

## AGRICULTURE EDUCATION AND TRAINING (AET) SYSTEM IN NEPAL: PRESENT STATUS, CHALLENGES AND FUTURE PRIORITIES



Sulav Paudel, Thomas Gill & Edwin Rajotte, The Pennsylvania State University

September 2013

USAID/BFS/ARP-Funded Project

Award Number: AID-OAA-L-12-00002

## Contents

|   |    |
|---|----|
| Executive Summary   | 4  |
| Introduction  | 5  |
| Background to Nepal   | 5  |
| Focus of this report: Nepal, innovATE and AET systems                         | 5  |
| Data collection methodologies   | 6  |
| History of education in Nepal   | 6  |
| History of agricultural education   | 7  |
| Structure of the Nepalese education system                                    | 8  |
| Structure of school education in Nepal  | 8  |
| Structure of higher education in Nepal  | 9  |
| The current status of Agricultural Training and Education Institutes in Nepal | 10 |
| Higher education programs in agriculture                                      | 10 |
| Agriculture and Forestry University (AFU)                                     | 11 |
| Shared between AFU and Tribhuvan University (TU)                              | 11 |
| Tribhuvan University (TU)   | 13 |
| Purbanchal University (PU)  | 14 |
| Technical schools and polytechnics  | 15 |
| Agricultural sector overview and workforce profile                            | 15 |
| ATE system in Nepal: SWOT analysis  | 17 |
| Strengths   | 17 |
| Weaknesses  | 17 |
| Opportunities   | 20 |
| Threats   | 21 |
| Next Steps  | 22 |
| Recommended action plan   | 25 |
| References  | 27 |
| List of interviewees  | 28 |

|                                |    |
|--------------------------------|----|
| Tables and Figures             | 29 |
| APPENDIX 1: Focus group report | 34 |

## **Executive Summary**

*This report examines the present status of agricultural education and training (AET) in Nepal and draws attention towards the current challenges and problems. It specifically looks at the agricultural education structure, analyzes the pressing problems and offers several recommendations for next steps to build capacity of the AET system in Nepal.*

*The report argues in a rapidly changing social and natural environment, strong AET is a pre-requisite for social and economic development in a country like Nepal. Here we emphasize the importance of improving AET systems by strengthening the innovative capabilities of AET organizations and professionals, changing organizational cultures, behaviors, and incentives, and building innovation networks and linkages.*

*This country assessment is based on a fact-finding operation searching for adequate information about the current agricultural training and education system in Nepal. The accumulation of the facts involved gathering of data through both primary and secondary sources, including interviews, a focus group and literature review.*

*Key reforms recommended include improving the infrastructure of AET organizations and aligning the mandates with societal and country needs, improving student/public impressions of agriculture through effective awareness programs, promoting practical programs that are more strategically attuned to the different needs of society, motivating young agricultural scientists to stay in Nepal through upgrading facilities and offering attractive packages, and improving the institutional capacity linkages between AET and diverse user communities, knowledge sources and private industries. In the final section, the study also puts forward recommended next steps for potential involvement in Nepal by innovATE, a new USAID-funded mechanism for building capacity in AET in developing countries.*

## Introduction

### Background to Nepal

Nepal is a diverse kingdom including Mt. Everest, artistic monuments, exotic wildlife, and distinctive cultures. It covers an area of 147,181 square kilometers, landlocked between two giants, India and China, and dominated by the Himalayas. Nepal extends from the highest peak of the world to the plains of Terai (elevation ranges from 66m to 8848m above sea level), thus there exists a variety of climatic conditions ranging from the tropical heat of the Terai plains to the freezing cold of the high Himalayas. With a population of 28 million (MHP, 2011), Nepal also consists of highly diverse ethnic groups of people living together as with their own languages and cultures. Nepali, written in the Devanagari script, is the national language but there are various other languages such as Maithili, Bhojpuri, Tharu, Tamang, etc. that are spoken by a large part of the population. English and Hindi are widely understood in the urban centers and areas frequented by tourists.

The economy of Nepal is largely dominated by agriculture. With 60% of its population dependent on agriculture for their livelihood and with agriculture contributing a third of the total national Gross Domestic Product (GDP), agriculture is regarded as one of prioritized sectors for the economic development of the country (ADS, 2012). Besides agriculture, tourism, carpets, and garments are major industries. Various factors such as political upheaval, social unrest, landlocked geography, rugged terrain, lack of natural resources, poor infrastructure, and lack of access to education have directly contributed to Nepal's underdevelopment.

### Focus of this report: Nepal, innovATE and AET systems

This report was commissioned by the 'Innovation for Agriculture Training and Education (innovATE)' program. 'innovATE' is a recently-awarded 5-year USAID program led by Virginia Tech University, with the primary goal of strengthening training and education systems to improve the performance of the agricultural sector in developing countries around the world. Penn State, as one of the consortium partners on innovATE, has the responsibilities to lead innovATE activities in Asia, including Nepal, one of the US government's focus countries under the 'Feed the Future' initiative. As a part of the innovATE program, this initial country assessment was conducted to review the current status of agricultural education and training (AET) in Nepal. This report encompasses the current strengths and challenges facing the AET system in Nepal, as well as potential next steps for strengthening these systems and ways for leveraging innovATE program involvement.

## **Data collection methodologies**

The accumulation of the facts involved gathering of data through both primary and secondary sources. One formal focus group discussion was carried out with Nepalese graduate students currently studying at Penn State and faculty members who have experience working in Nepal. Consultations with governmental and non-governmental staff, agriculture students and faculty members at other institutions were also carried out to acquire existing views and information regarding AET in Nepal. Consultations were carried out by phone, e-mail and in some cases by Skype. Meanwhile, secondary information was obtained from library resources, newspaper archives, and government, university and NGO websites.

## **History of education in Nepal**

Education is one of the most well developed social services in Nepal. Though there are many things which are far from perfect, the tremendous expansion that the education system has achieved in the last few decades is highly impressive. Modern education in Nepal began with the establishment of the first school in 1853, which was restricted only for the members of the ruling families and their courtiers. Schooling for the general public began only after 1951, when a popular movement ended the autocratic Rana family regime and initiated a democratic system. Today, almost 7.4 million (CBS, 2012) are enrolled in schools and colleges.

Higher education in Nepal started almost one hundred years ago. Tri-Chandra campus was established as the first higher education institution in the country affiliated to Patna University, India in 1918. In 1959, Tribhuvan University (TU) was established as the first university under the Nepali government. Following its establishment, there were many colleges established in different parts of the country under the affiliation of TU. Another governmental university, Mahendra Sanskrit University (MSU), was established in 1985 and focused on promoting Sanskrit education. Two other privately-funded universities besides TU & MSU were established in the 1980s & 1990s: Kathmandu University and Pokhara University. However, until 1990, higher education development was highly restrained as the country's gross enrollment ratio (GER) was only about 5%. Inclusive development of all sectors of society, including disadvantaged groups (females, dalits, etc.) in higher education, was an emerging issue as only 23% of the students enrolled were female in 1990 (MES, 2004). In 1990 there was a major political uprising that abolished absolute monarchism and established a multiparty system. Developing a robust higher education system which will cover the majority of the population has been a priority of the country ever since. In these contexts, the Nepal National Commission of Education emphasized the implementation of the Higher Secondary Education Board (HSEB) as the first step towards specialization in higher education in 1992. In 1993, the University Grants Commission (UGC) was established to

promote, facilitate, and support development of higher education in Nepal. Currently there are 12 different universities operating in various parts of the country under the UGC (UGC, 2010/11).

### **History of agricultural education**

After the 1951 revolution, in an effort to establish an educational system that would address individual as well as societal needs, the ‘School of Agriculture’ was established under the Ministry of Agriculture in 1957. The school was set up to produce lower-level technical manpower to serve farmers called ‘Junior Technical Assistants (JTA)’. Later, in 1968, the school was upgraded to the College of Agriculture and a two-year ‘Intermediate of Agriculture Science (I.Sc.Ag)’ program was started, producing middle level technical manpower in agriculture, known as Junior Technicians (JT). Both of these schools and colleges were in Kathmandu and were under the Ministry of Agriculture, Government of Nepal. In 1972, the college was upgraded to the ‘Institute of Agriculture and Animal Sciences (IAAS)’ under the umbrella of Tribhuvan University. The institute was then relocated from Kathmandu to its present site at Rampur in Chitwan district with an area of 110 hectares. In 1978, 125 hectares of a livestock farm which was under the Ministry of Agriculture was handed over to IAAS. Presently, the institute has its central campus at Rampur and two other satellite campuses; a) The Lamjung Campus, located at Sundar Bazaar in Lamjung District which was established in 1975 and b) The Paklihawa Campus located at Bhairahawa in Rupandehi district which was established in 1978.

Meanwhile, the ‘Nepal Forestry Institute’ under the Department of Forestry was established in 1947 to produce entry-level forest staff, including rangers and foresters. In July 1972, the institute was brought under TU and renamed as the ‘Institute of Forestry (IOF)’. Until the late 1970s, IOF was training only sub-professional or technical grade manpower through a B.Sc degree in Forestry.

