lack enough knowledge and skill in these areas. Likewise, they are likely to face emergency situations during natural calamities such as drought and floods which have a serious negative impact on animal health and production; unfortunately, they have little or no knowledge/skills in such cases (Box 7).

Box 7: Perception of Field Veterinarians on Course Curriculum

There was a general perception amongst many stakeholders in the livestock sector that fresh graduates emerging from veterinary colleges do not have opportunities to understand many of the important challenges in the livestock sector such as disease control and eradication, quarantine, certification and veterinary public health. The education is believed to be more geared towards “securing government jobs and for clinical practice”. Important topics such as livestock-environment interactions, participatory processes, gender-balanced development, farmers’ traditional wisdom, herbal medicine and the role as extension agents for small livestock farmers are also not covered adequately. The need to establish a well-balanced livestock service delivery system through a combination of public and private actors and the efforts to equip them to deliver effective services to the farmers also deserve an enhanced attention (Rao *et al.*, 2008).

The colleges argue that the graduates will be trained as per the VCI syllabus and guidelines. If need arises, the graduates need to attend refresher courses on specific topics. Unfortunately both colleges and AHDs lack the desired coordination

which is affecting the delivery of services to the livestock owners, the common target group for both these institutions. Several of the contentious issues between them could be sorted out through open discussion across the table by (Box 8).

Box 8: Collaboration – The Missing Link in Refresher Trainings

The Planning Commission (Now NITI Aayog) emphasized that re-training of the field veterinarians to brace for the recent developments is paramount and they should attend mandatory refresher courses every five years during their career (Planning Commission, 2012). To impart refresher training in technical areas to field veterinarians, the AHDs have regional training centres in each state. In addition, veterinary colleges/animal science research institutes of ICAR also impart refresher technical trainings. Therefore, proper coordination is required between AHDs, Veterinary Colleges and ICAR Animal Science Institutes in capacity building of field veterinarians. To strengthen refresher training, there is a need to establish regional academic staff colleges exclusively to build up the skills and competence of field veterinarians, which was also recommended in an earlier study (Rao *et al.*, 2015).

The VCI curriculum was first formulated in 1992 and was revised two times – in 2008 (VCI, 2008) and latter in 2016 (VCI, 2016) but the revision did not serve its purpose adequately. The revision was done by organising meetings with academicians (mostly researchers) who were not associated with UG teaching. It was done without taking into consideration the views of other stakeholders. As per the new regulations the duration of the course is five-and-a-half complete professional years (earlier it was five years) including a compulsory

internship of one year duration undertaken after successful completion of all credits as prescribed in the syllabus. Curriculum and syllabus revision is a professional job and it needs to be handled by professionals who have expertise in such areas.

The dichotomy here is that training given to the veterinary graduates in the colleges is not in tune with the job responsibilities of the field veterinarians due to inadequate reflection of AHD’s requirements during curriculum revisions.



8. Field Veterinarians Vs Para-veterinarians

Veterinarians are the product of veterinary colleges whereas the para-veterinarians are trained by the AHDs. There is uniformity in the duration and course content/syllabus for veterinary graduates; however, training duration for para-veterinarians ranges from six months (Gopalmitras/Lay inseminators working under State Livestock Development Agencies) to 2 years (Veterinary Assistants). There is always conflict between the field veterinarians and para-veterinarians in attending to the cases. The para-veterinarians are basically trained to perform AI and vaccinations, and to provide first aid to the animals. Para-veterinarians are introduced in the field to provide these services to mitigate the problem arising out of the severe shortage of field veterinarians and also to assist the latter in delivery of cases. The Para-veterinarians are usually posted in their respective or nearby villages to enable them to provide the basic services and charge from the livestock owners. They are not supposed to handle any other cases which need the attention of the qualified veterinarian. Unfortunately, reports indicate that the para-veterinarians do attend to all the cases, including complex cases like dystokia, mastitis, retention of placenta etc resulting in spoiling the cases and sometimes the death of the animals (Ravikumar 2017). This is mainly because para-veterinarians cannot sustain by charging for only AI and first aid cases.

Para-veterinarians being from the same locality are accessible to the livestock owners on all the days (24 x7) and their charges are less compared to the veterinarians for treatment of cases. There is a conflict of interest in attending to cases other than AI and first aid. Amidst this conflict, there is a severe shortage of para-veterinarians as well, which is hampering the delivery of veterinary services in the country and also increasing the cost

of veterinary health care to the animal owners. This calls for improving the number and quality of veterinarians as well as para-veterinarians to enhance the coverage and effectiveness in the delivery of veterinary services.

The dichotomy here is conflict between veterinarians and para-veterinarians on attending cases based on qualifications and availability or non-availability of them in villages during need of the hour.

9. Gender Dichotomy

Livestock services are generally provided by men for men, despite key roles that women play in livestock farming (Matthewman and Ashley, 1996). A few decades ago there were hardly any women opting for the veterinary science course, and thus, the focus was on men, resulting in producing mostly male veterinarians whose access to women livestock owners was very weak. Training programmes were designed for male livestock owners although most of the livestock-related activities are generally performed by women. Nowadays, in most veterinary colleges, the number of women students is more than their male counterparts and this is a welcome sign as the accessibility to women veterinarians to interact with the women livestock owners is very high.