In response to the growing demand for agriculture technicians and graduates in the country, several private and governmental colleges were established at the start of 20<sup>th</sup> century. The Himalayan College of Agriculture Sciences and Technology (HICAST), was established in 2000 at Bhaktapur and offers Bachelor and Master’s level courses on agriculture and veterinary sciences. Similarly, Gokuleshwor Campus under IAAS was established in the western part of the country in 2010. Realizing the importance of trained human resources in agriculture and forestry as a catalyst for overall development, the cabinet decided to establish a new ‘Agriculture and Forestry University (AFU)’ in 2010. The idea was to merge the IAAS and its affiliated campuses and the Institute of Forestry (IOF) to produce a more robust agricultural education system in Nepal.

Similarly, with the aim of producing competent and technical professionals in the field of agriculture, Nepal Polytechnic Institute (NPI) under the Center of Technical Education and Vocational Training

(CTEVT) started a B.Sc. agriculture program at Bharatpur, Chitwan in 2011. Recently, under the Tribhuvan University system, two new campuses are now offering agriculture programs: Mahendra Ratna Multiple Campus, Illam, B.Sc in Floriculture and Horticulture (2012) and Mechi Campus, Jhapa, B.Sc. in Tea Technology.

## Structure of the Nepalese education system

### Structure of school education in Nepal

The school system in Nepal consists of primary, lower secondary, secondary and higher secondary education, lasting a total of 12 years (5+3+2+2) (Fig.1). There are mainly three types of schools in Nepal:

- a) Community (fully or partially aided by government): These kinds of schools are focused on either primary (5), lower secondary (5+3) or secondary level (5+3+2) of education, depending on the resources.
- b) Institutional (private): Similar to community schools, institutional schools are also focused on either primary, lower secondary or secondary level of education.
- c) Higher secondary schools: These schools are providing higher secondary studies (10+2) in the country.

Basic education lasts eight years, with a five-year primary cycle and a three-year lower secondary cycle. Students take a further two years of schooling at the secondary level, which concludes with the *School leaving Certificate* (SLC) examination, required for admission to the upper secondary level. Upper secondary schooling is a further two years, which is undertaken within the school system or through a similar certificate program offered at universities. A vocational stream at the secondary level (from grade 9) is also being introduced under the new system, which will enable students on a vocational track to enter tertiary education after completing an additional one-year bridge course.

Both community schools and institutional schools cater to primary and lower secondary students, whereas only higher secondary schools provide education at the higher secondary level. Diploma courses of three years, which are equivalent to higher education, are also offered by colleges under the Council for Technical Education and Vocational Training (CTEVT). CTEVT, founded in 1989, is a national autonomous apex body of Technical and Vocational Education and Training (TVET) committed to the production of technical and skillful human resources required by the nation. Colleges also offer SLC-level certificate programs of between one and two years.

After completion of SLC level, students receive further education at the higher secondary level, also called “10+2”. The “Higher Secondary Education Board (HSEB) Certificate” is awarded in one of the

following four streams: Science, Management, Humanities, or Education, and provides access to university. The science and management streams are the most popular, and the education stream is the training program for lower secondary school teachers. The HSEB is the supervising and awarding body.

### Structure of higher education in Nepal

University or higher education begins after 12 years of schooling (Figure 1). The first level of higher education is three to five years (depending on the field) leading to a Bachelor's degree. Arts, science, commerce, education, and social sciences are usually three-year programs, and law is offered as a three-year graduate entry program. Engineering, pharmacy, agriculture, and business administration and information are four-year programs. Meanwhile, architecture, law, medicine, veterinary science and animal husbandry are all 5-year programs.

Bachelor degree programs are followed by the Master's degree (graduate diploma), which is usually two years in length and typically in the same area of study. Master's degree programs are further followed by Ph.D. degrees (Doctoral), which are usually a minimum of three years, typically including coursework, subjects on research methodology and some specialized subjects, and with approximately two-thirds of the time devoted to a research thesis. Universities are autonomous in academic and other matters and are coordinated by the UGC.

### Types of higher educational institutes

**a) Universities:** Established in 1959, Tribhuvan University (TU) is the oldest institution in Nepal and enrolls almost 90% of the total student population through its five institutes *Medical, Engineering, Forestry, Agriculture & Animal Sciences, and Science & Technology*, four faculties, *Humanities & Social Sciences, Management, Education, and Law*, four research centers, *Center for Economic Development and Administration (CEDA), Center for Nepal and Asian Studies (CNAS), Research Center for Applied Science and Technology (RECAST), Research Center for Educational Innovation and Development (CERID)*, and 878 constituent and affiliated colleges spread across the country (Singh, 2008).

Four other universities were established in the 1980s and 1990s: Nepal Sanskrit University, Kathmandu University, Purbanchal University, and Pokhara University. Three other universities – Far-Western, Mid-Western, and Agriculture and Forestry – are currently being established to help meet student demand (UGC reports, 2011). Additionally, there are three other university-level institutes and academies under the purview of the University Grants Commission (UGC). These are: B.P. Koirala Institute of Health Sciences, National Academy of Medical Sciences, and Patan Academy of Health Sciences.

**b) Technical and Vocational:** Technical and vocational education in Nepal is provided by both public and private institutions, and offered under the purview of CTEVT, established in 1989. Technical schools and polytechnics offer a mix of short and long-term training programs. Currently, CTEVT offers three levels of TEVT programs: Diploma, Technical SLC, and Short-Term Vocational Trainings in the areas of health, agriculture, and engineering, among others. It also conducts skills testing and standardization of skills learned by formal or informal means. In addition, it also conducts training for technical instructors. The CTEVT system currently has an average yearly enrollment capacity of 13,000 students in the Diploma and TSLC levels. TU also offers some diploma level programs in technical fields and some of the newer private universities also offer diploma programs accredited by the council through their affiliated campuses.

### **The current status of Agricultural Training and Education Institutes in Nepal**

Agricultural education in Nepal has been rapidly changing. Agriculture campuses/universities have gone through various names to meet changing world needs. Agriculture programs currently operating in Nepal can be classified in two different ways: a) Universities, which offer degree-granting programs in agriculture and b) Technical Schools and Polytechnics, offering a mix of short and long-term training programs in agriculture and related fields. Presently, there are around 3500 agriculture graduates working in Nepal. In total, 250 agriculture graduates, 70 veterinarians, and 80 forestry graduates (2012) are being developed annually by different institutions around the country and out of which 30% are believed to go abroad either to study or for employment (Pyakuryal, 2013).

Meanwhile agriculture education in schools is now being prioritized too. The government has recently made changes in school curriculum making ‘agriculture’ (previously optional) a compulsory course during 9<sup>th</sup> and 10<sup>th</sup> grade. Also in the recent changes, to increase the number of technical level agriculture workforce in the country, curriculum (based more on practical application, 60:40, practical: theory) of 9<sup>th</sup> and 10<sup>th</sup> grade has been drafted for those students motivated toward a getting technical degree, Junior Technical Assistant (JTA). In the majority of districts (presently in 48 districts out of 75), governmental schools are running JTA programs, where students in each grade (9<sup>th</sup> and 10<sup>th</sup>) are taught five different agricultural based subjects in conjunctions with others. Emphasis has been given more toward practical application; 60:40 practical: theory ratio (Anil Babu Pokhrel, Personal communication, July 24, 2013).

### **Higher education programs in agriculture**

Among 12 universities in Nepal, there are only 3 which offer degrees in agriculture and related fields (Table 1) – Agriculture and Forestry University (AFU), Tribhuvan University (TU) and Purbanchal

University (PU). These three are constituted of various institutes, campuses and programs, which are important to delineate (Table 1).

### **Agriculture and Forestry University (AFU)**

AFU is the first University in Nepal that is based on a land-grant model (similar to that found in the US), with the mandate of conducting instruction (teaching), research, and extension programs for agriculture and forestry development in the country. Established in June, 2010 at Rampur, Chitwan, it consists of two campuses which were formerly under Tribhuvan University: Institute of Agriculture and Animal Sciences Campus at Rampur, Chitwan and the Institute of Forestry Campus at Hetauda, Makawanpur. Considered as the second-generation university to address current needs, it has its specific and standard organization structure, academic programs and curricula developed by highly qualified professionals.

Presently, 110 undergraduate students are accepted in Agriculture and 40 in Forestry each year (from 2012). The University has 195 faculty members and currently university infrastructure holds a capacity of around 800 undergraduate students, 200 postgraduate students and around 50 Ph.D. scholars in different disciplines of agriculture and forestry.

### **Shared between AFU and Tribhuvan University (TU)**

#### **Institute of Agriculture and Animal Sciences (IAAS)**

IAAS is the oldest institution for formal training in agriculture in Nepal. Established in 1972 under Tribhuvan University, the institute has been recently been split between TU and AFU. At present, it offers four year B.Sc. Agriculture (Bachelor of Science in Agriculture), B.V.Sc. & A.H (Bachelor of Veterinary Science and Animal Husbandry), M.Sc. Agriculture, M.Sc. Animal Science, M.V.Sc., M.Sc. Aquaculture, and Doctor of Philosophy (Ph.D) programs. With over 150 trained and dedicated faculty members at its central and branch campuses, IAAS provides teaching, research, and extension programs (<http://www.iaas.edu.np>).

The four-year B.Sc. agriculture program has the primary goal of developing technically competent agricultural undergraduates who can apply their knowledge and skills to the established and emerging needs of the agriculture sector in Nepal. Students acquire knowledge in a variety of core subjects in the first three years following which elective courses in their areas of interest are offered. A wide range of courses are offered from biochemistry, crop physiology, agriculture microbiology, environmental sciences, agro-ecology, ichthyology, agronomy, horticulture and animal science to production-focused courses on cereal crop production, commercial crops, vegetable and spice crop production, fruit and plantation crop production, pig and poultry production, as well as courses on management and conservation such as farm management, social mobilization and community development, soil

conservation and watershed management, animal nutrition and feeding practices, and animal breeding practices.

Furthermore, IAAS offers a two-year *Master of Science in Agriculture (M.Sc. Agriculture)*, with a major in various specializations: Agriculture Economics, Agriculture Extension, Entomology, Horticulture, Plant Breeding, Plant Pathology, Conservation Ecology and Soil Sciences. In addition to a few specialized departmental core courses, students must take courses on statistical methods, crop physiology, general biochemistry, and technical writing. Similarly, *Master of Science in Animal Science*, (Animal Breeding/Animal Nutrition/Fodder Production), *Master of Veterinary Science*, (Medicine /Pharmacology/ Microbiology/ Pathology/ Theriogenology/ Parasitology) and *Master of Science in Aquaculture* are also being offered. Additionally, three-year Doctor of Philosophy (Ph.D.) programs under different departments are also offered.

Students aspiring to pursue B.Sc. Ag and B. V. Sc & A.H, should have passed 10+2 in the science stream with English, Physics, Chemistry and Biology/Math as majors. Only those securing a minimum of a 50% aggregate score from TU or any other accredited university and boards are eligible to sit for the entrance exam. Similarly, to sit for the M.Sc.Ag entrance exam, s/he should possess a B.Sc. Ag. or B.Sc. Animal Science, or an equivalent degree. Likewise, for M.Sc. Aquaculture, one must have a B.Sc. Ag, B.Sc Animal Science, B.V.Sc & A.H, B.Sc. Aquaculture, M.Sc. Zoology or an equivalent degree. In order to enroll in the M.V.Sc, an applicant must have a B.V.Sc and A.H or equivalent degree with English as a teaching medium and at least second division score during undergraduate (45 % to 59.99% marks).

110 seats are offered each year (from 2012) under IAAS, Rampur. Previously, 150 total were offered between Paklihawa and Lamjung. Recent reorganization has prompted change in the system as both Paklihawa and Lamjung campuses are now under TU and Rampur under AFU. This year TU offered 220 seats under Paklihawa and Lamjung campuses. Students are mostly selected on merit based on their qualifying exam scores and are offered full scholarships (which includes hostel accommodations) but around 20% of the students accepted have to pay Rs. 100,000 (\$1200) to enroll.

### **Institute of Forestry (IOF)**

The Institute of forestry (IOF) is the only well-established national academic and training institute in Nepal that has been training forestry and natural resource management graduates since 1947. Until the late 1970s, IOF was only focused on producing sub-professional or technical grade forestry manpower. In 1981, it expanded its academic programs with a two-year technical certificate in forestry and three-year Bachelor of Science in Forestry degree. Later, with the assistance of the World Bank's International Development Agency (IDA) and the United States Agency for International Development (USAID), the

Bachelor program was shifted to new campus premises at Pokhara. In 1995, the Bachelor degree program was upgraded to a four-year program. Currently, IOF operates at two separate campuses, one at Pokhara (under TU) and the other at Hetauda (under AFU). Various academic programs are being offered, such as a two-year Technical Certificate in Forestry, a four-year Bachelor of Science in Forestry, and a Master's in Forest Science. Recently, it has further extended its degree program by offering an M.Phil. & Ph.D. in Community Forestry at Pokhara. (<http://www.iof.edu.np>). 80 students are accepted each year (Pokhara + Hetauda) based on their merit on the qualifying examination. 44 out of the 80 students (including several quotas) study with full scholarship (based on merit) and the rest have to pay Rs. 200,000 to enroll.

## **Tribhuvan University (TU)**

### **Kathmandu Forestry College (KAFCOL)**

KAFCOL in Kathmandu also offers B.Sc. in Forestry and Diploma in Forestry (Ranger) programs (<http://www.kafcol.edu.np>). Established in 2005 and affiliated with TU, it is the first and currently only private institution with the mandate of producing forestry graduates in Nepal. In 2012, KAFCOL affiliated with Salzburg University, Austria for M.Sc. in Geographical Information Science and Systems. It also runs Diploma-level courses in Forestry under the affiliation of CTEVT. 50 seats are offered each year. Tuition Cost: Rs 400,000 (\$5000).

### **Gokuleshwor Agriculture and Animal Science Campus (GAASC)**

GAASC was established in Baitadi, Nepal in 2010 under TU with the primary goal of making agricultural education more accessible to the students of remote areas developing technically competent agriculture graduates. It offers a four-year Bachelor program; during the first three years students are made familiar with core agricultural disciplines. In the fourth year, elective courses are offered to provide the students an opportunity to acquire knowledge and skills in areas of their interest. The curriculum and other activities are more or less similar with IAAS (<http://gaasc.edu.np>). A total of 50 seats are offered each year. To get admission, students need to secure at least 80 (pass mark) in the entrance examination under IAAS. Tuition cost: Rs.250,000 (\$3100) for four years.

### **Tea technology and Management**

Realizing the need of expertise in the tea industry in the country, a B.Sc. in Tea Technology and Management was started at Mechi Multiple Campus, Bhadrapur, Jhapa in 2011. This is an entirely new program in Nepal which is a four-year program incorporating courses from basic science and technology, to practically-based management and field works. 24 seats are offered each year. Tuition Cost: unknown.

## **Horticulture and Floriculture Management**

In 2012, under the affiliation of TU, Institute of Science and Technology, Mahendra Ratna Multiple Campus, Illam started a four-year (eight semesters) B.Sc. program in Horticulture and Floriculture Management. To address the growing demand, the main goal of the program is to produce better horticulturists in Nepal who are competent both in skills and knowledge. Several basic courses like soil science, pathology, entomology, breeding, and agri-statistics are offered along with some specialized courses on horticulture and floriculture. Courses are designed to cover not only the production aspects but also the produce management in marketing or in the tourism industry. 30 seats are offered each year and the students are selected based on their merit in the entrance examination. Tuitions cost: Rs. 326,000 (\$4000), for four years.

## **Purbanchal University (PU)**

### **Himalayan College of Science and Technology (HICAST)**

Accredited by Purbanchal University, HICAST was established in the year 2000 to develop academically and technically sound graduates to address the shortage of trained professionals in agriculture. It offers various academic programs such as B.Sc. Ag, B.V.Sc & A.H, M.Sc. The four-year Bachelor program aims to provide knowledge on agricultural development and on indigenous technologies used by farmers. Focus in the early semesters is on introductory courses (similar to IAAS), followed by project work and electives. Students are linked with research firms, agro-industry companies, NGOs, and farms for an internship in the last semester to provide real field-based experience. Students are required to submit their theses to complete their undergraduate education.

HICAST also offers a Master's of Meat Technology degree and a Master's of Dairy Technology degree. These are specialized degrees that aim to improve food quality and safety. The focus is on preservation, processing, packaging, distribution, and the use of safe, nutritious, and wholesome food and dairy products (<http://www.hicast.edu.np>) To enroll in HICAST, applicants must sit in the entrance exam for undergraduate/graduate level and must have at least a 50% score in the +2 Science stream with Biology, Physics, and Chemistry as compulsory subjects. For a Master's, a student is required to have a Bachelor's degree in Agriculture, Veterinary Science, or Microbiology. 96 seats are offered each year. Tuition cost: Rs 600,000 (\$7500) paid on an installment basis in each semester.

### **Nepal Poly-technique Institute (NPI)**

Established in 1996 in Bharatpur, Chitwan, NPI is the first public limited company of its kind committed to produce human resources in the areas of engineering, agriculture, and medicine. Starting in 2011, under the affiliation of Purbanchal University, it offers a four-year Bachelor program in Agriculture (B.Sc. Ag)

and a five-year Bachelor in Veterinary Science & Animal Husbandary (B.V.Sc. & A.H). NPI under the affiliation of CTEVT also offers a three-year diploma program on agriculture (Intermediate Science in Agriculture, I.Sc. Ag) and a 15-month technical certificate (Livestock JTA) (<http://www.npiharatpur.org.np/>). Each year 48 seats are offered. Tuition cost: Rs. 600,000 (\$7500) on average per degree program.