For this reason, in many places the women veterinarians turn out to be good livestock advisors. But the AHD administration in many states are finding it difficult to post women veterinarians in the rural centres for a variety of reasons such as lack of basic amenities for women in the villages, family obligations forcing the women to prefer urban centres, difficulty for women veterinarians to attend emergency calls in odd hours of the day, etc. It is also not possible for the administration to provide jobs for all the women veterinarians in the urban centres (Disease

diagnostic labs, Polyclinics etc.). For these reasons, many women veterinarians prefer to opt for teaching faculty positions in the colleges which are located in urban areas.

The dichotomy here is that on one side, there is lot of scope for women veterinarians to become effective livestock advisors in the rural areas, while on the other side neither the administration nor the women veterinarians (with few exceptions) wish to work in the rural areas for the above-mentioned reasons. Hence, it is suggested to take an undertaking from the students (irrespective of the gender) before joining the veterinary course that they need to serve in the rural areas at least for three years after their graduation and this needs to be adhered without succumbing to pulls and pressures.

10. Veterinary Services Free or Paid

In India, veterinary services delivery have been traditionally funded, managed and delivered by the public sector till the early 1990s. However, the veterinary service delivery system promoted by public sector often provides a limited support to large majority of smallholder livestock farmers, with the latter seeking alternatives for rescuing them from hardships. This assumes more significance in the prevailing scenario of globalization and liberalization, with the consequence of opened economy. Of late private or public-private partnership interventions were found effective in providing these services, prompting Governments to encourage, legalize and regularize these service providers. Also, several studies conducted in different states clearly indicated that farmers were not satisfied with the services provided by the public sector and they are willing to pay for effective and timely services.

Dichotomy in this context means that, in the years to come the government sector presence in the veterinary service delivery is inevitable in India in view of the social welfare obligations and interests of the millions of small and landless livestock keepers. On the other hand, private sector's participation is equally important in view of economic and operational reasons. Therefore, the technical framework for rational delivery of services under public, private and public-private partnerships should take into account this dichotomy.

Way Forward and Implications for Policy Decisions

Some of the important dichotomies plaguing veterinary colleges/universities are discussed with a view to focus the attention of policy makers to take appropriate decisions for the smooth functioning of these institutions. A few suggestions have

been put forth for their consideration which, if accepted and implemented, may help in resolving dichotomies concerning veterinary education and service delivery in the country.

1. The Ministry of Agriculture, GOI, may entrust the total responsibility of ensuring quality standards in veterinary education to the Veterinary Council of India as is the case with Medical Council of India. Indian Council of Agricultural Research (ICAR) must focus on providing guidance on research and extend financial support to veterinary colleges and universities in strengthening the infrastructure. It is necessary to strengthen the VCI to enable it to enforce standards in veterinary education and veterinary practice in the country.
2. The scores of NEET may be considered for admitting students to UG programme under VCI quota in future also.
3. It is necessary to constitute a committee of professionals to recommend whether to "develop a jack-of-all-trades and master-of-none veterinarian" giving equal emphasis on both animal production and health, or to separate the two streams at the graduation level as electives.
4. As there is severe shortage of veterinarians in the country, it is time for the GOI to encourage private sector participation in veterinary education without compromising the standards of education. As establishing veterinary colleges involve huge expenditure in terms of land, animals and building and equipment etc., in addition to maintenance of the required staff, the Government may consider PPP mode in establishing new colleges.
5. It is easier and better to strengthen old colleges by infusing more human resources and material, instead of diverting the funds for the establishment of new institutions as the development of the latter will take a lot of time and resources (land, labour and capital). Once the old institutions are strengthened, the intake of the students could be increased; this would help in reducing the gap between the demand and supply of the veterinary graduates.
6. The curriculum and syllabus of the BVSc & AH course must match the job requirements of field veterinarians. Designing an appropriate course curriculum is a challenging and time-consuming process and must be assigned to a professional group well versed with such tasks. It does not serve purpose in simply revising the course curriculum and syllabus in a hurried manner without taking into consideration the views of all the concerned stakeholders.

7. Although, the VCI emphasizes on practice rather than theory, the fact is that the new regulations diluted standards, resulting in producing graduates with theoretical knowledge (classroom teaching, the easiest one) but poor in skills which require competent teachers, better infrastructural facilities in terms of good labs, better livestock farm complex with more number of animals and more cases in the teaching veterinary hospitals. It is advisable to provide liberal grants to veterinary colleges to improve the existing infrastructure in terms of both human and material resources.
8. One idea worth trying out is of providing an option to interns before the start of one-year internship programme to choose between farm training and veterinary hospital training, so as to enable them to opt for production jobs (farm manager, advisor etc.) or veterinary

health (disease diagnosis, clinician etc.). This one-year duration of internship (newly introduced) also helps in satisfying the aptitude of the graduates and also in developing confidence in establishing livestock farms or vet clinics/ diagnostic centres as entrepreneurs.

9. Need-,based refresher training programmes including continuing veterinary education, must be organised by the colleges at regular intervals to improve the capacity of the working veterinarians and enable them to face the emerging challenges in livestock sector. Similarly, there must be a good coordination between the AHDs and the Veterinary Universities in identifying areas of collaboration and to improve the delivery of veterinary services to the livestock owners, the ultimate objective of these two important veterinary institutions.



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