### **Technical schools and polytechnics**

The Council of Technical Education and Vocational Training (CTEVT) is a national autonomous apex body of vocational education and training (TVET) in the country. Under CTEVT, various technical schools and training centers, technical colleges and institutes, and annex schools offer three levels of programs including Diploma, Technical SLC and Short-Term Vocational Trainings in the areas of agriculture, health, engineering, and others.

- a) *Proficiency/diploma level*: The entry requirement for 3-year certificate/diploma level programs is SLC passed at least in second division (45% to 49.99% score). Various academic programs such as an Intermediate in Science (I.Sc). Ag (Plant Science), I.Sc. Ag (Animal Science) and a Diploma in Food and Dairy Technology are offered.
- b) *Technical school leaving certificate (TSLC)*: TSLC level programs are offered in health, agriculture, engineering, social management, office management, etc. For the course of 15 months, an SLC pass is the requirement whereas those who do not pass the SLC are eligible for the course of 29 months.
- c) *Short-term vocational and skill training*: The goal is to provide certain professional and vocational skills to the people who are unable to gain higher education or are interested in gaining certain vocational/professional skills to excel in their professional career. Various training programs ranging from 39 hours to 1500 hours are offered in agriculture and related fields. Anybody can take part in these short-term programs.

Table 2 provides a list of agriculture-related courses offered during each of these three different levels.

### **Agricultural sector overview and workforce profile**

Agriculture and livestock are key components of the livelihoods for the majority in the country. However, farming is largely based on low-value cereals and subsistence production, with mere 13% of outputs traded in markets. Rice is the most important cereal crop followed by maize, wheat and barley. However in the mountains, potato is the major food item followed by maize, buckwheat and barley.

Lately, growing vegetables (both off-season and on-season) such as cabbage, peas, cucumber, tomato etc. is gaining popularity among farmers, because of their competitiveness in terms of market price. Commercial banana cultivation on the flat lands of the terai is also growing in popularity. Also, livestock production forms a major component of mixed farming systems. In these systems, while forests supply fodder, fuel wood, grazing land, and balances hydrology, livestock convert fodder, grasses, and agricultural by-products to milk, meat, manure, and household income. Goats, followed by cattle, buffalo, pigs and sheep are the major livestock raised in Nepal.

Growing unemployment and underemployment of graduates across a wide range is one of the serious issues. Many graduates do not enter or return to agricultural production jobs. However, medical and technical graduates (including those in the agricultural sector) in comparison with others, are quite suitable for the current job market in the country (Lamichane and Chemjong, 2003). In the agricultural sector, currently the majority of the jobs are with local and international NGOs, as well as with the government (research, education and extension) and agro-based industries. Lucrative salaries and good facilities makes NGOs the prioritized options for graduates and technical assistants (Pokharel, 2013), however there are several candidates attracted toward governmental jobs due to the offer of long-term benefits. Agro-based industries, which are one of the important components of agriculture commercialization are still emerging. They mainly exist in very small production units and are highly scattered. Obsolete and inefficient technology and lack of farm managerial skills are two of the most important constraints in agri-business development. Dairy, tea, coffee, cardamom, spices, apple, non-timber forest products, seeds and citrus fruits are the major agriculture industries currently in operation. Although these are on a small scale, many have great prospects in both local and international markets if managed well.

Even though there is a serious paucity of agriculture graduates in the country, production of lower level technical graduates coming from rural backgrounds, motivated toward working with farmers in the communities should be prioritized. Currently, agro-job opportunities have surged on both the national and international fronts, which necessitates a wide range of vocational trainings in different subsectors of agriculture. However, the present capacity of vocational agriculture training in Nepal has been inadequate, justifying for additional efforts for expansion.

## ATE system in Nepal: SWOT analysis

### Strengths

**Establishment of Agriculture and Forestry University (AFU):** Realizing the importance of effective agricultural education and research system in the transformation of agriculture in the country, the establishment of AFU is being regarded as one of the critical steps to improve the agricultural efficiency in the country (Regmi, 2007). AFU is the first agriculture-based university in the country and is based on a land-grant model. The university is still establishing itself and has just started enrolling students. Thus, good planning and organization of this new university to address the current demand of the communities and the agricultural workforce will have a significant impact in the future.

**Strong theory background:** One overwhelmingly positive attribute mentioned by many of the participants in our focus group discussion (Appendix 1) was about their strong theoretical background. Agriculture students coming out from the current ATE system are inundated with a large block of theory, emphasizing more on detailed, theoretical understanding on several disciplines.

**Scholarships opportunities:** Current agricultural universities and institutes are offering students with attractive and generous scholarship opportunities for several students (selection based on merit). Around 75% of the total students enrolled in AFU or IAAS are in full scholarship and the rest have to pay around 100,000 (\$1200) or 200,000 (\$2400) for a period of 4 years depending on their performance during the entrance exam.

### Weaknesses

**Human resource issues:** Characterized by traditional and subsistence farming, Nepalese agriculture is still facing an acute shortage of trained human resources. There is no debate on the fact that to achieve the agricultural transformation for improved food security in Nepal, critical deficiencies in human resources need to be urgently addressed. Inadequate services to farmers due to lack of staffing and funding has been quoted as one of the major problems for continuous underdevelopment of the agriculture sector in the country. The Ministry of Agriculture and Development (MOAD) has 378 extension offices nationwide and each office serves more than 11,000 farmers; one technician is responsible for an average of 1,500 farmers, whereas in developed countries this ratio is 1 technician/400 farmers (IRIN, 2013).

Also, in recent years, several vacancies in various governmental organizations (agriculture-based) remain unfulfilled due to lack of applicants (Pokharel, 2013). Presently, almost 65,000 students graduate every year from different universities in the country (UGC report, 2011), yet only 0.3 % of higher education enrollment is in agriculture (including veterinary and forestry programs), which clearly shows the negligence from government and the universities to produce forestry and agricultural graduates while the

majority of the population is involved in the agricultural sector. According to Pyakuryal (2013), 1224 farming households are being served by a single agriculture graduate on average. Further, Nepal requires 6000-7000 animal scientists/veterinarians, 18,000 forestry graduates, though there are only 624 registered veterinarians and 1800 forestry graduates respectively, indicating that the supply is behind the demand. These issues are inextricably linked to the need to improve the country's inadequate infrastructure and overall support for agriculture research, education, and extension.

**Lack of agricultural value-chain and systems research:** A top-down approach of agriculture research, education and extension, which is not demand-driven, is a huge constraint to the overall development of the Nepalese agriculture sector. One of the most fundamental knowledge gaps in research and intervention is an understanding of the determinants of consumer choice and how to use this information to improve the food and the agricultural system (Thapa, 2010). For example, even though the National Agriculture Research Institute (NARC) has been developing various crop varieties, farmers' adoption rates are extremely limited and are still heavily dependent on Indian varieties. Similarly, if you consider the educational institutes, a student will often graduate with extensive knowledge of the varieties and species developed by foreign institute, but with very little knowledge about the local varieties released from NARC.

The National Agriculture Research Council (NARC) has an important role in technology generation, dissemination and promoting adoption of technology in all subsectors of agriculture. However, cereal research dominates over other subsectors in terms of technology generation, availability of human resources, and investment in research projects resulting in limited technologies available in horticulture, livestock, commercial crops and fisheries (ADS report, 2012). Thus, NARC is struggling to meet the needs of farming communities, agro-entrepreneurs, industrialists and traders at large (Gaucha, 2007), which largely forces the farming communities to depend on technologies introduced from neighboring countries and abroad. For example, cardamom production has declined in eastern Nepal and appropriate solutions are not available yet. Similarly, in absence of proper management techniques against Coffee White Stem Borer (CWSB), coffee growers are struggling to protect their crop, forcing them to move away from coffee plantation production. Also, there is limited research funding; only 0.4% of the agriculture sector's GDP is spent on research, which is largely insufficient, and is hampering the overall development of the country (IRIN, 2013).

**Lack of collaboration between agricultural education, research, and the extension system:** The separation of agricultural education, research and extension into three different ministries and agencies, with limited functional mechanism to link them together has resulted in systemic "bottlenecks" in national agriculture systems and their effectiveness to contribute to development. The three organizations (NARC

for research, DOA/DLS for extension, and IAAS for university) do not seem to benefit from cross-fertilization of agricultural knowledge as there are not any clear cut policies under the Tribhuwan University Act, 2049 or the University Grant Act, 2050 resulting into a proper research, extension and education system (ADS, 2012). Even though these institutions are supposed to be working hand-in-hand, it rarely happens. Agricultural research is conducted by NARC station and laboratories, the majority of which are not linked with universities. Similarly, few research activities are carried out as part of a higher degree (M.S or Ph.D), but very seldom are they related to national priorities or programs.

**Outdated curricula:** To address the current needs and challenges, continual updating of curricula is imperative, but it is not something that happens frequently in Nepal. When it comes to agriculture, where technical knowledge is changing so rapidly, it is most essential that the students keep up-to-date with scientific progress to develop their competencies. Sadly, academic curricula in agriculture in Nepal which were developed often several decades ago (with the help of a few foreign consultants) still largely remain the same. Furthermore, the curricula tend to be more theory-based and lacking in diverse alternatives, thus often inappropriate for the needs and challenges of agricultural communities in diverse geographical and agro-ecological regions throughout the country.

**Infrastructure and financial issues:** The majority of agriculture graduates in Nepal come from governmental institutes, where the sole source of funding and financial support is from the government. They operate on the basis of an annual budget which depends on the number of students enrolled, previous funding levels, and governmental capacity to support the institutions, of which 85% of the total budget is used for salaries (FAO reports). In absence of proper educational infrastructure such as electricity, internet, teaching labs, instructional equipment, and research materials, a proper mechanism to balance spending between salaries and infrastructure needs to be considered. For example, in IAAS, the biggest agriculture institute in the country, students are forced to live in the dark many hours a day and they do not have facilities for internet. Furthermore, restricted budgets have resulted in an increasing information gap, which hinders teachers and students from keeping their knowledge current and conducting up-to-date research. Additionally, private institutions (which are very few in number and are still not that well established) lack proper labs and teaching facilities, which impedes the students' development.

**Lack of rural-based students in agricultural education programs:** As the population in the cities continues to grow and as the government is mostly focused on developing urban centers, educational standards in rural areas are not often a priority of the government, which places rural young people in direct competition with better-schooled urban youth. The other serious problem for rural students is that pursuing agriculture requires a student to choose 'science' during the higher secondary level, and in most

of these rural areas 'science' colleges are hard to find. So, they end up going into management, education, or humanities, which are more accessible, and those rural youth who possess unique attitudes and understanding of the rural sector are not able to serve in the technical work of agriculture. This in turn leads to much fewer students with in-depth understanding of rural life and agricultural production working as extension agents and agriculture advisers.

**Technical & Vocational Education and Training (TVET) shortcomings:** The current TVET program in Nepal fails to prepare effective technical manpower for employment opportunities in agriculture and other related fields. While no concrete data are available on the employment rates of graduates from institutions, qualitative information indicates that the placement rate is only around 50-60% (Ghimire, 2011). The current TVET system has several shortcomings like poor access to training, irrelevant training skills, inadequate research and communication in the TVET sector, low quality of training, and a lack of post-training support systems. Even at the policy level, low efficiency and effectiveness have become serious concerns.

## Opportunities

**Building strong connections among institutions:** Often, academic programs in agriculture are working in isolation, with very few connections between institutions. The agricultural institutions should partner with NARC, DOA, NGOs, and private companies to better support the needs of students and the farming community, such as by establishing joint programs and courses and developing pathways for students pursuing careers in agriculture. For agricultural institutions to participate more in research and extension, the role should be well-defined in the institutional policies and in the responsibilities of faculty members. In collaboration with governmental and non-governmental organizations, the institutions need to develop research and demonstration plots that directly address farmers' needs. This also requires that farmers are valued for their contribution to production through their innovations and sharing of local knowledge.

Also, there is a necessity to improve the structuring, coordination, and rationalization of international cooperation, particularly at the regional level. Thus, making good connections with universities, international organizations, and NGOs abroad and developing exchange programs to enable agriculture students/teachers to spend semesters doing research/teaching at academic institutions will be a great experience for both students and teachers.

**Initiatives from Government:** Government should clearly define the overall agricultural priorities and policies with regard to agriculture education and training, with objectives for the educational system and its institutions. Government-run agriculture institutions, which are the major producers of agriculture students in Nepal, could take some initiatives to attract more students to choose agriculture as a career. If

a student doesn't see better employment prospects after graduation, it will serve as a disincentive and discouragement that may lead to the attrition. Therefore, payment packages for government employees should be competitive with similar jobs in the private sector or international NGOs, in order to enhance the image of agriculture among students and others. To further improve the uptake of agriculture graduates, the government could also avail some special scholarships for women because their position is still not comparable to that of men in agriculture. There is also a need to allocate more funding toward the agricultural institutions so that they can establish good lab and research facilities for the students and teachers.

## Threats

**Skilled migration and brain drain:** Young and enthusiastic agriculture graduates and scientists leaving the country in search of more attractive opportunities abroad is very common; 30% of the total number of agriculture graduates produced each year go abroad to study or work (Pyakuryal, 2013). The result of this is a high average age of agricultural personnel due to the low intake of younger candidates; more than 40% of the scientists are nearing retirement age, while 32% of posts are vacant due to recruitment problems (IRIN, 2013). Those who are inside the country are unsatisfied with the existing facilities, salaries (which are often paid 4-5 times less than the Indian counterparts), inadequate research support and facilities, etc. Promotions occur infrequently (nepotism and political influence) and there are very few opportunities for travelling abroad to share knowledge or to engage in short-term international training (Pokharel, 2013). Therefore, it is difficult to find masters-level entomology, plant pathology, soil science and other “hard”-science graduates (IRIN, 2013).

**Poor image of agricultural education:** Overall, attitudes about agriculture are much more negative than positive, and a general ignorance about agriculture contributes to the poor perception of agriculture and careers in this field. It is not that uncommon to find people in Nepal, including many students, considering agriculture to only involve plowing and food production. Nepalese graduate students at Penn State in a focus group meeting (Appendix 1) highlighted that students often choose agriculture as a last resort (default) career. Amid the family and social influence, almost every child growing up in Nepal aspires to go into either ‘medicine’ or ‘engineering’. Thus this attitude towards agriculture as a “fall-back” career leads to a lack of commitment to agricultural careers and may produce mediocre students who would be ineffective in their future jobs. Also, agriculture graduates’ reluctance to act as role models (entrepreneurs) and desire to be more focused toward sophisticated jobs with NGOs or abroad was one of the resounding comments from all the students in the focus group discussion.

In recent years, the number of farmers in Nepal has been decreasing greatly and the new generation lacks ambition to be farmers. The younger generation engaged in agriculture has become a rare sight in Nepal,

as they are usually turned off by the hardship or the low income versus high cost. The government's 2012 Agriculture Development Strategy Assessment (ADS) Report estimated 200,000 youth migrated abroad (especially in Gulf countries) for employment in 2010, leaving mostly women, children, and the elderly behind. Female-headed agricultural households have increased from 12% in 1995 to 26% in 2010. These facts and figures are indicative of the fact that agriculture is far less appreciated today than in past generations. In our grandparents' age, being a farmer was one of the most honored professions in the country. 'Uttam krishi, madhyam vyavasay, adham naukri' is an old adage, which basically lauds 'farming' as the best option, over 'business' and 'jobs'. Thus it has become important to understand that the immediate and real peril facing Nepalese agriculture is not only how to produce more food, but also how to keep farmers from losing the will to produce it and how to improve the image of agriculture as an "honorable" profession.

## **Next Steps**

There are several potential avenues for strengthening the ATE system in Nepal that need to be explored in further detail. The background literature, focus group and initial interviews conducted for this report indicate that the following ways forward are worth further examination:

### **Improving Agricultural teaching in Primary Schools**

To stimulate students' interest in agriculture, early inclusion of agriculture courses should be implemented to broaden students' perceptions of agriculture and related fields. Government and private schools should prioritize agriculture in their curriculum by making it a core subject from primary to secondary level. This will be the best pedagogical approach towards improving the overall image of agriculture among students. In addition to the academic courses, involving students in some aspect of agriculture could be a starting point; for example, maintaining a school garden as a part of practical training could compliment agricultural courses. Furthermore, it is also important that the content of the syllabus is student-oriented and is practical, so that students enjoy the manual activities and appreciate the value of experimental activities associated with agriculture.

### **Agriculture in Universities: Practice versus theory**

Agricultural education at both the undergraduate and Master's levels is mostly concentrated around theory. More emphasis is given to detailed, theoretical understanding of each discipline which requires student to repeat, verbatim, a large block of theory. The present curriculum hardly prepares students for lifelong careers, nor does it provide understanding and appreciation of the challenges and problems faced by those working in the agricultural sector. Updating the curriculum by placing less emphasis on theoretical models and more on practical application of research relevant to society is one of the

immediate needs that should be addressed. Projects and other practical activities must consist of real life situations in which students engage in activities that mirror skills they have to apply in the work environment once they graduate. Subsequently, universities, in collaboration with NGOs and other private sector companies, should expose their students to strong field-based internship programs and should provide the opportunities for them to share their research findings with farmers and other stakeholders.

Courses that are offered in the institutions also need to be considered to meet the changing need. Rapid advancement in science has influenced the subject matter and the types of topics students need to understand in today's agricultural system. Food processing, gender in agriculture, bio-technology, and farming systems development are some of the subject areas which need to be incorporated into curricula. To improve further, a more inter-disciplinary, systems approach to agriculture education integrating environmental, gender, population issues, and sustainable agriculture topics should be incorporated as a part of the academic program. Also, institutions must improve the information infrastructure to ensure students and faculties have good access to new resources.

For students interested in extension, courses on effective communication with diverse rural groups and the process of collaborative problem-solving should be given emphasis. Also, while developing curricula it is important to recognize paradigm shifts and different approaches to the teaching-learning process.

### **Hiring and retention of quality researchers and educationists**

'Brain drain' among the young faculties and researchers is one of the huge challenges currently facing Nepal, as each year younger cohorts are lured towards the more rewarding/lucrative opportunities abroad. Thus, academic/research institutions must create a working environment with good labs and facilities and also must reward those exemplary teachers/scientists who have contributed significantly, including rigorous consideration in hiring, tenure, and promotion. Research achievements, along with effective teaching, should form the base of criteria for assessment. Research and teaching assistantships to support full time graduate students under the direction of faculty will be one of the best ways to improve faculty capacity and motivation. Payment packages also need to be reconsidered as they are not currently competitive with those provided by NGOs or opportunities abroad.

Also, most of the university faculty do not generally receive much training in effective pedagogy and are still using outmoded methods of teaching focused on one-way knowledge transfer through lecturing. Thus, government and academic institutions must support faculty development activities focused on effective teaching and research to increase their motivational level.

## **Overcoming financial issues in academic institutions**

Limited budgetary resources have always been one of the major problems for the institutions under the government (which produces a large number of agriculture graduates in the country). Thus, new and innovative ways of funding institutions need to be explored to make agriculture institutions sustainable. A small percentage of money received from the sale of cash crops could be used as funds for research and teaching efforts. Also, providing fee-based services to commercial agriculture enterprises to enhance teaching and research programs could improve the situation.

## **Improving the image of agricultural education**

The misconception that agriculture is only about the production of crops and livestock needs to be remedied. Advertising and creating awareness on the whole agricultural value chain and the broad range of agriculture programs to parents, students, potential students, and high school counselors, in a format (and in languages) they can understand should have an immediate impact. Mobilizing co-operatives and FM stations could be one of the options to consider.

## **Guidance and counseling services**

There are very few counseling centers in the country when it comes to considering study. Primarily, the parents are the one who mostly decide what studies they want their children to pursue. Thus, strengthening the guidance and counseling support for students during high school and the higher-secondary level could be a significant method of improving the uptake of students into agricultural disciplines.

## **Improving TVET**

Improvements in the TVET system are imperative in the context of Nepal in order to facilitate its educational system as a means to alleviate poverty and also to ensure the competitiveness of its workforce with the international workforce and securing the opportunities for Nepalese in the international labor market. There is an immediate need to develop a standard and regular monitoring and evaluation (M & E) system for regular assessment and improvement of the TVET programs. Making curriculum more relevant to the present national and international labor market is something that needs serious consideration. Also, it is necessary to improve the market access of poor and disadvantaged groups, who are unlikely to be selected for admission to programs due to their poor access to primary education. Therefore, it is necessary to conduct mobile training in the remote areas of the country. To further improve access, these groups of people need to be provided training for free or very low cost and need guidance when looking for employment. Furthermore, incorporating TVET programs and micro-enterprise development through the cooperative approach will support those TVET graduates greatly who

are willing to start their own enterprises but are constrained to do so due to financial and marketing problems.

## **Recommended action plan**

It is clear that enhanced ATE capacity is needed at all levels to address the technological, organizational, institutional, and policy problems currently faced by ATE systems in Nepal. While the need to strengthen organizational policy is recognized in various governmental programs and policies, very little action has been taking to address these needs, including identifying specific gaps between current agricultural education supply and agricultural workforce demand. Thus, the need exists to first identify the gaps in the system, and then developing the tools to efficiently address these gaps.

Below is an outline of a suggested action plan for next steps from all stakeholders in order to build on this background report for on-the-ground impact in building capacity in ATE systems in Nepal. The suggested next steps are:

1. Review of this report by all initial stakeholders, including innovATE consortium, USAID-Washington and USAID-Nepal, and, potentially, Nepalese ATE institutions.
2. Conference call between USAID-Nepal and innovATE consortium concerning potential next steps for innovATE involvement in Nepal.
3. Potential scoping visit to Nepal by innovATE consortium with the purposes of:
  - a. Ground-truthing the information contained in this background report.
  - b. Conducting further interviews and focus groups to assess the ATE system stakeholder needs and priorities.
  - c. Exploring in greater depth the workforce demand in the agricultural sector in terms of skills, competencies, and technical and/or professional training required of employees entering the sector.
  - d. Examine in greater depth the links between this initial assessment and critical cross-cutting themes, including gender, the use of ICT and the legacy of post-conflict upon AET systems in Nepal.
  - e. Expanding on this report's findings (especially the SWOT analysis) to develop a comprehensive menu of options for strengthening ATE systems in Nepal, to present to

and discuss with USAID-Nepal and critical stakeholders. This menu of options will include:

- i. Prioritized needs for building AET human and institutional capacity.
- ii. Suggestions of how to address these prioritized activities, in synergy with ongoing USAID-Nepal agricultural sector investments.
- iii. Recommended budget and timeframes for implementing these prioritized activities.

## References

- Agriculture Development Strategy (ADS) (2012). Preparation of the Agriculture Development Strategy (ADS)- Assessment Report
- Andersson, J., Lindkvist, J., & Andersson, J. (n.d.). Education in Nepal A Study of Nepalese Teachers ' Views on their School Situation, 1–7.
- Center Bureau of Statistics (CBS), 2012. National Population and Housing Census, 2011. (National Report)
- Food and Agriculture Organization (FAO), (2010). Agricultural Extension Services Delivery System in Nepal Food and Agriculture Organization of the United Nations, (June).
- Ghimire, S.S. (2011). Current educational/TVET system in Nepal. Emerging challenges and trends in TVET in the Asia-Pacific Region, 163=171
- IRIN, (2013). Analysis: The trouble with Nepal's agriculture. Published on Jan 23<sup>rd</sup>, 2013. <http://www.irinnews.org/report/97321/analysis-the-trouble-with-nepal-s-agriculture>
- Lamichhane. A & Chemjong, P. (2003). Graduates and job markets in nepal A comparative study of graduates ( in 2002 and 2003 ) and job markets from public and private universities / colleges in Nepal First Draft report. National Institute of Social Sciences SANEL. (6414).
- Maalouf, W. D. (1988). Views on strategies for higher agricultural education in support of agricultural and rural development. *Agriculture and Human Values*, 5(4), 40–49. doi:10.1007/BF02217647
- Ministry of Health and Population (MHP) (2011). “Nepal Population Report, 2011”
- Ministry of Education (MOE) (2010). Ministry of Education: A glimpse, 2010(2067).
- Ministry of Education and Sports (MES) (2004). Quality education for all young people: Challenges, trends and priorities. The development of education National Report of Nepal.
- Pokhrel, D. (2013). ‘Brain Drain’ of agriculture scientists (Nepali). *Karobar Daily*. March 28<sup>th</sup>, 2013. <http://tinyurl.com/nly7u95>
- Regmi. P.P (2007). For Agriculture and Forestry University. *The Rising Nepal*. September 21<sup>st</sup>, 2007.
- port, A. (1993). SECTION I, 1–185.
- Series, N. (2012). Stocktaking : Agriculture Degree Programs in Nepal, (11).

Shreshtha, S (2013). Studying Agriculture in Nepal. *The Himalayan Times*. June 23<sup>rd</sup>, 2013  
<http://www.thehimalayantimes.com/fullNews.php?headline=Studying+Agriculture+in+Nepal&NewsID=373867>

Singh, S. (2008.). Development of Higher Education in Nepal, Golden Jubilee Souvenir, Nepal 132–142.

University Grant Commission (UGC) (2012). Report on Higher education 2010/2011 (2067/68) Nepal.

Upadhyaya, MP. (2008). National Agricultural research System of Nepal. NARC 2008, Annual report 2007/2008, NARC, Kathmandu

## List of interviewees

- 1) Dr. Krishna Roka, Faculty at University of Wisconsin- Madison, [Krishna.roka@gmail.com](mailto:Krishna.roka@gmail.com)
- 2) Dr. Sony Shrestha, former HICAST student, currently a Post-Doctoral Scholar @ Department of Entomology, Penn State University, [shrestha.sony@gmail.com](mailto:shrestha.sony@gmail.com)
- 3) Madhav Kafle, PhD student @ Department of Linguistic, Penn State University, [kaflemadhav@gmail.com](mailto:kaflemadhav@gmail.com)
- 4) Nawaraj Acharya, former IAAS student, currently PhD student @ Department of Entomology, Penn State University, [acharyanra@gmail.com](mailto:acharyanra@gmail.com)
- 5) Prakash Raj Timilsina, former IAAS student, currently PhD student @ Department of Plant Sciences, Penn State University, [prtimilsina@gmail.com](mailto:prtimilsina@gmail.com)
- 6) Samita limbu, former HICAST student, currently Masters Student @ Department of Entomology, Penn State University, [limbz\\_sami@hotmail.com](mailto:limbz_sami@hotmail.com)
- 7) Saroj Adhikari, PhD student @ Department of Physics, Penn State University, [adh.saroj@gmail.com](mailto:adh.saroj@gmail.com)
- 8) Sree Sharma, PhD Student @ School of Forestry and Wildlife services, Auburn University, [shreeram.iof@gmail.com](mailto:shreeram.iof@gmail.com)
- 9) Mr. Sundar Tiwari, Lecturer @ IAAS, Rampur, Nepal, [tiwari\\_sundar@yahoo.com](mailto:tiwari_sundar@yahoo.com)
- 10) Mr. Kedar Devkota, Faculty @ Nepal Poly-technique Institute, Chitwan, Nepal, [kedar\\_devkota@yahoo.com](mailto:kedar_devkota@yahoo.com)
- 11) Mr. Lok Man Sapkota, Former IOF student, Presently working in NGOs, [sapkotalok@gmail.com](mailto:sapkotalok@gmail.com)
- 12) Mr. Bikash Khanal, Faculty @ Horticulture and Floriculture Management, Illam, Nepal
- 13) Mr. Shankar Kaji Shrestha, Former GAASC instructor, currently at University of Florida, [shankarshakya@ufl.edu](mailto:shankarshakya@ufl.edu)
- 14) Ms. Asa Lamsal, Undergraduate Student, Nepal Poly-technique Institute, Chitwan, Nepal [asa.lamsal@gmail.com](mailto:asa.lamsal@gmail.com)

## Tables and Figures

**Table 1. List of universities and their institutes/campuses offering agricultural degrees in Nepal**

| University                                       | Institutes/Campus  |
|--|--|
| <b>Agriculture and Forestry University (AFU)</b> | <ul style="list-style-type: none"> <li>• Institute of Agriculture and Animal Sciences, Rampur</li> <li>• Institute of Forestry (IOF), Hetauda</li> </ul>   |
| <b>Tribhuvan University (TU)</b>                 | <ul style="list-style-type: none"> <li>• Institute of Agriculture and Animal Sciences, Paklihawa and Lamjung</li> <li>• Institute of Forestry (IOF), Pokhara</li> <li>• Kathmandu Forestry College (KAFCOL)</li> <li>• Gokuleshwor Agriculture and Animal Science Campus</li> <li>• Tea technology and Management (under Mechi Multiple Campus, Bhadrapur, Jhapa)</li> <li>• Horticulture and Floriculture Management (under Mahendra Ratna Multiple Campus, Illam)</li> </ul> |
| <b>Purbanchal University (PU)</b>                | <ul style="list-style-type: none"> <li>• Himalayan College of Science and Technology</li> <li>• Nepal Poly-technique Institute</li> </ul>  |

**Table 2. List of agriculture-related courses offered at three different levels in the Nepales TVET system**

a) Proficiency/diploma level

| <b>Programs/Subject</b>              | <b>Duration</b> | <b>Entry qualification</b> |
|--------------------------------------|-----------------|----------------------------|
| I.Sc. in Agriculture (Plant Science) | 3 years         | SLC pass                   |
| I.Sc in Agriculture (Animal Science) | 3 years         | SLC pass                   |
| Diploma in Food/dairy technology     | 3 years         | SLC pass                   |
| Diploma in Forestry                  | 3 years         | SLC pass                   |

b) Technical school leaving certificate (TSLC)

| <b>Programs/Subject</b>                                     | <b>Duration</b>                     | <b>Entry qualification</b> |
|---|-------------------------------------|----------------------------|
| <i>Agriculture (Animal)</i>                                 |                                     |                            |
| Junior technical assistant (JTA) Livestock                  | 2.5 years, On-the-job training(OJT) | Test pass                  |
| Junior technical (JT) in livestock production/Animal health | 15 months                           | SLC pass                   |
| JT course in Agriculture/Veterinary/Livestock               | 1 year                              | JTA + 3yrs experience      |
| TSLC in livestock production/animal health                  | 15 months                           | SLC pass                   |
| Agriculture and livestock production/Animal health          | 2.5 years, OJT                      | Test pass                  |
| <i>Agriculture (Plant)</i>                                  |                                     |                            |
| Curriculum on Plant Science                                 | 15 months                           | SLC pass                   |
| JTA plant   | 2.5 years, OJT                      | Test pass                  |

|   |                |           |
|---|----------------|-----------|
| JTA in Agriculture plant science        | 15 months, OJT | SLC pass  |
| Agriculture and livestock production    | 2.5 years, OJT | Test pass |
| Agro mechanist                          | 2 years        | SLC pass  |
| Agronomist                              | 2 years        | SLC pass  |
| <b><i>Food</i></b>                      |                |           |
| Food technical assistant                | 15 months, OJT | SLC pass  |
| Curriculum for food technical assistant | 1 year         | SLC pass  |
| Food technical assistant                | 2 years        | Test pass |

c) Short-term vocational and skill training

| <b>Programs/Subject</b>          | <b>Duration</b> | <b>Entry qualification</b> |
|----------------------------------|-----------------|----------------------------|
| <b><i>Animal science</i></b>     |                 |                            |
| Dairy product/Sweets maker       | 550 hrs         |                            |
| Community livestock assistant    | 390 hrs         |                            |
| Wool processor                   | 460 hrs         |                            |
| Slaughter house technician       | 390 hrs         |                            |
| <b><i>Plant science</i></b>      |                 |                            |
| Tea plantation and management    | 197 hrs         |                            |
| Mushroom production              | 48 hrs          |                            |
| Off-season vegetables production | 39 hrs          |                            |
| Horticulture                     | 435 hrs         |                            |
| Sericulture technical worker     | 140 hrs         |                            |
| Assistant florist                | 393 hrs         |                            |
| Garden designer                  | 550 hrs         |                            |
| Flower decorator                 | 260 hrs         |                            |

|                                 |         |  |
|---------------------------------|---------|--|
| Fruit processor                 | 390 hrs |  |
| Allo processor                  | 160 hrs |  |
| Cardamom processor              | 460 hrs |  |
| Herb processor                  | 460 hrs |  |
| Off-season vegetable producer f | 390 hrs |  |
| Banana fiber craft person       | 460 hrs |  |
| Tea plantation worker           | 390 hrs |  |
| Coffee plantation worker        | 460 hrs |  |
| Beekeeper                       | 460 hrs |  |
| Community agriculture assistant | 390 hrs |  |
| Vegetable processor             | 550 hrs |  |
| Herbal farm worker              | 390 hrs |  |

Source: <http://ctevt.org.np/>

**Figure 1. Educational System in Nepal**

| AGE | GRADE | SCHOOL EDUCATIONAL SYSTEM                            |
|-----|-------|--|
|     |       |  |
| 19  | 15    | <b>HIGHER EDUCATION (UNIVERSITY)</b>                 |
| 18  | 14    |  |
| 17  | 13    |  |
| 16  | 12    | <b>HIGHER SECONDARY EDUCATION<br/>(GRADES 11-12)</b> |
| 15  | 11    |  |
| 14  | 10    | <b>SECONDARY EDUCATION<br/>(GRADES 9-10)</b>         |
| 13  | 9     |  |
| 12  | 8     | <b>LOWER SECONDARY EDUCATION<br/>(GRADES 6-8)</b>    |
| 11  | 7     |  |
| 10  | 6     |  |
| 9   | 5     | <b>PRIMARY EDUCATION<br/>(GRADES 1-5)</b>            |
| 8   | 4     |  |
| 7   | 3     |  |
| 6   | 2     |  |
| 5   | 1     | <b>PRE-PRIMARY EDUCATION</b>                         |
| 4   |       |  |

## APPENDIX 1: Focus group report

### Summary:

Under the 'Innovation for Agriculture Training and Education (innovATE)' program, Penn State organized a focus group discussion on Thursday, May 16<sup>th</sup>, 2013, involving six Nepalese graduate students from Penn State. Through the focus group discussion, we gathered information regarding the present agricultural educational system in Nepal, its challenges, and how could it be improved.

### Introduction:

'Innovation for Agriculture Training and Education (innovATE)' is a recently-awarded 5-year USAID program led by Virginia Tech University, with the primary goal of strengthening training and education systems to improve the performance of the agriculture sector in developing countries around the world. Penn State, as one of the consortium partners on innovATE, has the responsibilities to lead innovATE activities in Asia, including Nepal, one of the US government's focus countries under the Feed the Future initiative. The focus group was conducted as part of the innovATE program to collect some first-hand information about the present system of agricultural education in Nepal. The discussion was designed to gather information from the students in regard to the following outcomes:

- 1) To understand the educational structure in Nepal
- 2) To understand how students/the general public perceive agriculture and agricultural education in Nepal
- 3) To understand the ongoing limitations that have kept the Nepalese agriculture education system from meeting the needs of students and communities
- 4) To understand the strengths of the Nepalese agricultural education system
- 5) To understand what should be future priorities to improve the AET system in Nepal to make it more robust

### Participants:

Nine participants participated in the discussion including Dr. Thomas Gill, PI for Penn State on innovATE, and Dr. Edwin Rajotte, Professor of Entomology at Penn State, who co-facilitated the focus group, and Dana James, Research Associate, who was the rapporteur. Six of the participants were from Nepal. These six participants were graduate students pursuing either a Master's or PhD degree in various departments at Penn State. Three of the six students were agriculture students, whereas the others were from the fields of sociology, literature, and physics. Five students were male, and one was female.

### Outcomes:

*Outcome 1: To understand the educational structure in Nepal*

- All of the participants had their primary and secondary level studies in Nepal. One of the six Nepalese participants came to the US for his undergraduate studies, and the remaining five students either came for their Master's or PhD.
- According to the participants, the school system in Nepal consists of primary, lower secondary, secondary and higher secondary education, lasting a total of 12 years (5+3+2+2). Basic education lasts eight years, with a five-year primary cycle and a three-year lower secondary cycle. Students take a further two years of schooling at the secondary level, which concludes with the *School leaving Certificate* (SLC) examination, required for admission to the upper secondary level. Upper secondary schooling is a further two years, which is undertaken within the school system or through a similar certificate program offered at universities.
- University or higher education begins after 12 years of schooling. The first level of higher education is three to five years (depending on the field) and leads to the Bachelor degree. The Bachelor is followed by the Master's degree (graduate diploma), which typically consists of two years and is usually in the same area of study. The Master's degree is further followed by the PhD degree (Doctoral degree). A PhD degree usually requires a minimum of three years.
- One of the participants pointed out an institution in Nepal which provides technical and vocational training, called the Center for Technical Education and Vocational Training (CTVET). CTVET provides short- to long-term training courses, ranging from 40 hours to 1500 hours, in Agriculture, Business, Tourism, etc. CTVET is run by the government, and students can attend after they complete grade 10 (when they are around 16 years old). This may be a key grade/age level to influence students to consider careers in agriculture.
- Teachers only need to pass an exam to be certified to teach.
- Rural students do not always have good teachers or sufficient access to resources, especially resources for science programs. Therefore, many rural students need to migrate to urban areas to learn about science because science is not always taught in rural schools.

*Outcome 2: To understand how students/general public perceive agriculture and agriculture education in Nepal*

- In general, participants believe that agriculture is not perceived well in the country. A major part of the population still has a rather negative impression about agriculture; agriculture is mainly regarded as a grueling job without any satisfactory returns. One participant stated, "If somebody who is educated will go back to the village and plans to start some agricultural farm or something related to agriculture, people will start calling him/her crazy or mad."
- Most participants agreed that during their primary and secondary levels of education, they had hardly heard about agricultural education. Almost all of them were motivated at a young age to either go into the field of medicine or the field of engineering. They used various phrases to describe their experiences, including "Parents will always insist that their children become either doctors or engineers" or "If you are a bright student, you have to go into science (implying medicine or engineering)."

- Three of the participants who completed their Bachelor in Agriculture from Nepal indicated that their situations were similar to those described above. They all tried to get into the field of medicine, but after being unsuccessful, they finally went into ‘agriculture science.’ They said things like “When you don’t have any other options left to choose from, you will finally go into agriculture as a good/safe option.”
- Many regard agriculture as the cheapest option too, because “after you pass the qualifying exam, you don’t have to pay anything for your tuition or hostel.”
- The non-agriculture students offered a number of reasons for their decision to not choose agriculture as their field of study, including:
  - Not enough available and useful information/advertising about the agricultural college; some students did not know (when they were growing up) that there was an agricultural college in Nepal
  - No stimulation or experiences with something agricultural during their primary or secondary level
  - Not a highly regarded field in the country - mostly operated by women and older members of the household; young members generally go abroad (Gulf countries) to earn hard cash
  - No counseling system
  - No classmates studied agriculture
  - Lack of understanding about the business side of agriculture in addition to the growing of crops

***Outcome 3: To understand the ongoing limitations that have kept the Nepalese agricultural education system from meeting the needs of students and communities***

- The one resounding complaint from all the agriculture students was about the lack of infrastructure and supplies inside the agriculture institutions. They were strongly concerned about the lack of proper lab facilities, updated books, frequent electricity loss, lack of internet and journal access, etc. Comments included, “How can you produce competitive students in this age when you don’t even have good access to electricity and internet in the institutions”.
- Several other participants commented that there is not enough useful information about college available: they did not get as much information about colleges as they would have liked in high school. This can likely be partially attributed to the lack of a counseling system in schools, from which students would be able to obtain academic and career advice.
- A few participants expressed their frustration with the lack of interdisciplinary subject material and research in the institutions: “We have two different governmental bodies which look after education and research, but the irony is that there is very little collaboration between them. Thus, professors in universities are mostly focused on teaching only, which leaves no research exposure to either undergraduate or graduate students.”

- Other negative factors included: an unsustainable system of agriculture education due to an insufficient budget that mainly comes from the government, limited capacity to further develop the agriculture education system, “brain drain” of educated agricultural agents in Nepal to other countries, a lack of trained teachers and professors, very few agriculture staff/agents to serve farmers, a lack of job opportunities, not enough private sector or agriculture companies, and almost no exposure to students in a topic related to agriculture during their scholastic studies.

**Outcome 4:** *To understand the strengths of the Nepalese agricultural educational system*

- The one overwhelmingly positive attribute mentioned by one of the participants was the human capital that is available to Nepal, as there are many brilliant Nepalese students in agriculture that are either working or studying abroad: “Despite of these many hurdles, the next step should be to connect these brilliant students (in regard to the agriculture students from Nepal living abroad) to the development of Nepalese agriculture.”
- Other positive features include the establishment of the new Agriculture and Forestry University to develop a workforce in agriculture that is more competent and competitive on the global scale, and the potential to make better use of agricultural programming that exists on the radio in Nepal.

**Outcome 5:** *To understand what should be future priorities to improve the AET system in Nepal to make it more robust*

- All of the participants agreed that there is an urgent need for an awareness program focused toward the parents of students and the general public, in order to improve how agriculture and agriculture education are perceived in Nepal.
- One of the participants pointed out the need to reorganize and build capacity in the current agriculture institute: “The first thing should be to figure out a way to make the institute sustainable. The whole system is struggling because they depend wholly on governmental funding, which is not sufficient by any means, as 90% of the current budget probably goes only to teacher salaries. Thus, utilizing internal resources such as farm land and others to regulate funding could be one of the first steps which will help improve the system.”
- Other priorities included:
  - Integrating agricultural activities and courses in primary and/or secondary schools
  - Creating an interdisciplinary approach to agricultural study
  - Improving institutional infrastructure, access to resources, and connections between academia, research, and extension
  - Changing policies (and potentially utilizing cooperatives) to allow more rural people to learn about other opportunities in agriculture
  - Creating a counseling service in the pre-university school system, since many students currently only receive career advice from their parents who may not understand the extent of opportunities in agriculture

- Improving curriculum; one student noted that “Most of the books and notes we read are based on India, and in some cases you don’t even know what kinds of varieties are being released in Nepal. Instead, we know almost all about India”
- Creating a practical approach to education; a participant stated that “More focus should be on practical education rather than concentrating only on theory”
- Improving teacher training and teaching methods/standards

### **Conclusions and Recommendations:**

Agriculture will remain a major contributor to the economy of Nepal well into the future. The agriculture sector is undergoing rapid changes as a consequence of both technology and economic forces, which call for an increased market focus, increased competitiveness, and higher productivity. This will further enhance the importance of agricultural training and education in Nepal, requiring a transformation of agricultural institutions into dynamic promoters of change within their environment.

Therefore, the responses and discussions from the focus group will help us to identify and better understand the issues that need to be addressed with agriculture education in the country. Based on several ideas suggested during our discussion, the following recommendations for building the capacity of Nepalese agricultural and education training systems are worthy of consideration and further exploration:

1. *To stimulate students’ interest in agriculture, early inclusion of agriculture courses, possibly at the primary or lower secondary level, could be implemented to broaden students’ perceptions of agriculture and related fields.*
2. *Advertising and creating awareness about agriculture and agriculture programs to parents, students, potential students and high school counselors could be encouraged, in a format (and in languages) they can understand. Mobilizing co-operatives could be a good option to increase awareness.*
3. *Policies are needed for an inter-disciplinary systems approach to agriculture education, integrating environmental and sustainable agriculture topics into academic programs.*
4. *Upgrading curriculum by placing less emphasis on theoretical models and more on practical applications of research that is relevant to societal needs would ensure that agriculture students receive the necessary skill sets to be successful.*
5. *A commitment to improving physical and communication infrastructure, especially with regard to the electricity and internet, should be a priority because of the potential to reduce the information gap, especially between urban and rural areas.*
6. *New and innovative ways of funding institutions need to be explored to make agriculture institutions sustainable. A small percentage of money received from the sale of cash crops could be used as “check-off money” for research and extension efforts.*
7. *Agricultural education institutions could work with research agencies and NGOs to develop research and demonstration plots that directly address farmers’ needs.*

**Acknowledgements:** Thanks to Sulav Paudel, Research Associate for innovATE at Penn State for organizing this focus group and compiling this report.

innovATE is supported by a grant from USAID and managed by Virginia Tech's Office of International Research, Education, and Development (OIRE). This project was made possible by the United States Agency for International Development and the generous support of the American people through USAID Cooperative Agreement No. AID-OAA-L-12-00002.